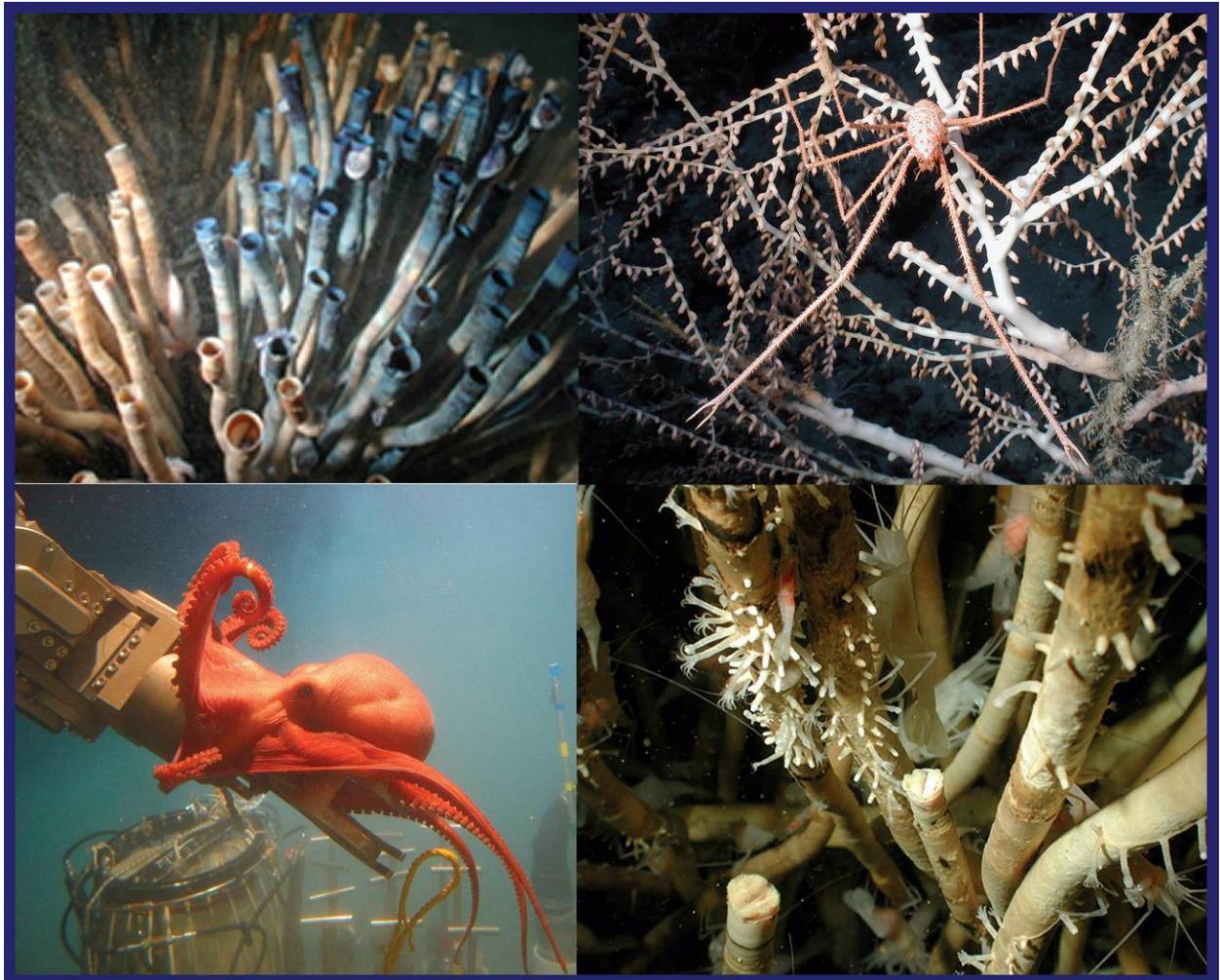


Investigations of Chemosynthetic Communities on the Lower Continental Slope of the Gulf of Mexico

Volume II: Appendices



Investigations of Chemosynthetic Communities on the Lower Continental Slope of the Gulf of Mexico

Volume II: Appendices

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Prepared under MMS Contract
M05PC00018 (1435-01-05-CT-39187)
by
TDI-Brooks International Inc.
1902 Pinon Drive
College Station, TX 77845

Published by

**U.S. Department of the Interior
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region**

**New Orleans
July 2014**

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REPORT AVAILABILITY

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CITATION

Brooks, J.M., C. Fisher, H. Roberts, B. Bernard, I. McDonald, R. Carney, S. Joye, E. Cordes, G. Wolff, E. Goehring. 2014. Investigations of chemosynthetic communities on the lower continental slope of the Gulf of Mexico: Volume II: Appendices. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study BOEM 2014-651. 442 pp.

COVER ART

Photographs from chemosynthetic communities visited during the program.

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APPENDIX 1. SAMPLES COLLECTED DURING *ATLANTIS*/*ALVIN* DIVES

Appendix 1. Samples Collected During ATLANTIS / ALVIN Dives.

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4173	AT 340	PSU	tubeworm genetics	x																		
4173	AT 340	PSU	tubeworm stable isotopes	x																		
4173	AT 340	PSU	tubeworm morphology	x																		
4173	AT 340	U. Austria	tubeworm symbionts	x																		
4173	AT 340	PSU	mussel genetics		x																	
4173	AT 340	PSU	mussel stable isotopes		x																	
4173	AT 340	PSU	mussel morphology		x																	

4173	AT 340	MPI Bremen	mussel symbionts		x																
4173	AT 340	PSU	clam genetics																		
4173	AT 340	PSU	clam stable isotopes																		
4173	AT 340	PSU	clam morphology																		
4173	AT 340	MPI Bremen	clam symbionts																		
4173	AT 340	PSU	macrofauna genetics																		
4173	AT 340	PSU	macrofauna stable isotopes																		

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4173	AT 340	PSU	macrofauna preserved				x															
4173	AT 340	U. Austria	meiofauna																			
4174	GC 600	PSU	tubeworm genetics	x																		
4174	GC 600	PSU	tubeworm stable isotopes	x																		
4174	GC 600	PSU	tubeworm morphology	x																		
4174	GC 600	U. Austria	tubeworm symbionts	x																		
4174	GC 600	PSU	mussel genetics					x														
4174	GC 600	PSU	mussel stable isotopes					x														
4174	GC 600	PSU	mussel morphology					x														
4174	GC 600	MPI Bremen	mussel symbionts																			
4174	GC 600	PSU	clam genetics																			
4174	GC 600	PSU	clam stable isotopes																			
4174	GC 600	PSU	clam morphology																			
4174	GC 600	MPI Bremen	clam symbionts																			
4174	GC 600	PSU	macrofauna genetics																			
4174	GC 600	PSU	macrofauna stable isotopes																			

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4174	GC 600	PSU	macrofauna preserved					x														
4174	GC 600	U. Austria	meiofauna				x															
4175	WR 269	PSU	tubeworm genetics						x													
4175	WR 269	PSU	tubeworm stable isotopes						x													
4175	WR 269	PSU	tubeworm morphology						x													
4175	WR 269	U. Austria	tubeworm symbionts						x													
4175	WR 269	PSU	mussel genetics																			
4175	WR 269	PSU	mussel stable isotopes																			
4175	WR 269	PSU	mussel morphology																			
4175	WR 269	MPI Bremen	mussel symbionts																			
4175	WR 269	PSU	clam genetics																			
4175	WR 269	PSU	clam stable isotopes																			
4175	WR 269	PSU	clam morphology																			
4175	WR 269	MPI Bremen	clam symbionts																			
4175	WR 269	PSU	macrofauna genetics																			
4175	WR 269	PSU	macrofauna stable isotopes						x													

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4175	WR 269	PSU	macrofauna preserved						x													
4175	WR 269	U. Austria	meiofauna																			
4176	KC 243	PSU	tubeworm genetics																			
4176	KC 243	PSU	tubeworm stable isotopes																			
4176	KC 243	PSU	tubeworm morphology																			
4176	KC 243	U. Austria	tubeworm symbionts																			
4176	KC 243	PSU	mussel genetics							x												
4176	KC 243	PSU	mussel stable isotopes							x												
4176	KC 243	PSU	mussel morphology							x												
4176	KC 243	MPI Bremen	mussel symbionts							x												
4176	KC 243	PSU	clam genetics																			
4176	KC 243	PSU	clam stable isotopes																			
4176	KC 243	PSU	clam morphology																			
4176	KC 243	MPI Bremen	clam symbionts																			
4176	KC 243	PSU	macrofauna genetics							x												
4176	KC 243	PSU	macrofauna stable isotopes							x												

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4176	KC 243	PSU	macrofauna preserved		x					x												
4176	KC 243	U. Austria	meiofauna							x												
4178	MC 853	PSU	tubeworm genetics																			
4178	MC 853	PSU	tubeworm stable isotopes																			
4178	MC 853	PSU	tubeworm morphology																			
4178	MC 853	U. Austria	tubeworm symbionts																			
4178	MC 853	PSU	mussel genetics							x												
4178	MC 853	PSU	mussel stable isotopes							x												
4178	MC 853	PSU	mussel morphology							x												
4178	MC 853	MPI Bremen	mussel symbionts							x												
4178	MC 853	PSU	clam genetics																			
4178	MC 853	PSU	clam stable isotopes		x																	
4178	MC 853	PSU	clam morphology		x																	
4178	MC 853	MPI Bremen	clam symbionts		x																	
4178	MC 853	PSU	macrofauna genetics		x			x	x	x												
4178	MC 853	PSU	macrofauna stable isotopes		x			x	x	x	x											

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4178	MC 853	PSU	macrofauna preserved		x			x	x	x	x											
4178	MC 853	U. Austria	meiofauna							x												
4179	AT 340	PSU	tubeworm genetics									x										
4179	AT 340	PSU	tubeworm stable isotopes									x										
4179	AT 340	PSU	tubeworm morphology									x										
4179	AT 340	U. Austria	tubeworm symbionts																			
4179	AT 340	PSU	mussel genetics		x																	
4179	AT 340	PSU	mussel stable isotopes		x																	
4179	AT 340	PSU	mussel morphology		x																	
4179	AT 340	MPI Bremen	mussel symbionts		x																	
4179	AT 340	PSU	clam genetics																			
4179	AT 340	PSU	clam stable isotopes																			
4179	AT 340	PSU	clam morphology																			
4179	AT 340	MPI Bremen	clam symbionts																			
4179	AT 340	PSU	macrofauna genetics		x				x			x										
4179	AT 340	PSU	macrofauna stable isotopes		x							x										

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4179	AT 340	PSU	macrofauna preserved		x				x			x										
4179	AT 340	U. Austria	meiofauna		x							x										
4180	AT 340	PSU	tubeworm genetics									x										
4180	AT 340	PSU	tubeworm stable isotopes									x										
4180	AT 340	PSU	tubeworm morphology									x										
4180	AT 340	U. Austria	tubeworm symbionts																			
4180	AT 340	PSU	mussel genetics		x																	
4180	AT 340	PSU	mussel stable isotopes		x																	
4180	AT 340	PSU	mussel morphology		x																	
4180	AT 340	MPI Bremen	mussel symbionts		x																	
4180	AT 340	PSU	clam genetics																			
4180	AT 340	PSU	clam stable isotopes																			
4180	AT 340	PSU	clam morphology																			
4180	AT 340	MPI Bremen	clam symbionts																			
4180	AT 340	PSU	macrofauna genetics		x							x										
4180	AT 340	PSU	macrofauna stable isotopes		x							x										

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4180	AT 340	PSU	macrofauna preserved		x							x										
4180	AT 340	U. Austria	meiofauna		x							x										
4181	AT 340	PSU	tubeworm genetics																			
4181	AT 340	PSU	tubeworm stable isotopes																			
4181	AT 340	PSU	tubeworm morphology																			
4181	AT 340	U. Austria	tubeworm symbionts																			
4181	AT 340	PSU	mussel genetics		x	x				x												
4181	AT 340	PSU	mussel stable isotopes		x	x				x												
4181	AT 340	PSU	mussel morphology		x	x				x												
4181	AT 340	MPI Bremen	mussel symbionts			x																
4181	AT 340	PSU	clam genetics																			
4181	AT 340	PSU	clam stable isotopes																			
4181	AT 340	PSU	clam morphology																			
4181	AT 340	MPI Bremen	clam symbionts																			
4181	AT 340	PSU	macrofauna genetics		x	x				x												
4181	AT 340	PSU	macrofauna stable isotopes		x	x				x												

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4181	AT 340	PSU	macrofauna preserved		x	x				x												
4181	AT 340	U. Austria	meiofauna		x	x				x												
4182	MC 640	PSU	tubeworm genetics																			
4182	MC 640	PSU	tubeworm stable isotopes																			
4182	MC 640	PSU	tubeworm morphology																			
4182	MC 640	U. Austria	tubeworm symbionts																			
4182	MC 640	PSU	mussel genetics		x	x				x												
4182	MC 640	PSU	mussel stable isotopes		x	x				x												
4182	MC 640	PSU	mussel morphology		x	x				x												
4182	MC 640	MPI Bremen	mussel symbionts			x																
4182	MC 640	PSU	clam genetics																			
4182	MC 640	PSU	clam stable isotopes																			
4182	MC 640	PSU	clam morphology																			
4182	MC 640	MPI Bremen	clam symbionts																			
4182	MC 640	PSU	macrofauna genetics		x	x				x												
4182	MC 640	PSU	macrofauna stable isotopes		x	x				x												

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4182	MC 640	PSU	macrofauna preserved		x	x		x		x			x									
4182	MC 640	U. Austria	meiofauna		x	x				x												
4183	AT 340	PSU	tubeworm genetics									x										
4183	AT 340	PSU	tubeworm stable isotopes									x										
4183	AT 340	PSU	tubeworm morphology									x										
4183	AT 340	U. Austria	tubeworm symbionts																			
4183	AT 340	PSU	mussel genetics																			
4183	AT 340	PSU	mussel stable isotopes																			
4183	AT 340	PSU	mussel morphology																			
4183	AT 340	MPI Bremen	mussel symbionts																			
4183	AT 340	PSU	clam genetics																			
4183	AT 340	PSU	clam stable isotopes																			
4183	AT 340	PSU	clam morphology																			
4183	AT 340	MPI Bremen	clam symbionts																			
4183	AT 340	PSU	macrofauna genetics						x			x										
4183	AT 340	PSU	macrofauna stable isotopes			x			x			x										

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B	
4183	AT 340	PSU	macrofauna preserved			x			x			x		x	x								
4183	AT 340	U. Austria	meiofauna									x		x	x								
4184	GC600	PSU	tubeworm genetics																				
4184	GC600	PSU	tubeworm stable isotopes																				
4184	GC600	PSU	tubeworm morphology																				
4184	GC600	U. Austria	tubeworm symbionts																				
4184	GC600	PSU	mussel genetics																				
4184	GC600	PSU	mussel stable isotopes																				
4184	GC600	PSU	mussel morphology																				
4184	GC600	MPI Bremen	mussel symbionts																				
4184	GC600	PSU	clam genetics													x							
4184	GC600	PSU	clam stable isotopes													x							
4184	GC600	PSU	clam morphology													x							
4184	GC600	MPI Bremen	clam symbionts																				
4184	GC600	PSU	macrofauna genetics					x	x														
4184	GC600	PSU	macrofauna stable isotopes					x	x							x							

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4184	GC600	PSU	macrofauna preserved					x	x							x						
4184	GC600	U. Austria	meiofauna													x						
4185	GC 852	PSU	tubeworm genetics																			
4185	GC 852	PSU	tubeworm stable isotopes																			
4185	GC 852	PSU	tubeworm morphology																			
4185	GC 852	U. Austria	tubeworm symbionts																			
4185	GC 852	PSU	mussel genetics																			
4185	GC 852	PSU	mussel stable isotopes																			
4185	GC 852	PSU	mussel morphology																			
4185	GC 852	MPI Bremen	mussel symbionts																			
4185	GC 852	PSU	clam genetics																			
4185	GC 852	PSU	clam stable isotopes																			
4185	GC 852	PSU	clam morphology																			
4185	GC 852	MPI Bremen	clam symbionts																			
4185	GC 852	PSU	coral preserved															x				
4185	GC 852	PSU	coral stable isotope															x				
4185	GC 852	USGS	coral genetics															x				

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4185	GC 852	PSU	macrofauna genetics					x														
4185	GC 852	PSU	macrofauna stable isotopes					x									x	x				
4185	GC 852	PSU	macrofauna preserved					x									x	x				
4185	GC 852	U. Austria	meiofauna																			
4186	GC 852	PSU	tubeworm genetics									x										
4186	GC 852	PSU	tubeworm stable isotopes									x										
4186	GC 852	PSU	tubeworm morphology									x										
4186	GC 852	U. Austria	tubeworm symbionts																			
4186	GC 852	PSU	mussel genetics							x												
4186	GC 852	PSU	mussel stable isotopes							x												
4186	GC 852	PSU	mussel morphology							x												
4186	GC 852	MPI Bremen	mussel symbionts																			
4186	GC 852	PSU	clam genetics																			
4186	GC 852	PSU	clam stable isotopes																			
4186	GC 852	PSU	clam morphology																			
4186	GC 852	MPI Bremen	clam symbionts																			

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4186	GC 852	PSU	coral preserved																			
4186	GC 852	PSU	coral stable isotope																			
4186	GC 852	USGS	coral genetics																			
4186	GC 852	PSU	macrofauna genetics						x	x		x										
4186	GC 852	PSU	macrofauna stable isotopes							x		x										
4186	GC 852	PSU	macrofauna preserved						x	x		x										
4186	GC 852	U. Austria	meiofauna							x		x										
4187	GC 852	PSU	tubeworm genetics									x										
4187	GC 852	PSU	tubeworm stable isotopes									x										
4187	GC 852	PSU	tubeworm morphology									x										
4187	GC 852	U. Austria	tubeworm symbionts																			
4187	GC 852	PSU	mussel genetics							x												
4187	GC 852	PSU	mussel stable isotopes							x												
4187	GC 852	PSU	mussel morphology		x					x												
4187	GC 852	MPI Bremen	mussel symbionts		x																	
4187	GC 852	PSU	clam genetics																			

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4187	GC 852	PSU	clam stable isotopes																			
4187	GC 852	PSU	clam morphology																			
4187	GC 852	MPI Bremen	clam symbionts																			
4187	GC 852	PSU	coral preserved																			
4187	GC 852	PSU	coral stable isotope																			
4187	GC 852	USGS	coral genetics																			
4187	GC 852	PSU	macrofauna genetics		x			x		x		x										
4187	GC 852	PSU	macrofauna stable isotopes		x					x		x										
4187	GC 852	PSU	macrofauna preserved		x			x		x		x										
4187	GC 852	U. Austria	meiofauna							x		x										
4188																						
4189	GC 852	PSU	tubeworm genetics																			
4189	GC 852	PSU	tubeworm stable isotopes																			
4189	GC 852	PSU	tubeworm morphology																			
4189	GC 852	U. Austria	tubeworm symbionts																			
4189	GC 852	PSU	mussel genetics																			

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4189	GC 852	PSU	mussel stable isotopes																			
4189	GC 852	PSU	mussel morphology																			
4189	GC 852	MPI Bremen	mussel symbionts																			
4189	GC 852	PSU	clam genetics																			
4189	GC 852	PSU	clam stable isotopes																			
4189	GC 852	PSU	clam morphology																			
4189	GC 852	MPI Bremen	clam symbionts																			
4189	GC 852	PSU	coral preserved															x				
4189	GC 852	PSU	coral stable isotope															x				
4189	GC 852	USGS	coral genetics															x				
4189	GC 852	PSU	macrofauna genetics															x				
4189	GC 852	PSU	macrofauna stable isotopes															x				
4189	GC 852	PSU	macrofauna preserved															x				
4189	GC 852	U. Austria	meiofauna															x				
4190	GC 852	PSU	tubeworm genetics																			
4190	GC 852	PSU	tubeworm stable isotopes																			

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4190	GC 852	PSU	tubeworm morphology																			
4190	GC 852	U. Austria	tubeworm symbionts																			
4190	GC 852	PSU	mussel genetics																			
4190	GC 852	PSU	mussel stable isotopes																			
4190	GC 852	PSU	mussel morphology																			
4190	GC 852	MPI Bremen	mussel symbionts																			
4190	GC 852	PSU	clam genetics																			
4190	GC 852	PSU	clam stable isotopes																			
4190	GC 852	PSU	clam morphology																			
4190	GC 852	MPI Bremen	clam symbionts																			
4190	GC 852	PSU	coral preserved															x				
4190	GC 852	PSU	coral stable isotope															x				
4190	GC 852	USGS	coral genetics															x				
4190	GC 852	PSU	macrofauna genetics															x				
4190	GC 852	PSU	macrofauna stable isotopes															x				
4190	GC 852	PSU	macrofauna preserved															x				
4190	GC 852	U. Austria	meiofauna															x				

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4191	WR 269	PSU	tubeworm genetics	x															x			
4191	WR 269	PSU	tubeworm stable isotopes	x															x			
4191	WR 269	PSU	tubeworm morphology	x															x			
4191	WR 269	U. Austria	tubeworm symbionts																x			
4191	WR 269	PSU	mussel genetics		x					x												
4191	WR 269	PSU	mussel stable isotopes							x												
4191	WR 269	PSU	mussel morphology							x												
4191	WR 269	MPI Bremen	mussel symbionts		x																	
4191	WR 269	PSU	clam genetics																			
4191	WR 269	PSU	clam stable isotopes																			
4191	WR 269	PSU	clam morphology																			
4191	WR 269	MPI Bremen	clam symbionts																			
4191	WR 269	PSU	coral preserved																			
4191	WR 269	PSU	coral stable isotope																			
4191	WR 269	USGS	coral genetics																			
4191	WR 269	PSU	macrofauna genetics	x	x					x									x			

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4191	WR 269	PSU	macrofauna stable isotopes	x	x					x									x			
4191	WR 269	PSU	macrofauna preserved	x	x					x									x			
4191	WR 269	U. Austria	meiofauna							x									x			
4192	AC 818	PSU	tubeworm genetics	x																		
4192	AC 818	PSU	tubeworm stable isotopes	x																		
4192	AC 818	PSU	tubeworm morphology	x																		
4192	AC 818	U. Austria	tubeworm symbionts	x																		
4192	AC 818	PSU	mussel genetics							x												
4192	AC 818	PSU	mussel stable isotopes							x												
4192	AC 818	PSU	mussel morphology							x												
4192	AC 818	MPI Bremen	mussel symbionts		x																	
4192	AC 818	PSU	clam genetics																			
4192	AC 818	PSU	clam stable isotopes																			
4192	AC 818	PSU	clam morphology																			
4192	AC 818	MPI Bremen	clam symbionts																			
4192	AC 818	PSU	coral preserved																			

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4192	AC 818	PSU	coral stable isotope																			
4192	AC 818	USGS	coral genetics																			
4192	AC 818	PSU	macrofauna genetics	x	x					x												
4192	AC 818	PSU	macrofauna stable isotopes	x	x					x												
4192	AC 818	PSU	macrofauna preserved	x	x					x												
4192	AC 818	U. Austria	meiofauna							x												
4193	AC601	PSU	tubeworm genetics	x																		
4193	AC601	PSU	tubeworm stable isotopes	x																		
4193	AC601	PSU	tubeworm morphology	x																		
4193	AC601	U. Austria	tubeworm symbionts																			
4193	AC601	PSU	mussel genetics		x																	
4193	AC601	PSU	mussel stable isotopes		x																	
4193	AC601	PSU	mussel morphology		x																	
4193	AC601	MPI Bremen	mussel symbionts		x																	
4193	AC601	PSU	clam genetics																			
4193	AC601	PSU	clam stable isotopes																			

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4193	AC601	PSU	clam morphology																			
4193	AC601	MPI Bremen	clam symbionts																			
4193	AC601	PSU	coral preserved																			
4193	AC601	PSU	coral stable isotope																			
4193	AC601	USGS	coral genetics																			
4193	AC601	PSU	macrofauna genetics		x			x														
4193	AC601	PSU	macrofauna stable isotopes		x																	
4193	AC601	PSU	macrofauna preserved	x	x			x														
4193	AC601	U. Austria	meiofauna																			
4194	AC 645	PSU	tubeworm genetics	x																		
4194	AC 645	PSU	tubeworm stable isotopes	x																		
4194	AC 645	PSU	tubeworm morphology	x																		
4194	AC 645	U. Austria	tubeworm symbionts																			
4194	AC 645	PSU	mussel genetics																		x	
4194	AC 645	PSU	mussel stable isotopes																		x	
4194	AC 645	PSU	mussel morphology																		x	

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4194	AC 645	MPI Bremen	mussel symbionts																			
4194	AC 645	PSU	clam genetics																			
4194	AC 645	PSU	clam stable isotopes																			
4194	AC 645	PSU	clam morphology																			
4194	AC 645	MPI Bremen	clam symbionts																			
4194	AC 645	PSU	coral preserved																			
4194	AC 645	PSU	coral stable isotope																			
4194	AC 645	USGS	coral genetics																			
4194	AC 645	PSU	macrofauna genetics	x				x												x	x	
4194	AC 645	PSU	macrofauna stable isotopes	x				x												x	x	
4194	AC 645	PSU	macrofauna preserved	x				x												x	x	
4194	AC 645	U. Austria	meiofauna																	x	x	
4195	AC 818	PSU	tubeworm genetics									x										
4195	AC 818	PSU	tubeworm stable isotopes									x										
4195	AC 818	PSU	tubeworm morphology									x										
4195	AC 818	U. Austria	tubeworm symbionts																			

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4195	AC 818	PSU	mussel genetics			x																
4195	AC 818	PSU	mussel stable isotopes			x																
4195	AC 818	PSU	mussel morphology			x																
4195	AC 818	MPI Bremen	mussel symbionts			x																
4195	AC 818	PSU	clam genetics																			
4195	AC 818	PSU	clam stable isotopes																			
4195	AC 818	PSU	clam morphology																			
4195	AC 818	MPI Bremen	clam symbionts																			
4195	AC 818	PSU	coral preserved																			
4195	AC 818	PSU	coral stable isotope																			
4195	AC 818	USGS	coral genetics																			
4195	AC 818	PSU	macrofauna genetics			x		x				x										
4195	AC 818	PSU	macrofauna stable isotopes			x		x				x										
4195	AC 818	PSU	macrofauna preserved			x		x				x										
4195	AC 818	U. Austria	meiofauna									x										
4196	AC 601	PSU	tubeworm genetics									x										

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4196	AC 601	PSU	tubeworm stable isotopes									x										
4196	AC 601	PSU	tubeworm morphology									x										
4196	AC 601	U. Austria	tubeworm symbionts																			
4196	AC 601	PSU	mussel genetics		x																	
4196	AC 601	PSU	mussel stable isotopes		x																	
4196	AC 601	PSU	mussel morphology																			
4196	AC 601	MPI Bremen	mussel symbionts																			
4196	AC 601	PSU	clam genetics																			
4196	AC 601	PSU	clam stable isotopes																			
4196	AC 601	PSU	clam morphology																			
4196	AC 601	MPI Bremen	clam symbionts																			
4196	AC 601	PSU	coral preserved																			
4196	AC 601	PSU	coral stable isotope																			
4196	AC 601	USGS	coral genetics																			
4196	AC 601	PSU	macrofauna genetics		x			x				x										
4196	AC 601	PSU	macrofauna stable isotopes		x							x										

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biohox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4196	AC 601	PSU	macrofauna preserved		x			x				x										
4196	AC 601	U. Austria	meiofauna									x										
4197	AC 645	PSU	tubeworm genetics		x																	
4197	AC 645	PSU	tubeworm stable isotopes		x																	
4197	AC 645	PSU	tubeworm morphology		x																	
4197	AC 645	U. Austria	tubeworm symbionts																			
4197	AC 645	PSU	mussel genetics		x															x		x
4197	AC 645	PSU	mussel stable isotopes		x															x		x
4197	AC 645	PSU	mussel morphology		x															x		x
4197	AC 645	MPI Bremen	mussel symbionts		x																	x
4197	AC 645	PSU	clam genetics																			
4197	AC 645	PSU	clam stable isotopes																			
4197	AC 645	PSU	clam morphology																			
4197	AC 645	MPI Bremen	clam symbionts																			
4197	AC 645	PSU	coral preserved																			
4197	AC 645	PSU	coral stable isotope																			
4197	AC 645	USGS	coral genetics																			

Dive	Site	Lab	Sample Type	tubeworm grab	mussel scoop	mussel scoop 2	biobox	rock grab	slurp	mussel pot 1	mussel pot 2	bushmaster	core R4	core Y4	core R1	clam scoop	crab grab	coral grab	push cores	mussel pot A	mussel pot D	mussel pot B
4197	AC 645	PSU	macrofauna genetics		x															x		x
4197	AC 645	PSU	macrofauna stable isotopes		x															x		x
4197	AC 645	PSU	macrofauna preserved		x			x												x		x
4197	AC 645	U. Austria	meiofauna																	x		x

APPENDIX 2. ISMS COLLECTION SITES

ISMS Collection Sites

All values from virtual van (lat/long, temp, etc) are from "start" event

	--> Significant signal, solid quantification
	--> Significant signal, BINARY quantification
	--> oil contamination, questionable sulfide data
	--> white cells are good quantifiable data, but may not have alkane or sulfide hits. See notes

Date	Position	Page(s) In Original Log	Spectra Starting Time (GMT)	Virtual Van Event(s)	Latitude	Longitude	Temp (C)	Depth (m)	pH	Conduct.	Excel file name	Workup	Nature of Data	Quick Explanation (if needed)	Comments
June 4-10		5-6												Beginning of Gernot's data. Setup and calibration of mass spec	
June 11	N/A	6-7	22:27:23	starts -7347	28 29.661 N	88 52.772 W	5.369	924.22		3.415	June_11_Dive.xlsx	Done	Raw	Very flat and consistent readings	(Gernot) 21:20 on the way down, power up MS. 21:22 power up turbo @ 42k RPM ~ 300ma... 22:40 on bottom, the 55-58 peaks are slowly going away. 22:55 turbo ~ 250ma, 23:20 shut down MS & turbo
June 12	N/A	7-9	4:04:25	starts -8223, note events 8424, 8464	28 29.683 N	88 52.894 W	5.240	968.12		3.405	June_12_Dive.xlsx	Done	Raw	Strong methane and butane peaks (near methane hydrate) at event 8464, otherwise relatively consistent	(Gernot) Power up MS... CO2 peak slowly going down... 5:46 15 peak going up sitting above hydrate, 5:52 high methane and propane peaks... 6:20 CH4 signal gone, propane/butane signal still there. (Virtual Van) 8464 EVT Mspec start methane seems to be going off
June 13	N/A	10	0:45:24	starts -9355	27 31.705 N	90 59.789 W	5.152	979.86		3.399	June_13_Dive_A.xlsx	Done	Raw	Some variation but no strong spikes. One propane/ethane spike around 2:30	(Gernot) There is a difference in response. N2 and O2 peaks are larger than yesterday. 15 peak slowly going down. Other background peaks slowly going down. Surveying several meters off the bottom, doing occasional scan
**	N/A	10	8:11:55	starts -10307, note events 10336, 10361	27 32.430 N	90 59.274 W	4.913	1032.23		3.380	June_13_Dive_BC.xlsx	Done	Raw	very strong spike of CH4, H2S, and several other gasses of interest (event 10336). Reference gasses also appear to be unstable... Otherwise, relatively consistent readings	(Virtual Van) 10336 EVT MSpec start ignore earlier mass spec start. (Scott) Reading inside corehole through hydrate?
June 14-15		11-12												Mass spec repairs + calibration, pH calibration	
June 16	N/A	12-13	5:17:10	only logged as of 15705 (06:08:29 GMT)	27 17.018 N	92 6.711 W	4.459	1274.45		3.351	June_16_Dive.xls	Done	Raw	relatively flat, uninteresting. Consistent issues with mass spec during the course of the day	(Gernot) Lost communication with turbo but appears to be running ok... 06:10 reach bottom mass 15 ~ 2.3x10-9... 06:28 mass 15 2.1x10-9...
June 17-22		14-20												Beginning of Pete's data. Mass spec repairs, rewiring, and calibration	
June 23	N/A	21-22	6:17:24	only logged as of 29033 (07:00:27 GMT)	27 6.086 N	91 10.200 W	4.285	1388.59		3.342	June_23_Dive_A.xlsx	Done	Raw	Begins with descent of mass spec, then readings from stable position at bottom. Very flat readings.	(Pete) 628 (Scan 25) @ 191 meters... 629 (scan 30) @ 266.4 meters, etc
June 23	N/A	None	8:31:02	starts -29230	27 6.602 N	91 9.967 W	4.277	1397.38		3.340	June_23_Dive_B.xlsx	Done	Raw	Flat	None
June 23	N/A	None	11:20:41	starts -29592	27 6.611 N	91 9.982 W	4.276	1398.35		3.341	June_23_Dive_C.xlsx	Done	Raw	*	*
June 23	1	22	13:40:15	29719	27 6.655 N	91 9.925 W	4.273	1405.34		3.341	June_23_Dive_DE.xlsx	Done	Background Scans		*
June 23	2	22-23	13:47:37	29737	27 6.655 N	91 9.925 W	4.274	1405.89		3.341	June_23_Dive_DE.xlsx	Done	Background Subtraction		(Pete) Small group of 5 mussels... not very active, at navigation marker #2. Intermittent methane hits
June 23	3	23	13:54:54	29755	27 6.656 N	91 9.926 W	4.275	1405.93		3.341	June_23_Dive_DE.xlsx	Done	Background Subtraction		(Pete) Sampling the same crappy mussel patch for chemistry. Scan ~20, intermittent CH4 hits @ ca. 1e-8 / 5e-9
June 23	4	23	14:12:33	29795	27 6.660 N	91 9.917 W	4.266	1406.76		3.340	June_23_Dive_DE.xlsx	Done	Background Subtraction		(Pete) Wand in nice batch of mussels
June 23	5	23-24	14:20:31	29797	27 6.656 N	91 9.920 W	4.267	1406.75		3.340	June_23_Dive_DE.xlsx	Done	Background Subtraction		(Pete) In small mussel patch seeing intermittent CH4 on scan 31... scan 36... getting CH4 + propane hits on scan 2-4
June 23	6	24	14:32:23	29804	27 6.646 N	91 9.934 W	4.265	1406.76		3.340	June_23_Dive_F.xlsx	Done	Raw		(Pete) Again seeing intermittent CH4 but no H2S through scan 23
June 23	7	24	14:42:15	29807	27 6.659 N	91 9.918 W	4.272	1406.76		3.341	June_23_Dive_F.xlsx	Done	Background Scans		(Pete) Background scans in H2O
June 23	8	24	15:00:42	29832	27 6.663 N	91 9.917 W	4.268	1406.18		3.340	June_23_Dive_F.xlsx	Done	Background Subtraction		(Pete) Still not seeing lots of sulfide
June 23	9	24-25	15:18:13	29871	27 6.663 N	91 9.920 W	4.267	1406.16		3.341	June_23_Dive_F.xlsx	Done	Background Subtraction		(Pete) Taking more samples near sulfide mussels... seeing ethane, maybe sulfide hits around scan 15-19

ISMS Collection Sites

All values from virtual van (lat/long, temp, etc) are from "start" event

	--> Significant signal, solid quantification
	--> Significant signal, BINARY quantification
	--> oil contamination, questionable sulfide data
	--> white cells are good quantifiable data, but may not have alkane or sulfide hits. See notes

Date	Position	Page(s) in Original Log	Spectra Starting Time (GMT)	Virtual Van Event(s)	Latitude	Longitude	Temp (C)	Depth (m)	pH	Conduct.	Excel file name	Workup	Nature of Data	Quick Explanation (if needed)	Comments
June 23	10	25	15:35:05	29906	27 6.686 N	91 9.914 W	4.270	1406.14		3.341	June_23_Dive_F.xlsx	Done	Background Subtraction		(Pete) microbial mat... check out scan 5 for sulfide, scan 11 for methane?
June 23	11	25	15:45:44	29930	27 6.660 N	91 9.923 W	4.273	1406.14		3.341	June_23_Dive_F.xlsx	Done	Background Subtraction		(Pete) Moved to a juicy mussel clump.... Resetting to collect a good mussel pot
June 23	N/A	None	15:57:21	starts ~29956	27 6.654 N	91 9.922 W	4.272	1406.14		3.341	June_23_Dive_G.xlsx	Done	Background Subtraction and Background Scans	Misc. Data (transiting?), seems flat	
June 23	12	25	17:11:10	30104	27 6.670 N	91 9.918 W	4.308	1406.61		3.344	June_23_Dive_H.xlsx	Done	Background Scans		(Pete) Changed the baseline bigtime, going to do more background scans
June 23	13	25-26	17:20:23	30112	27 6.691 N	91 9.900 W	4.271	1406.61		3.341	June_23_Dive_H.xlsx	Done	Raw		(Pete) in the top of a mussel clump
June 23	14	26	17:37:23	30116	27 6.697 N	91 9.890 W	4.278	1406.61		3.342	June_23_Dive_H.xlsx	Done	Background Scans that are also subtraction (???)	very strange readings (see difference graph in Excel file). Seems flawed	(Pete) This is a background sea H2O scan
June 23	15	26	17:40:10	30118	27 6.670 N	91 9.887 W	4.270	1406.61		3.341	June_23_Dive_H.xlsx	Done	Background Subtraction	very strange readings (see difference graph in Excel file). Seems flawed	(Pete) inside of mussels... not the top of Me mus
June 23	16	26	17:52:47	30122	27 6.734 N	91 9.856 W	4.271	1406.59		3.341	June_23_Dive_H.xlsx	Done	Raw		(Pete) we have positioned the probe tip in the midst of mussels... no white
June 23	17	26-27	18:08:18	30136	27 6.751 N	91 9.845 W	4.269	1406.62		3.341	June_23_Dive_H.xlsx	Done	Raw		(Pete) moved wand to another point in the clump... seeing both CH4 and H2S in these H2O samples... both B. Brooki and childressi are here...
June 23	18	27	18:34:54	30140	27 6.790 N	91 9.829 W	4.269	1406.61		3.340	June_23_Dive_H.xlsx	Done	Background Scans		(Pete) seawater control
June 23	N/A	None	18:35:58	starts ~30142	27 6.687 N	91 9.904 W	4.274	1406.61		3.342	June_23_Dive_I.xlsx	Done	Raw	Transit data. Flat.	
June 23	20	27-28	20:03:29	30414	27 6.668 N	91 9.920 W	4.272	1406.70		3.341	June_23_Dive_J.xlsx	Done	Raw		(Pete) The basement under the mussels... scan 11 shows signs of higher hydrocarbons as well as CH4 at mass 12... scans 22-23 shows higher hydrocarbons, some CH4 + a little sulfide...
June 23	21	28	20:20:00	30450	27 6.669 N	91 9.920 W	4.266	1406.66		3.340	June_23_Dive_J.xlsx	Done	Raw		(Pete) [sampling] near basement of carbonate where mussels were collected... VERY NICE hydrocarbons + methane + sulfide. AWESOME
June 23	22	28	21:07:33	30536	27 6.651 N	91 9.922 W	4.265	1405.51		3.340	June_23_Dive_J.xlsx	Done	Raw		(?) Brown mussels, base of rock near sedimen
June 23	23	28	21:22:04	30538	27 6.651 N	91 9.922 W	4.269	1405.51		3.340	June_23_Dive_J.xlsx	Done	Raw		(Pete) [some] H2S, maybe alkanes; not a lot of C
June 23	24	28-29	21:37:11	30540	27 6.651 N	91 9.922 W	4.267	1405.50		3.340	June_23_Dive_J.xlsx	Done	Raw		(Pete) same mussel clump, just off to the side; seems far more seawater-like... getting minor whiffs of sulfide... no apparent CH4
June 23	25	29	21:54:57	30542	27 6.651 N	91 9.922 W	4.268	1405.49		3.340	June_23_Dive_J.xlsx	Done	Raw		(Pete) Positioned top near tubeworm... getting more minor sulfide hits; no signs of hydrocarbons... still getting small sulfide hits. This is a good looking site, small but healthy, think moderate sulfide...
June 23	26	29	22:44:04	30584	27 6.652 N	91 9.919 W	4.265	1405.71		3.341	June_23_Dive_J.xlsx	Done	Raw		(Pete) Positioning probe on mussel flange; very young mussels... starting sucking on mussel beds... no obvious methane
June 23	27	29-30	23:04:13	30627	27 6.652 N	91 9.919 W	4.267	1405.69		3.340	June_23_Dive_J.xlsx	Done	Raw		(Pete) Trying to get under mussel beds... WOW position 27 was awesome... CH4, H2S, alkanes
June 23	28	30	23:27:13	30675	27 6.652 N	91 9.919 W	4.271	1405.68		3.341	June_23_Dive_J.xlsx	Done	Raw		(Pete) probe near baby mussels on upper right hand side pumping to flush now
June 23	29	30	23:48:25	30720	27 6.652 N	91 9.919 W	4.268	1405.72		3.340	June_23_Dive_J.xlsx	Done	Raw		(Pete) setting up on far right side of the flange... not so good on the gasses
June 24	N/A	None	0:51:22	30854	27 6.652 N	91 9.919 W	4.266	1405.70		3.340	June_24_Dive_A.xlsx	Done	Raw	Transit data	
June 24	30	30	1:14:35	30901	27 6.658 N	91 9.921 W	4.267	1405.85		3.340	June_24_Dive_A.xlsx	Done	Background Scans		(Pete) seawater control
June 24	31	30	1:29:21	30919	27 6.658 N	91 9.921 W	4.265	1405.87		3.340	June_24_Dive_A.xlsx	Done	Raw		(Pete) sampling underneath black mussels...
June 24	32	31	1:44:43	30934	27 6.658 N	91 9.921 W	4.265	1405.88		3.340	June_24_Dive_A.xlsx	Done	Raw		(Pete) sampling seawater now...
June 24	33	31	2:03:01	30960	27 6.658 N	91 9.921 W	4.264	1405.89		3.340	June_24_Dive_A.xlsx	Done	Raw		(Pete) sampling under mussels... getting sulfide hits here; maybe some CH4? But not really high...
June 24	34	31	2:20:29	30971	27 6.659 N	91 9.921 W	4.277	1405.93		3.342	June_24_Dive_A.xlsx	Done	Raw		(Pete) B. Childressi (?) mussels; small clump
June 24	35	31-32	12:28:52	32238	27 6.369 N	91 9.953 W	4.267	1409.34		3.340	June_24_Dive_B.xlsx	Done	Background Scans		(Pete) Background seawater

ISMS Collection Sites

All values from virtual van (lat/long, temp, etc) are from "start" event

	--> Significant signal, solid quantification
	--> Significant signal, BINARY quantification
	--> oil contamination, questionable sulfide data
	--> white cells are good quantifiable data, but may not have alkane or sulfide hits. See notes

Date	Position	Page(s) in Original Log	Spectra Starting Time (GMT)	Virtual Van Event(s)	Latitude	Longitude	Temp (C)	Depth (m)	pH	Conduct.	Excel file name	Workup	Nature of Data	Quick Explanation (if needed)	Comments
June 24	36	32	12:46:15	32274	27 6.370 N	91 9.953 W	4.277	1409.20		3.341	June_24_Dive_B.xlsx	Done	Raw		(Pete) this position is H2O being sampled from inside a blue stained tubeworm tube! Very cool... so far no difference from background no sulfide even from within the tube... but a little less O2
June 24	37	32	13:00:49	32306	27 6.370 N	91 9.953 W	4.272	1409.23		3.341	June_24_Dive_B.xlsx	Done	Raw		(Pete) taking waters from the base of the tubeworms, underneath the carbonate... ISMS reads a little higher CO2 in porewater... higher O2 than the tubeworm tube
June 24	38	32	14:11:58	32442	27 6.380 N	91 9.953 W	4.258	1407.95		3.340	June_24_Dive_B.xlsx	Done	Raw		(Pete) underneath mussel clump... so far looks like seawater
June 24	39	33	14:23:40	32450	27 6.379 N	91 9.953 W	4.259	1407.93		3.340	June_24_Dive_B.xlsx	Done	Raw		(Pete) moved tip two mussels over; just seawater-like... pretty damn sure it's just seawater
June 24	40	33	14:30:51	32462	27 6.380 N	91 9.953 W	4.258	1407.94		3.340	June_24_Dive_B.xlsx	Done	Raw		(Pete) good insertion between mussels... getting a little sniff of sulfide... See hits @ mass 33 + slight increases @ mass 34 around scan 5-6... Still seeing very minor sulfide hits @ mass 33 (see scan 25)
June 24	41	33	14:45:08	32465	27 6.380 N	91 9.953 W	4.274	1407.93		3.341	June_24_Dive_B.xlsx	Done	Raw		(Pete) another sniff of mussels... again little whiffs of H2S (mass 33; scan 7-9), little tiny methane hit @ 15 (scan 10); sulfide (scan 15); scan 23
June 25	42	34	15:19:40	33420	27 11.153 N	92 7.508 W	4.385	1257.93		3.344	June_25_Dive.xlsx	Done	Raw		(Pete) this position is within the mussels; not so sure about the spectra... did have ^CH4, some alkanes
June 25	43	34	15:44:09	33472	27 11.152 N	92 7.510 W	4.437	1257.92		3.347	June_25_Dive.xlsx	Done	Raw		(Pete) within mussel patch... methane dropping off, seems lower methane @ this point.
June 25	44	35	15:58:27	33504	27 11.152 N	92 7.510 W	4.446	1257.87		3.348	June_25_Dive.xlsx	Done	Raw	Also increase in H2 gas.	(Pete) still within big mussel field... small methane hits @ this site; small increases in CO2; no obvious H2S hits on ISMS... methane hits increasing
June 25	45	35	16:16:41	33542	27 11.155 N	92 7.508 W	4.424	1257.84		3.347	June_25_Dive.xlsx	Done	Raw		(Pete) more mussel scanning; the probe is inserted into mussel bed; CH4 hits, no obvious sulfide
June 25	46	35	16:30:53	33572	27 11.155 N	92 7.509 W	4.418	1257.82		3.347	June_25_Dive.xlsx	Done	Raw		(Pete) small increases in CH4 @ mass 15; sulfide hits @ 36. This head appears to be less reactive than the previous head
June 26-27		37												Beginning of Suni's data. Mass spec filament repairs.	
June 28	47	37	21:30:17	38007	26 21.254 N	94 29.830 W	4.270	2190.83		3.374	June_28_Dive.xlsx	Done	Raw		(Suni) Test of MS away from anything... 7.0 meters above bottom
June 29	48	38	1:04:34	38465	26 21.257 N	94 29.834 W	4.272	2195.89		3.374	June_28_Dive.xlsx	Done	Raw	(Suni)	site of white worm... sniffer end ~1 cm above
June 29	49	38	1:24:30	38508	26 21.278 N	94 29.847 W	4.271	2195.92		3.374	June_28_Dive.xlsx	Done	Raw		(Suni) no H2S? or mass 15 (CH4)
June 29	50	38	1:45:29	38552	26 21.296 N	94 29.853 W	4.268	2195.93		3.374	June_28_Dive.xlsx	Done	Raw		(Suni) Black 23 WS
June 29	51	38	2:07:15	38597	26 21.334 N	94 29.849 W	4.267	2195.93		3.374	June_28_Dive.xlsx	Done	Raw		(Suni) pushed sniffer in closer to edge of clump & straight down so that we can estimate where sediment is.
June 29	52	38	2:26:00	38637	26 21.349 N	94 29.851 W	4.267	2195.96		3.374	June_28_Dive.xlsx	Done	Raw	(Suni)	near tube #3, below tube ends, near sediment
June 29	53	39	3:01:00	38711	26 21.365 N	94 29.859 W	4.267	2195.99		3.374	June_28_Dive.xlsx	Done	Raw	(Suni)	close to opening of Red 47 (near marker)
June 29	54	39	3:20:06	38751	26 21.365 N	94 29.858 W	4.268	2195.97		3.374	June_28_Dive.xlsx	Done	Raw	(Suni)	close to base of tubeworms
June 29	55	39	4:11:44	39091	26 21.249 N	94 29.836 W	4.268	2193.27		3.373	June_28_Dive.xlsx	Done	Raw	(Suni)	white 4 [?], close to marker A
June 29	56	39	4:33:43	39137	26 21.248 N	94 29.836 W	4.267	2193.34		3.373	June_28_Dive.xlsx	Done	Raw	(Suni)	tip of red worm near marker A
June 29	57	39	4:50:52	39174	26 21.251 N	94 29.836 W	4.268	2193.32		3.373	June_28_Dive.xlsx	Done	Raw	(Suni)	base of the two previous worms
June 29	58	39	6:05:03	39336	26 21.252 N	94 29.833 W	4.268	2194.33		3.373	June_28_Dive.xlsx	Done	Raw	(Suni)	close to marker 10 - worm white #2 WP (li
June 29	59	39	6:19:09	39366	26 21.254 N	94 29.831 W	4.266	2194.60		3.373	June_28_Dive.xlsx	Done	Raw	(Suni)	close to marker 10 - worm black tag (dea
June 29	60	40	6:37:57	39408	26 21.256 N	94 29.820 W	4.268	2194.64		3.373	Data Missing	N/A	N/A	(Suni)	Base of the two previous worms. Close to mussels (all dead?)
June 29	61	40	13:09:58	40354	26 21.255 N	94 29.835 W	4.272	2197.15		3.374	June_29_Dive.xlsx	Done	Background Scans	Oil contamination appears to begin here [?]	(Suni) start background scans ~2m above mussel pots... possibly some SO2 & CH4? Appears to be a lot @ high mw (50-59) various hydrocarbon? Incl. oil?

ISMS Collection Sites

All values from virtual van (lat/long, temp, etc) are from "start" event

	--> Significant signal, solid quantification
	--> Significant signal, BINARY quantification
	--> oil contamination, questionable sulfide data
	--> white cells are good quantifiable data, but may not have alkane or sulfide hits. See notes

Date	Position	Page(s) in Original Log	Spectra Starting Time (GMT)	Virtual Van Event(s)	Latitude	Longitude	Temp (C)	Depth (m)	pH	Conduct.	Excel file name	Workup	Nature of Data	Quick Explanation (if needed)	Comments
June 29	62	40	13:30:22	40397	26 21.255 N	94 29.826 W	4.274	2197.13		3.374	June_29_Dive.xlsx	Done	Raw		(Suni) pushed sniffer into mound of mussels (covered in thin layer of white stuff) just far enough that the tip disappears... appears to be the same as background (water column) scans (again, lots of hydrocarbon)
June 29	63	40	13:50:38	40443	26 21.253 N	94 29.813 W	4.276	2197.13		3.374	June_29_Dive.xlsx	Done	Raw		(Suni) moved sniffer over slightly & into some more mussels... similar to previous mussels, + bigger peaks @ 63, 64, 65
June 29	64	40	14:08:47	40482	26 21.245 N	94 29.813 W	4.274	2197.11		3.374	June_29_Dive.xlsx	Done	Raw		(Suni) move to a new location but close by... signal is not changing -- maybe clogged, stop & change valves
June 29	65	41	14:27:21	40523	26 21.242 N	94 29.813 W	4.272	2197.11		3.374	June_29_Dive.xlsx	Done	Raw		(Suni) replace sniffer approximately where it was (ahead of white stuff)... start scan, looks the same -- clogged? stop scan (didn't do full scan)
June 29	66	41	17:47:17	40967	26 21.253 N	94 29.830 W	4.270	2196.83		3.374	June_29_Dive.xlsx	Done	Raw		(Suni) start scan, same as before - leave it running while putting wand back... no change (slight decrease in hydrocarbons)
June 30	67	42	13:00:27	41747	26 10.461 N	94 37.458 W	7.590	573.14		3.616	June_30_Dive.xlsx	Done	Raw		(Suni) start scanning 400m. Scanning on the way down... end depth calibration 2710m, filament off
July 1	68	42	3:01:12	43240	26 10.852 N	94 37.380 W	4.313	2744.01		3.399	July_01_Dive_AB.xlsx	Done	Background Scans		(Suni) approx 1m above mussel pile... background scan... these mussels have white film (biofilm) whose presence is correlating w/ sulfide => expect to see methane & sulfide
July 1	69	42	3:18:24	43248	26 10.867 N	94 37.398 W	4.312	2744.01		3.399	July_01_Dive_AB.xlsx	Done	Raw		(Suni) Nose pushed into mussel bed... no significant change from background. (Virtual Van) close to mussels with white stain
July 1	70	42	3:44:32	43254	26 10.863 N	94 37.471 W	4.311	2744.01		3.399	July_01_Dive_AB.xlsx	Done	Raw		(Suni) nearby mussel site. (Virtual Van) among mussels with white stain
July 1	71	43	4:40:23	43270	26 10.894 N	94 37.522 W	4.311	2744.16		3.399	July_01_Dive_AB.xlsx	Done	Raw		(Suni) start mussels (white mussels sampled @ this location). In mussel pot scan 35 minutes... w/in .5cm from mud, no different from background scan
July 1	72	43	5:17:11	43273	26 10.885 N	94 37.377 W	4.311	2744.76		3.399	July_01_Dive_AB.xlsx	Done	Raw		(Suni) moved to a patch of brown mussels not far away... stop scan - realized it was in the mud, switched to filter tip, replaced wand
July 1	73	43	5:29:38	43279	26 10.868 N	94 37.407 W	4.311	2744.74		3.399	July_01_Dive_AB.xlsx	Done	Raw		(Suni) looks identical to previous scans... stop scan (no reason to do another)
July 1	74	43	6:23:49	43573	26 10.833 N	94 37.480 W	4.313	2744.70		3.400	July_01_Dive_CDE.xlsx	Done	Raw		(Suni) inside mussel pot ~1 cm from mud... (expect CH4, H2S), No m/z 15, maybe some m/z 34?
July 1	75	43	6:43:39	43616	26 10.858 N	94 37.486 W	4.312	2744.72		3.400	July_01_Dive_CDE.xlsx	Done	Background Scans		(Suni) lift arm up 1m for background scan
July 1	76	43-44	7:36:19	43727	26 10.843 N	94 37.375 W	4.311	2743.51		3.399	July_01_Dive_CDE.xlsx	Done	Background Scans		(Suni) background scan while maneuvering to start coring... looks the same as all the others
July 1	77	44	8:10:44	43790	26 10.841 N	94 37.365 W	4.315	2745.34		3.400	July_01_Dive_CDE.xlsx	Done	Raw		(Suni) pushcore site #3 (mat)... (no change in any peaks incl. CH4 & H2S)
July 1	78	44	8:33:22	43842	26 10.840 N	94 37.342 W	4.316	2745.34		3.400	July_01_Dive_CDE.xlsx	Done	Raw	(Suni)	pushcore site #5 (mat)... (no change in peaks)
July 1	79	44	9:13:18	43933	26 10.842 N	94 37.324 W	4.311	2745.76		3.399	July_01_Dive_CDE.xlsx	Done	Raw		(Suni) pushcore #10 (control)
July 1	80	44	17:00:31	45065	26 10.842 N	94 37.381 W	4.312	2746.20		3.399	July_01_Dive_CDE.xlsx	Done	Raw		(Suni) near stained tubeworms
July 2	81	45	22:40:41	46238	26 23.514 N	94 30.772 W	4.282	2331.99		3.380	July_02_Dive.xlsx	Done	Background Scans		(Suni) background scan away from brine lake (end of photomosaic transect [?])... not sure how much sample seawater it is actually getting! -- just a test!
July 2	82	45	23:09:02	46300	26 23.541 N	94 30.797 W	4.282	2330.61		3.380	July_02_Dive.xlsx	Done	Raw		(Suni) start scan over brine pool except that wand is still in can -- (no real change - probably not seeing sample)
July 3	83	45	2:49:39	46781	26 23.568 N	94 30.832 W	4.289	2333.82		3.382	July_02_Dive.xlsx	Done	Background Scans		(Suni) start background scan above brine tool 'it has been stirred up by taking a few pushcores...' note that water peaks have gone down compared to beginning of dive -- membrane getting conditioned?

ISMS Collection Sites

Cell Color Indicate Signal Quality
Significant signal, solid quantification
Significant signal, BINARY quantification
Oil contamination, questionable sulfide data
Good quantifiable data, but may not have alkane or sulfide hits.

Date	Position	Page(s) in Original Log	Spectra Starting Time (GMT)	Virtual Van Event(s)	Latitude ¹	Longitude ¹	Temp. (C) ¹	Depth (m)	pH	Conduct.	Excel file name	Workup	Nature of Data	Quick Explanation (if needed)	Comments
July 3	84	45	3:08:08	46820	26 23.570 N	94 30.831 W	4.294	2333.98		3.382	July_02_Dive.xlsx	Done	Raw	Significant spike in methane, unnoticed by Suni	(Suni) nose placed about 1 cm above sediment just on the brine shore (right above black sediment transition zone)
July 3	85	45-46	3:31:31	46872	26 23.569 N	94 30.832 W	4.286	2334.38		3.384	July_03_Dive.xlsx	Done	Raw		(Suni) at new position (~1m down the "shoreline"). No significant change (expected!) from previous scan. Slight increase CH4 & SO2. CO2 decreased
July 3	86	46	3:53:48	46921	26 23.567 N	94 30.832 W	4.289	2334.12		3.382	July_03_Dive.xlsx	Done	Raw		(Suni) huge CH4 (m/z 14, 15, 16) and SO2 (64). CO2 goes way up & O2 changes but not by as much... not stopping yet- some change (increase) in 14-16 still going
July 3	87	46	4:16:27	46968	26 23.567 N	94 30.832 W	4.283	2334.18		3.381	July_03_Dive.xlsx	Done	Raw		(Suni) keep scanning while transiting to make sure signal from last location clears. Signal is taking a very long time but decreasing consistently - we will know we have signal when we see an INCREASE - stop before it goes to baseline
July 3	88	46	4:38:59	47017	26 23.531 N	94 30.850 W	4.301	2333.94		3.382	July_03_Dive.xlsx	Done	Raw		(Suni) @ center of brine pool in about 20 cm depth... signal (huge, by the way) ... scan regular time span ... huge CO2, CH4, SO2], H2S
July 3	89	46-47	5:01:49	47065	26 23.532 N	94 30.849 W	4.282	2334.71		3.381	July_03_Dive.xlsx	Done	Raw	Huge increases in hydrocarbons and other interest gases	(Suni) push deeper at same location by .6m... start scanning in brine pool deeper depth
July 3	90	47	8:09:25	47479	26 23.532 N	94 30.902 W	4.277	2334.71		3.380	July_03_Dive.xlsx	Done	Raw		(Suni) urchin core hole (Marshall) near brine pool, core #6 red in urchin trail, right behind urchin... similar to background about 2cm in hole... tip clogged? Should be H2S & CH4 based on last year's results! (Marshall)
July 4	91	47	6:01:59	50214	26 22.171 N	94 31.160 W	4.276	2282.52		3.378	July_04_Dive.xlsx	Done	Background Scans		(Suni) background scan over mussels (~2m above m
July 4	92	47	6:20:31	50252	26 22.170 N	94 31.161 W	4.277	2283.91		3.378	July_04_Dive.xlsx	Done	Raw		(Suni) move wand into mussel pot scar... scanning in mussel pot hole, pretty deep in scar, maybe 2cm from bottom
July 4	93	47	6:37:00	50285	26 22.170 N	94 31.161 W	4.276	2283.92		3.378	July_04_Dive.xlsx	Done	Raw		(Suni) move to brown mussel bed - wand in between 2 mussels
July 4	94	48	7:28:18	50394	26 22.167 N	94 31.098 W	4.286	2283.05		3.379	July_04_Dive.xlsx	Done	Raw		(Suni) Brine pool - we couldn't find real brine so we measured in a depression / gully over black sediment... methane! Also 34, 63... slight CO2 increase
July 4	95	48	8:08:11	50484	26 22.178 N	94 31.153 W	4.275	2276.59		3.377	July_04_Ascent.xlsx	Done	Raw		(Suni) long ascending scan
July 4	N/A	48	21:20:02	starts ~50505	26 9.512 N	94 37.616 W	17.140	137.16		4.677	July_04_Descent.xlsx	Done	Raw		(Suni) descending scan
July 5	96	48	5:25:18	51386	26 10.852 N	94 37.376 W	4.314	2742.86		3.400	July_05_Dive.xlsx	In Prog	Background		(Suni) Background scan - start, lots of H2O vapor
July 5	97	48	5:43:16	51424	26 10.851 N	94 37.377 W	4.312	2744.07		3.400	July_05_Dive.xlsx	In Prog	Raw		(Suni) move to brown mussels, just below level of mussel mouth... @ the mouth level of brown mussels... similar to background scan
July 5	98	49	5:59:39	51459	26 10.852 N	94 37.377 W	4.315	2744.12		3.400	July_05_Dive.xlsx	In Prog	Raw		(Suni) Nearby in same mussel bed, also slightly lower than top of mussel mouths...
July 5	99	49	6:16:19	51494	26 10.852 N	94 37.377 W	4.315	2744.12		3.400	July_05_Dive.xlsx	In Prog	Raw		(Suni) white stained mussels, "these are pretty sparse, we'll take 1 measurement & look for a better spot..."
July 5	100	49	6:34:22	51532	26 10.852 N	94 37.378 W	4.315	2744.31		3.400	July_05_Dive.xlsx	In Prog	Raw		(Suni) base of tubeworm bush - tried to get in underneath the tangle... wand is pushed into tangle @ base... no noticeable change in signal
July 5	101	49	6:50:28	51567	26 10.852 N	94 37.378 W	4.319	2744.30		3.400	July_05_Dive.xlsx	In Prog	Raw		(Suni) move wand to tip of a tubeworm in middle of
July 5	102	49	7:29:34	51653	26 10.843 N	94 37.378 W	4.312	2745.24		3.400	July_05_Dive.xlsx	In Prog	Raw		(Suni) new mussel pot silt [?], before mussel... pot is taken - white stained mussels - wand @ level of mouth again
July 5	103	50	11:26:11	52187	26 10.861 N	94 37.362 W	4.315	2738.42		3.399	July_05_Dive.xlsx	In Prog	Raw	Data from 12:40 to 13:04 is missing	(?) Transect w/ depth during ascent with wand in manip, starting depth 2740m

¹ All values from virtual van (lat/long, temp, etc) are from "start" event

APPENDIX 3. AUTONOMOUS UNDERWATER VEHICLE (AUV)

*I read the pages that you are including in the appendix
and you have my permission to use them in the report. If
you need anything further please do not hesitate to call.*

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APPENDIX 3-A
**Instrument Settings,
Survey Configuration, and
Equipment Descriptions**

INSTRUMENT SETTINGS

COASTALSTUDIES INSTITUTE
SITE SURVEY
BLOCK 340, ATWATER VALLEY AREA
BLOCK 852, GREEN CANYON AREA
BLOCK 269, WALKER RIDGE AREA
BLOCK 601, ALAMINOS CANYON AREA

EDGETECH CHIRPED SUBBOTTOM PROFILER

Acoustic Source Level = 200 dB re 1 JIPa at one meter
Beam Width = 15° - 25°
Record Length = 100 meters (1,500 meters/second)
Record Divisions = 10 meters
Delay = Variable in meters
Setback = None (acoustically positioned)
Frequency = 2 to 8 kilohertz (Chirped/Frequency Modulated)

EDGETECH DUAL FREQUENCY SIDE SCAN SONAR

Frequency = 120 kilohertz
Acoustic Source Level = 210 dB re 1JIPa @ 1 m
Transducer Radiation = 0.8° horizontal composite, 70° vertical
Range = 225 meters per channel
Record Divisions = 50 meters
Pulse Bandwidth = 12 kHz

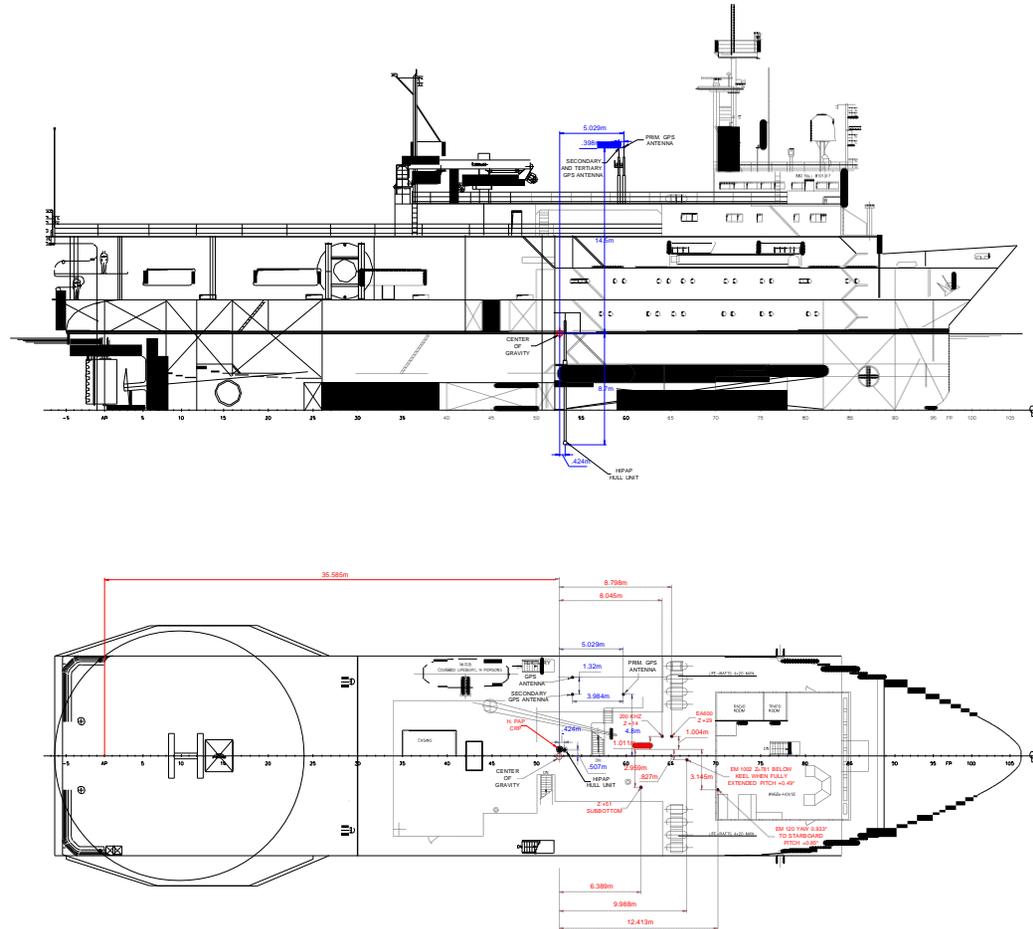
SIMRAD EM-2000 MULTIBEAM ECHOSOUNDER

Frequency = 200 kHz
Ping Rate = 3 times per second
Number of Beams per Ping = 111
Beamwidth = 2° acrosstrack; 1.5° alongtrack
Pulse Length = 0.05 – 0.25 msec

SURVEY VESSEL

R/V *Northern Resolution*
Average speed during survey = 3.8 knots
Survey sea state = Calm to 6 feet

GLOBAL POSITIONING SYSTEM ANTENNA OFFSETS



C-Surveyor IITM Autonomous Underwater Vehicle (AUV)

The **C-Surveyor IITM** Autonomous Underwater Vehicle (AUV) is designed to collect deep-water, high-resolution geophysical data for site and route surveys in water depths up to 3,000 meters. C & C Technologies, Inc. worked with Kongsberg Simrad in developing the complex system design in the year 2005. A schematic diagram (Figure 1) of the vehicle and major system components is presented following this text.

Primary survey sensors found in the system payload include a Simrad EM 2000 Swath Bathymetric System, EdgeTech Chirp Side Scan Sonar and an EdgeTech Chirp Subbottom Profiler. An inertial guidance system is used for primary positioning of the underwater vehicle. Ancillary sensors include a precision depth sensor, altimeter, acoustic Doppler log and a salinity/temperature probe for calculating water column sound velocity. Transponders on the system for transmission of data include the HiPAP (High Precision Acoustic Positioning), ACL (Acoustic Command Link) and ADL (Acoustic Data Link). An aluminum/oxygen fuel cell powers the AUV for a period of up to 60 hours. Emergency ascent systems include a drop weight and air bag. A pinger, radio beacon, flashing light and GPS/RF link output visual and remote sensing aids used in locating the AUV should an event occur where communication is lost with the survey ship.

Three industrial strength computers control all the system functions within the **C-Surveyor IITM**. These computers are referred to as the Control Processor, Payload Processor and Navigation Processor. The processors use artificial intelligence algorithms based on feedback returned from the more than 75 sensors to make real-time decisions regarding the system performance. Two titanium spheres, payload and control, house the computers and dual 50-gigabyte data storage drives.

Three topside computers communicate continuously with the vehicle while it is in operation. The **C-Surveyor IITM** Operator Station is responsible for monitoring all the sensors found in the vehicle and generates warnings to the operator when the values are out of optimal range. The Payload Operator Station computer provides the user with graphical views of the reduced subsets of the subbottom, bathymetry and side scan sonar data. It also allows the user to turn the systems

on or off and adjust instrument settings as needed. The third topside computer is the HiPAP Operator Station. This computer provides a real-time graphic display of the **C-Surveyor II**TM vehicle subsurface position and the surface position of the mother ship, which travels directly above the AUV while collecting data. C & C's C-NAV[®] Differential GPS provides the mother ship positions while the AUV vehicle positions are calculated using ultra short baseline acoustics (USBL), inertial navigation and Doppler velocity speed log.

Primary positioning of the **C-Surveyor II**TM is controlled by the inertial navigation system. This system uses precision gyros and accelerometers to maintain the AUV track of the mission plan (trackline running sequence). The mission plan is downloaded to the **C-Surveyor II**TM system computers before deployment. The HiPAP system and Doppler velocity speed log provide input into the inertial navigation system for guidance system checks. These inputs are weighted and applied to the positioning solution using a Kalman digital filter. Post processing routines can be implemented to further refine the subsea positions.

Simrad's EM 2000 Swath Bathymetry System collects soundings in approximately a 200-meter swath underneath the **C-Surveyor II**TM vehicle. An onboard velocimeter provides real-time data at the transducer for proper beam forming of the acoustic transmissions. The system is capable of collecting 111 beams or soundings across the swath. A high-precision depth sensor provides the **C-Surveyor II**TM vehicle depth. The data are processed utilizing C & C's proprietary HydroMap software.

The **C-Surveyor II**TM is equipped with a dual frequency chirp EdgeTech Side Scan Sonar that uses a calibrated wide band digital frequency modulated (FM) signal to provide high resolution, low-noise images. This sonar simultaneously transmits linearly swept FM pulses centered at two discrete frequencies: 120 kHz and 410 kHz. The raw data files are post-processed and converted to XTF (eXtended Triton Format) for digital interpretation and hardcopy generation.

Seismic profiles are collected with an EdgeTech Chirp Subbottom Profiler. The transmit pulses are generated in the frequency band between 2 and 8 kHz. The system takes advantage of built-in deconvolution of the system response of the output pulse. The sonar's measured system

impulse response is used to design a unique output pulse that will prevent the source from ringing. The raw seismic data can be post processed to create SEG-Y or XTF datasets.

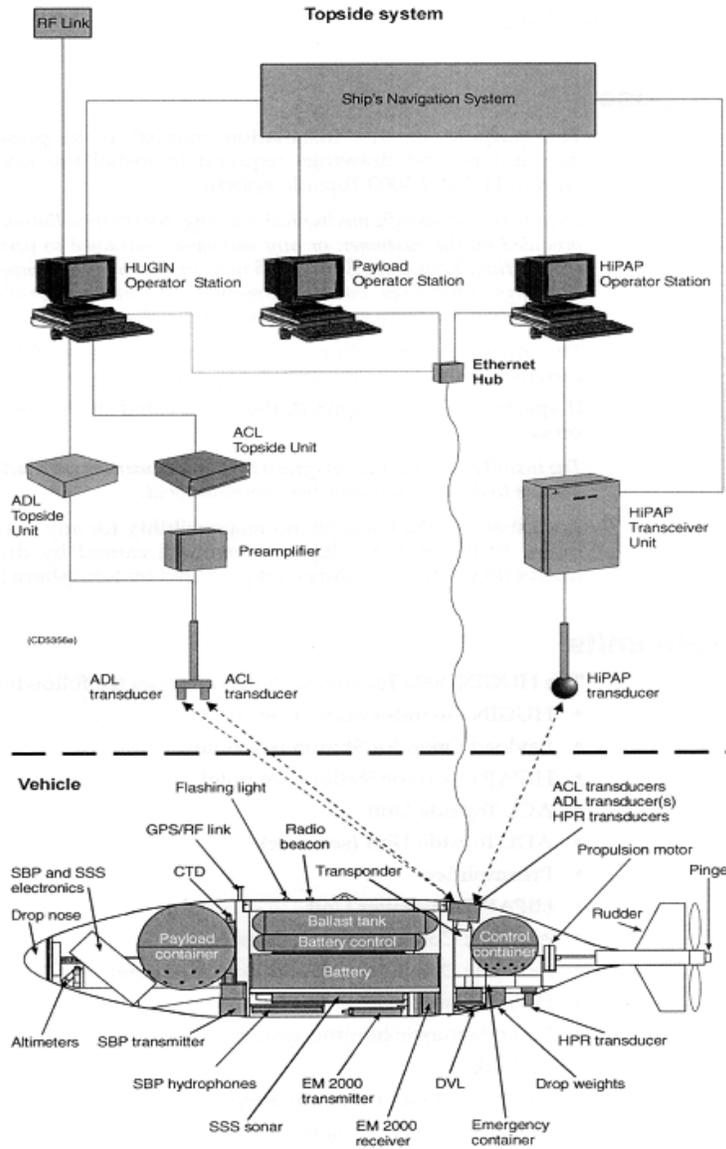


Figure 1 - C-Surveyor II™ (complete system)

Survey Sensors:

Simrad EM 2000 Bathymetry and Imagery (200 kHz, 150°)

Side Scan Sonar: Chirp (120 kHz and/or 410 kHz)

Subbottom Profiler: Chirp (2 –8 kHz)

Ancillary Sensors:

Inertial Navigation

Simrad HiPAP USBL

Doppler Velocity Log

Kalman Filter

Fiber Optic Gyro

Motion Reference Unit

Digiquartz Depth Unit

Single-Beam Altimeter

DGPS

Acoustic Communications

Command and Control (Low Speed Acoustic Modem)

Data Uplink (High Speed Acoustic Modem)

Vessel Specifications:

Depth Rating: 3,000 meters

Length: 6.1 meters

Maximum Diameter: 0.96 meters

Normal Speed: 4 knots

Underwater Endurance @ 4 knots: 60 hours

Power: Aluminum Oxygen Fuel Cell

Survey Equipment Specifications:**Simrad EM 2000 Multibeam Echo Sounder**

Frequency	200 kHz
Maximum Ping Rate	10 times per second
Number of Beams per Ping	111
Beamwidth	2° acrosstrack; 1.5° alongtrack
Beam Spacing	Equiangle or equidistant
Coverage Sector	150°
Depth Resolution	2 cm
Pulse Length	0.05 – 0.25 msec
Range Sampling Rate	10 kHz
Sonar Head Depth Rating	6,000 meters

C-NAV DIFFERENTIAL GPS

C-Nav is a globally corrected differential GPS system owned and operated by C & C Technologies, Inc. The C-Nav GPS Receiver combines a dual-frequency, geodetic grade, GPS Receiver with an integrated L-BAND communication RF detector and decoder all linked by an internal microprocessor. C-Nav uses monitoring stations strategically located around the globe to provide worldwide accuracies in the order of 0.25m (1 sigma)*.



The technique, developed by the Jet Propulsion Lab for the National Aeronautics Space Administration, uses a global network of reference stations to track the entire constellation of GPS satellites. The raw GPS observations are transmitted via the Internet back to the Network Control Center where the GPS constellation satellite orbital corrections and clock-offset values are calculated and modeled in real-time. These corrections are universally valid and can be applied to GPS measurements from any location on earth.

The multi-function antenna assembly is capable of receiving the L1 and L2 GPS frequencies as well as the Inmarsat L-BAND receive frequency band. The gain pattern of this antenna is designed to be relatively constant even at lower elevations. This allows for an efficient link budget when the unit is operated at higher latitudes where the elevation of the geo-stationary communication satellite is low and close to the horizon. Atmospheric delays are eliminated from local measurements by comparing the L1 and L2 frequencies in the internal GPS receiver.

Full Spectrum Chirp Side Scan Sonar

Modulation	Full spectrum chirp frequency modulated pulse with amplitude and phase weighting
Dual Frequency Combinations	120/410 kHz

Common

Vertical Beam Width	70°
Depression Angle	25° from horizontal
A/D Resolution	16 bits
Sample Rate	~2,000 samples per channel

Frequency Specific

Center Frequency	120 kHz	410 kHz
Pulse Bandwidth	12 kHz	41 kHz
Pulse Length	8.3 msec.	2.4 msec.
Range Scale Selection (per side)	25-500 meters	12.5-100 meters
Maximum Ping Rate	30 pps	60 pps
Range Resolution	6.25 cm	1.8 cm
Horizontal 3 dB Beam Width	0.8°	0.5°
Transmit Power	200 Watts	160 Watts
Peak Source Level	210 dB	216 dB
(ref = 1JIPa @ 1 m)		
Receiver Sensitivity	-190 dB	-196 dB
(ref = 1 V/JIPa @ center frequency)		

Full Spectrum Chirp Subbottom Profiler

Modulation	Full Spectrum Chirp Frequency Modulated Pulse with amplitude and phase weighting
Source Level	200 dB re 1 JIPa at one meter
Transmit Power	200 Watts
Receive Sensitivity	-204 dB re 1 JIPa at one meter
Receiver Variable Gain	38 – 105 dB, automatic or manual control
Noise Level	70 dB re 1 JIPa at one meter over sonar bandwidth (at hydrophone input)
Pulse Repetition Frequency	15 Hz maximum
Calibration	Each system is acoustic tank tested to calibrate for reflection coefficient measurements
Frequency Band	2 – 8 kHz
Number of Hydrophone Arrays	2
Resolution	6 – 10 cm
Beam Width	15° - 25°

Survey Sensors:

Simrad EM 2000 Bathymetry and Imagery (200 kHz, 150°)

Side Scan Sonar: Chirp (120 kHz and/or 410 kHz)

Subbottom Profiler: Chirp (2 –8 kHz)

Ancillary Sensors:

Inertial Navigation

Simrad HiPAP USBL

Doppler Velocity Log

Kalman Filter

Fiber Optic Gyro

Motion Reference Unit

Digiquartz Depth Unit

Single-Beam Altimeter

DGPS

Acoustic Communications

Command and Control (Low Speed Acoustic Modem)

Data Uplink (High Speed Acoustic Modem)

Vessel Specifications:

Depth Rating: 3,000 meters

Length: 6.1 meters

Maximum Diameter: 0.96 meters

Normal Speed: 4 knots

Underwater Endurance @ 4 knots: 60 hours

Power: Aluminum Oxygen Fuel Cell

Survey Equipment Specifications:**Simrad EM 2000 Multibeam Echo Sounder**

Frequency	200 kHz
Maximum Ping Rate	10 times per second
Number of Beams per Ping	111
Beamwidth	2° acrosstrack; 1.5° alongtrack
Beam Spacing	Equiangle or equidistant
Coverage Sector	150°
Depth Resolution	2 cm
Pulse Length	0.05 – 0.25 msec
Range Sampling Rate	10 kHz
Sonar Head Depth Rating	6,000 meters

impulse response is used to design a unique output pulse that will prevent the source from ringing. The raw seismic data can be post processed to create SEG-Y or XTF datasets.

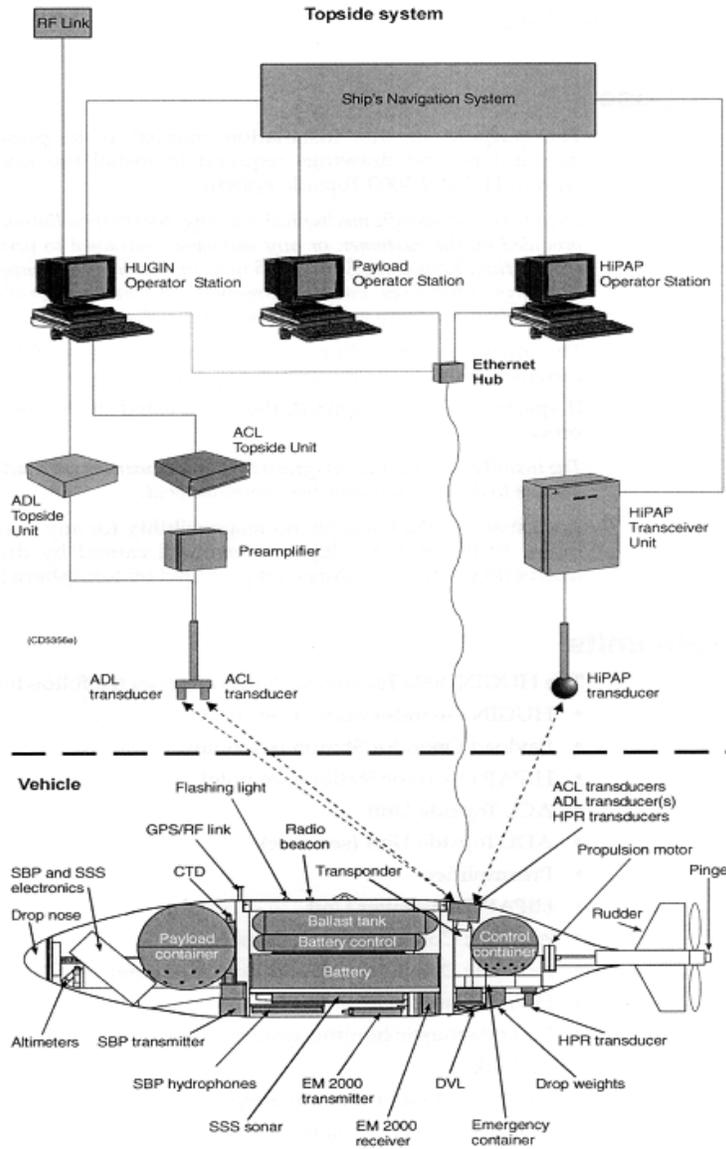


Figure 1 - C-Surveyor II™ (complete system)

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Three industrial strength computers control all the system functions within the **C-Surveyor IITM**. These computers are referred to as the Control Processor, Payload Processor and Navigation Processor. The processors use artificial intelligence algorithms based on feedback returned from the more than 75 sensors to make real-time decisions regarding the system performance. Two titanium spheres, payload and control, house the computers and dual 50-gigabyte data storage drives.

Three topside computers communicate continuously with the vehicle while it is in operation. The **C-Surveyor IITM** Operator Station is responsible for monitoring all the sensors found in the vehicle and generates warnings to the operator when the values are out of optimal range. The Payload Operator Station computer provides the user with graphical views of the reduced subsets of the subbottom, bathymetry and side scan sonar data. It also allows the user to turn the systems

Specifications:

	Measurement Range	Initial Accuracy	Resolution	Sensor Calibration
Conductivity	0 to 7 S/m	+/- 0.001 S/m	+/- 0.0001 S/m	0 – 7 S/m Physical calibration over the range 1.4 to 6 S/m, plus zero conductivity (air)
Temperature (°C)	-5 to + 35	+/- 0.01	+/-0.001	-1 to +31 (Measurements outside this range may be at slightly reduces accuracy due to extrapolation errors)
Depth	68 to 1000 m	+/- 0.25%	+/- 0.015%	Minimum 5 values between 0 and full scale

APPENDIX 3-B
Project Personnel,
Daily Progress Reports, and
Survey Logs



PROJECT PERSONNEL

FIELD PERSONNEL

R/V *NORTHERN RESOLUTIN*:

Scott McBay – Party Chief
David Aucoin – Shift Leader
Cole Gibbens –COS Operator
Beau Hollie – Shift Leader
Mark Gatch – COS Operator
T.J. Maise – AUV Van Crew Chief
Gerard Lege – AUV Technician
Keith Dominique – AUV Technician
Josh Saran – AUV Technician
Scotty Belaire – Data Processor
Will Harwell – Data Processor
Tim Badeaux – ACAD Operator
Kim Eslinger – Geologist
Eddie Romero – Additional C&C Crew (trainee)
Tom Javins – Medic
Mark Quinney – Cook

OFFICE PERSONNEL

Jay Northcutt – Geophysical Projects Manager
Ralph Coleman – Database Calculations
Jason Duplechin – Data Processor
Tony George – Geosciences Manager
Ave McBride – Cartographer
Nicole Douglas – Geophysical Assistant
Nikki Bono – Geophysical Assistant



Louisiana State University
LSU

JOB #	072265	DPR #	1	Mission:	run070207_1		2/7/2007
Client	LSU						
Project Name	AUV Site Survey						
Survey Area	Multiple Areas						
Scope of Work	AUV Site Survey						
Vessel	R/V Northern Resolution						
Midnight Location	Lat:	N28 01.3201	Lon:	W88 08.3575			
DPR Distribution List:							
E-mail Address	Name			Company			
Client Representative							
Client Distribution List							
hrober3@lsu.edu	Dr. Harry Roberts						
C&C Technologies:							
smm@cctechnol.com	Scott Melancon			C&C Technologies			
pcm@cctechnol.com	Paige Melancon			C&C Technologies			
jsm@cctechnol.com	Scott McBay			C&C Technologies			
jgn@cctechnol.com	Jay Northcutt			C&C Technologies			
ces@cctechnol.com	Charlie Spann			C&C Technologies			
tdr@cctechnol.com	Tom Richards			C&C Technologies			
tsc@cctechnol.com	Thomas Chance			C&C Technologies			
dja@cctechnol.com	Dave Alleman			C&C Technologies			
jef@cctechnol.com	Jeff Fortenberry			C&C Technologies			
Project Dates/Times							
Note All Times In UTC (GMT)							
	Date:			Time:			
Commenced Mobilization	2/7/2007			0600			
Completed Mobilization	2/7/2007			0800			
Transit to Job Site	2/7/2007			0600			
Arrived at Job Site	2/7/2007			0800			
Commenced Calibrations							
Completed Calibrations							
Commenced Scope of Work	2/7/2007			1000			
Completed Scope of Work							
Commenced Additional Work							
Completed Additional Work							
Commenced Rerun's							
Completed Rerun's							
Commenced Coring							
Completed Coring							
Arrived alongside							
Commenced Demobilization							
Completed Demobilization							

Dive Summary						
Cumulative Dives	Planned Dives Complete	Failed Dives Prior To Start of Mission	Failed Dives During Mission	Dives Aborted		
1	0	0	0	0		
Percentage	0.00%	0.00%	0.00%	0.00%		
Percentages: Survey Operations						
Description			Complete	Remain		
Mob/Demob			50%	50%		
Transit			50%	50%		
Data Acquisition						
Calculations Based On 140 Km in a 24 Hour Period						
Description	Total	Today	To Date	Complete	Remain	Days
Survey Primary	216.00	60.90	60.90	28.19%	71.81%	1.11
Survey Additional	0.00	0.00	0.00	0.00	100.00%	0.00
Rerun's Primary	0.00	0.00	0.00	0.00	100.00%	0.00
Rerun's Additional	0.00	0.00	0.00	0.00	100.00%	0.00
Battery Change + LR	Anode Changes	0	Recovery Fluid Change	0	0.00	
Coring						
Calculations Based on 12 Cores Taken in a 24 Hour Period						
Description	Total	Complete	Remain	Days		
Piston	0	0	0	0.00		
Box	0	0	0	0.00		
Totals				1.11		
Comments						
C&C:						
Client:						
Contact Numbers						
R/V Northern Resolution						
Lab Voice-----Ext. 2911	VSAT	(337) 237-4242 Then Appropriate Ext.				
Bridge Voice-----Ext. 2913	SAT B	001-874-327-302-889				
Party Chief Voice-----Ext. 2912						
C&C TECHNOLOGIES						
Office	337-261-0660					
Office Fax	337-261-0192					
C&C Representative		Client Representative		Client Representative		
AUV Field Project Manager						
Scott McBay						



Louisiana State University LSU

JOB #	072265	DPR #	2	Mission:	run070207_1		2/8/2007
Client	LSU						
Project Name	AUV Site Survey						
Survey Area	Multiple Areas						
Scope of Work	AUV Site Survey						
Vessel	R/V Northern Resolution						
Midnight Location	Lat:	N28 01.3201	Lon:	W88 08.3575			
DPR Distribution List:							
E-mail Address	Name		Company				
Client Representative							
Client Distribution List							
hrober3@lsu.edu	Dr. Harry Roberts						
C&C Technologies:							
smm@cctechnol.com	Scott Melancon		C&C Technologies				
pcm@cctechnol.com	Paige Melancon		C&C Technologies				
jsm@cctechnol.com	Scott McBay		C&C Technologies				
jgn@cctechnol.com	Jay Northcutt		C&C Technologies				
ces@cctechnol.com	Charlie Spann		C&C Technologies				
tldr@cctechnol.com	Tom Richards		C&C Technologies				
tsc@cctechnol.com	Thomas Chance		C&C Technologies				
dja@cctechnol.com	Dave Alleman		C&C Technologies				
jef@cctechnol.com	Jeff Fortenberry		C&C Technologies				
Project Dates/Times							
Note All Times In UTC (GMT)							
	Date:		Time:				
Commenced Mobilization	2/7/2007		0600				
Completed Mobilization	2/7/2007		0800				
Transit to Job Site	2/7/2007		0600				
Arrived at Job Site	2/7/2007		0800				
Commenced Calibrations							
Completed Calibrations							
Commenced Scope of Work	2/7/2007		1000				
Completed Scope of Work							
Commenced Additional Work							
Completed Additional Work							
Commenced Rerun's							
Completed Rerun's							
Commenced Coring							
Completed Coring							
Arrived alongside							
Commenced Demobilization							
Completed Demobilization							

Dive Summary						
Cumulative Dives	Planned Dives Complete	Failed Dives Prior To Start of Mission	Failed Dives During Mission	Dives Aborted		
1	0	0	0	0		
Percentage	0.00%	0.00%	0.00%	0.00%		
Percentages: Survey Operations						
Description			Complete	Remain		
Mob/Demob			50%	50%		
Transit			50%	50%		
Data Acquisition						
Calculations Based On 140 Km in a 24 Hour Period						
Description	Total	Today	To Date	Complete	Remain	Days
Survey Primary	216.00	18.00	78.90	36.53%	63.47%	0.98
Survey Additional	0.00	0.00	0.00	0.00	100.00%	0.00
Rerun's Primary	0.00	0.00	0.00	0.00	100.00%	0.00
Rerun's Additional	0.00	0.00	0.00	0.00	100.00%	0.00
Battery Change + LR	Anode Changes	0	Recovery Fluid Change	0	0.00	0.00
Coring						
Calculations Based on 12 Cores Taken in a 24 Hour Period						
Description	Total	Complete	Remain	Days		
Piston	0	0	0	0.00		
Box	0	0	0	0.00		
Totals				0.98		
Comments						
C&C:						
Client:						
Contact Numbers						
R/V Northern Resolution						
Lab Voice-----Ext. 2911	VSAT	(337) 237-4242 Then Appropriate Ext.				
Bridge Voice-----Ext. 2913	SAT B	001-874-327-302-889				
Party Chief Voice-----Ext. 2912						
C&C TECHNOLOGIES						
Office	337-261-0660					
Office Fax	337-261-0192					
C&C Representative		Client Representative		Client Representative		
AUV Field Project Manager						
Scott McBay						



Louisiana State University LSU

JOB #	072265	DPR #	3	Mission:	run070208_1		2/9/2007
Client	LSU						
Project Name	AUV Site Survey						
Survey Area	Multiple Areas						
Scope of Work	AUV Site Survey						
Vessel	R/V Northern Resolution						
Midnight Location	Lat:	N26 41.2369	Lon:	W91 40.2744			
DPR Distribution List:							
E-mail Address	Name		Company				
Client Representative							
Client Distribution List							
hrober3@lsu.edu	Dr. Harry Roberts						
C&C Technologies:							
smm@cctechnol.com	Scott Melancon		C&C Technologies				
pcm@cctechnol.com	Paige Melancon		C&C Technologies				
jsm@cctechnol.com	Scott McBay		C&C Technologies				
jgn@cctechnol.com	Jay Northcutt		C&C Technologies				
ces@cctechnol.com	Charlie Spann		C&C Technologies				
tldr@cctechnol.com	Tom Richards		C&C Technologies				
tsc@cctechnol.com	Thomas Chance		C&C Technologies				
dja@cctechnol.com	Dave Alleman		C&C Technologies				
jef@cctechnol.com	Jeff Fortenberry		C&C Technologies				
Project Dates/Times							
Note All Times In UTC (GMT)							
	Date:		Time:				
Commenced Mobilization	2/7/2007		0600				
Completed Mobilization	2/7/2007		0800				
Transit to Job Site	2/7/2007		0600				
Arrived at Job Site	2/7/2007		0800				
Commenced Calibrations							
Completed Calibrations							
Commenced Scope of Work	2/7/2007		1000				
Completed Scope of Work							
Commenced Additional Work							
Completed Additional Work							
Commenced Rerun's							
Completed Rerun's							
Commenced Coring							
Completed Coring							
Arrived alongside							
Commenced Demobilization							
Completed Demobilization							

Safety				
	Today	To Date		
Stop Cards	1	0	Safety/Orientation inductions	2
Tailgate Meetings	2	2	Job Kickoff Meeting	2/5/2007
Shift Change Meetings	2	2	Last Safety Meeting	2/9/2007
JSA Review	1	1	Last Safety Committee	2/2/2007
First aid cases	0	0	Last Fire Drill	2/7/2007
Medical treatment cases	0	0	Last Abandon Ship Drill	2/7/2007
Restricted work cases	0	0	Last Man Over Board Drill	2/7/2007
Lost time incidents	0	0	Total Personnel On Board	33

Comments: |

Weather - Last 24 hours				
Time	Wind Direction	Wind Speed Knots	Seas Meters	Swell
0000-0600	N	10	1	
0600-1200	E	7	0	
1200-1800	E	3	.5	
1800-2400	NE	4	1	

Forecast Next 48 Hours				
Date	Wind Direction	Wind Speed knots	Seas Meters	Swell
2/10/2007	ENE	5-10	1	
2/11/2007	ESE	10	1	

Daily Chronology Summary				
From Hr:Min	To Hr:Min	Total Hr:Min	Code	Description
0:00	12:00	12:00	RL	Survey GC852
12:00	13:30	1:30	ALR	Recover CSII
13:30	17:00	3:30	TR	Transit to WR269
17:00	18:30	1:30	AIV	CTD 070209a
18:30	20:00	1:30	ALR	Launch CSII
20:00	0:00	4:00	RL	Survey WR269
		0:00		
		0:00		
		0:00		
		0:00		
		0:00		
		0:00		
		0:00		

Cumulative Times				
Description	Code	Today	To Date	Cumulative
Mobilization/Demob	MD	0.00	8.00	8.00
Transit	TR	3.50	14.50	18.00
Calibrations Op(AUV in the Van) Op(AUV	CA	0.00	0.00	0.00
running lines) OP(AUV	AIV	1.50	5.50	7.00
L&R)	RL	16.00	17.00	33.00
Additional work (Clients request)	ALR	3.00	3.00	6.00
Coring	AW	0.00	0.00	0.00
Standby	CO	0.00	0.00	0.00
Equipment Downtime	SB	0.00	0.00	0.00
Vessel Downtime	ED	0.00	0.00	0.00
Re Runs	VD	0.00	0.00	0.00
Weather Downtime	RR	0.00	0.00	0.00
Other	WOW	0.00	0.00	0.00
Totals	OTH	0.00	0.00	0.00
		24.00	48.00	72.00

Ops Planned Next 3 Days:

AUV Survey

Dive Summary						
Cumulative Dives	Planned Dives Complete	Failed Dives Prior To Start of Mission	Failed Dives During Mission	Dives Aborted		
3	2	0	0	0		
Percentage	66.67%	0.00%	0.00%	0.00%		
Percentages: Survey Operations						
Description				Complete	Remain	
Mob/Demob				50%	50%	
Transit				50%	50%	
Data Acquisition						
Calculations Based On 140 Km in a 24 Hour Period						
Description	Total	Today	To Date	Complete	Remain	Days
Survey Primary	216.00	88.05	166.95	77.29%	22.71%	0.35
Survey Additional	0.00	0.00	0.00	0.00	100.00%	0.00
Rerun's Primary	0.00	0.00	0.00	0.00	100.00%	0.00
Rerun's Additional	0.00	0.00	0.00	0.00	100.00%	0.00
Battery Change + LR	Anode Changes	0	Recovery Fluid Change	0	0.00	
Coring						
Calculations Based on 12 Cores Taken in a 24 Hour Period						
Description	Total	Complete	Remain	Days		
Piston	0	0	0	0.00		
Box	0	0	0	0.00		
Totals				0.35		
Comments						
C&C:						
Client:						
Contact Numbers						
R/V Northern Resolution						
Lab Voice-----Ext. 2911	VSAT	(337) 237-4242 Then Appropriate Ext.				
Bridge Voice-----Ext. 2913	SAT B	001-874-327-302-889				
Party Chief Voice-----Ext. 2912						
C&C TECHNOLOGIES						
Office	337-261-0660					
Office Fax	337-261-0192					
C&C Representative	Client Representative		Client Representative			
AUV Field Project Manager						
Scott McBay						



Louisiana State University LSU

JOB #	072265	DPR #	4	Mission:	run070210_1		2/10/2007
Client	LSU						
Project Name	AUV Site Survey						
Survey Area	Multiple Areas						
Scope of Work	AUV Site Survey						
Vessel	R/V Northern Resolution						
Midnight Location	Lat:	N26 21.7806	Lon:	W94 31.3067			
DPR Distribution List:							
E-mail Address	Name		Company				
Client Representative							
Client Distribution List							
hrober3@lsu.edu	Dr. Harry Roberts						
C&C Technologies:							
smm@cctechnol.com	Scott Melancon		C&C Technologies				
pcm@cctechnol.com	Paige Melancon		C&C Technologies				
jsm@cctechnol.com	Scott McBay		C&C Technologies				
jgn@cctechnol.com	Jay Northcutt		C&C Technologies				
ces@cctechnol.com	Charlie Spann		C&C Technologies				
tdr@cctechnol.com	Tom Richards		C&C Technologies				
tsc@cctechnol.com	Thomas Chance		C&C Technologies				
dja@cctechnol.com	Dave Alleman		C&C Technologies				
jef@cctechnol.com	Jeff Fortenberry		C&C Technologies				
Project Dates/Times							
Note All Times In UTC (GMT)							
	Date:		Time:				
Commenced Mobilization	2/7/2007		0600				
Completed Mobilization	2/7/2007		0800				
Transit to Job Site	2/7/2007		0600				
Arrived at Job Site	2/7/2007		0800				
Commenced Calibrations							
Completed Calibrations							
Commenced Scope of Work	2/7/2007		1000				
Completed Scope of Work							
Commenced Additional Work							
Completed Additional Work							
Commenced Rerun's							
Completed Rerun's							
Commenced Coring							
Completed Coring							
Arrived alongside							
Commenced Demobilization							
Completed Demobilization							

Safety				
	Today	To Date		
Stop Cards	0	1	Safety/Orientation inductions	2
Tailgate Meetings	2	4	Job Kickoff Meeting	2/5/2007
Shift Change Meetings	2	4	Last Safety Meeting	2/10/2007
JSA Review	2	2	Last Safety Committee	2/10/2007
First aid cases	0	0	Last Fire Drill	2/7/2007
Medical treatment cases	0	0	Last Abandon Ship Drill	2/7/2007
Restricted work cases	0	0	Last Man Over Board Drill	2/7/2007
Lost time incidents	0	0	Total Personnel On Board	33
Comments:				
Weather - Last 24 hours				
Time	Wind Direction	Wind Speed Knots	Seas Meters	Swell
0000-0600	N	2	.5	
0600-1200	E	7	1	
1200-1800	E	3	1	
1800-2400	NE	4	1	
Forecast Next 48 Hours				
Date	Wind Direction	Wind Speed knots	Seas Meters	Swell
2/11/2007	E	15	2	
2/12/2007	SE	15	2	
Daily Chronology Summary				
From Hr:Min	To Hr:Min	Total Hr:Min	Code	Description
0:00	2:30	2:30	RL	Survey WR269
2:30	4:00	1:30	ALR	Recover CSII
4:00	18:00	14:00	TR	Transit to AC601
18:00	20:00	2:00	AIV	CTD 070210a
20:00	21:00	1:00	ALR	Launch CSII
21:00	0:00	3:00	RL	Survey AC601
		0:00		
		0:00		
		0:00		
		0:00		
		0:00		
		0:00		
Cumulative Times				
Description	Code	Today	To Date	Cumulative
Mobilization/Demob	MD	0.00	8.00	8.00
Transit	TR	14.00	18.00	32.00
Calibrations	CA	0.00	0.00	0.00
Op(AUV in the Van)	AIV	2.00	7.00	9.00
Op(AUV running lines)	RL	5.50	33.00	38.50
OP(AUV L&R)	ALR	2.50	6.00	8.50
Additional work (Clients request)	AW	0.00	0.00	0.00
Coring	CO	0.00	0.00	0.00
Standby	SB	0.00	0.00	0.00
Equipment Downtime	ED	0.00	0.00	0.00
Vessel Downtime	VD	0.00	0.00	0.00
Re Runs	RR	0.00	0.00	0.00
Weather Downtime	WOW	0.00	0.00	0.00
Other	OTH	0.00	0.00	0.00
Totals		24.00	72.00	96.00
Ops Planned Next 3 Days:				
AUV Survey				

Dive Summary						
Cumulative Dives	Planned Dives Complete	Failed Dives Prior To Start of Mission	Failed Dives During Mission	Dives Aborted		
4	3	0	0	0		
Percentage	75.00%	0.00%	0.00%	0.00%		
Percentages: Survey Operations						
Description			Complete	Remain		
Mob/Demob			50%	50%		
Transit			50%	50%		
Data Acquisition						
Calculations Based On 140 Km in a 24 Hour Period						
Description	Total	Today	To Date	Complete	Remain	Days
Survey Primary	216.00	21.15	188.10	87.08%	12.92%	0.20
Survey Additional	0.00	0.00	0.00	0.00	100.00%	0.00
Rerun's Primary	0.00	0.00	0.00	0.00	100.00%	0.00
Rerun's Additional	0.00	0.00	0.00	0.00	100.00%	0.00
Battery Change + LR	Anode Changes	0	Recovery Fluid Change	0	0.00	0.00
Coring						
Calculations Based on 12 Cores Taken in a 24 Hour Period						
Description	Total	Complete	Remain	Days		
Piston	0	0	0	0.00		
Box	0	0	0	0.00		
Totals				0.20		
Comments						
C&C:						
Client:						
Contact Numbers						
R/V Northern Resolution						
Lab Voice-----Ext. 2911	VSAT	(337) 237-4242 Then Appropriate Ext.				
Bridge Voice-----Ext. 2913	SAT B	001-874-327-302-889				
Party Chief Voice-----Ext. 2912						
C&C TECHNOLOGIES						
Office	337-261-0660					
Office Fax	337-261-0192					
C&C Representative		Client Representative		Client Representative		
AUV Field Project Manager						
Scott McBay						



Louisiana State University LSU

JOB #	072265	DPR #	5	Mission:	run070210_1		2/11/2007
Client	LSU						
Project Name	AUV Site Survey						
Survey Area	Multiple Areas						
Scope of Work	AUV Site Survey						
Vessel	R/V Northern Resolution						
Midnight Location		Lat:	N26 21.7806	Lon:	W94 31.3067		
DPR Distribution List:							
E-mail Address	Name		Company				
Client Representative							
Client Distribution List							
hrober3@lsu.edu	Dr. Harry Roberts						
C&C Technologies:							
smm@cctechnol.com	Scott Melancon		C&C Technologies				
pcm@cctechnol.com	Paige Melancon		C&C Technologies				
jsm@cctechnol.com	Scott McBay		C&C Technologies				
jgn@cctechnol.com	Jay Northcutt		C&C Technologies				
ces@cctechnol.com	Charlie Spann		C&C Technologies				
tldr@cctechnol.com	Tom Richards		C&C Technologies				
tsc@cctechnol.com	Thomas Chance		C&C Technologies				
dja@cctechnol.com	Dave Alleman		C&C Technologies				
jef@cctechnol.com	Jeff Fortenberry		C&C Technologies				
Project Dates/Times							
Note All Times In UTC (GMT)							
	Date:		Time:				
Commenced Mobilization	2/7/2007		0600				
Completed Mobilization	2/7/2007		0800				
Transit to Job Site	2/7/2007		0600				
Arrived at Job Site	2/7/2007		0800				
Commenced Calibrations							
Completed Calibrations							
Commenced Scope of Work	2/7/2007		1000				
Completed Scope of Work	2/11/2007		0700				
Commenced Additional Work							
Completed Additional Work							
Commenced Rerun's							
Completed Rerun's							
Commenced Coring							
Completed Coring							
Arrived alongside							
Commenced Demobilization							
Completed Demobilization							

Safety				
	Today	To Date		
Stop Cards	0	1	Safety/Orientation inductions	2
Tailgate Meetings	2	4	Job Kickoff Meeting	2/5/2007
Shift Change Meetings	2	4	Last Safety Meeting	2/10/2007
JSA Review	2	2	Last Safety Committee	2/10/2007
First aid cases	0	0	Last Fire Drill	2/7/2007
Medical treatment cases	0	0	Last Abandon Ship Drill	2/7/2007
Restricted work cases	0	0	Last Man Over Board Drill	2/7/2007
Lost time incidents	0	0	Total Personnel On Board	33
Comments:				
Weather - Last 24 hours				
Time	Wind Direction	Wind Speed Knots	Seas Meters	Swell
0000-0600	N	2	.5	
0600-1200	E	7	1	
1200-1800	E	3	1	
1800-2400	NE	4	1	
Forecast Next 48 Hours				
Date	Wind Direction	Wind Speed knots	Seas Meters	Swell
2/11/2007	E	15	2	
2/12/2007	SE	15	2	
Daily Chronology Summary				
From Hr:Min	To Hr:Min	Total Hr:Min	Code	Description
0:00	5:00	5:00	RL	Survey AC601
5:00	7:00	2:00	ALR	Recover CSII
7:00	0:00	17:00	TR	Transit to GC237
		0:00		
		0:00		
		0:00		
		0:00		
		0:00		
		0:00		
		0:00		
Cumulative Times				
Description	Code	Today	To Date	Cumulative
Mobilization/Demob	MD	0.00	8.00	8.00
Transit	TR	17.00	32.00	49.00
Calibrations	CA	0.00	0.00	0.00
Op(AUV in the Van)	AIV	0.00	9.00	9.00
Op(AUV running lines)	RL	5.00	38.50	43.50
OP(AUV L&R)	ALR	2.00	8.50	10.50
Additional work (Clients request)	AW	0.00	0.00	0.00
Coring	CO	0.00	0.00	0.00
Standby	SB	0.00	0.00	0.00
Equipment Downtime	ED	0.00	0.00	0.00
Vessel Downtime	VD	0.00	0.00	0.00
Re Runs	RR	0.00	0.00	0.00
Weather Downtime	WOW	0.00	0.00	0.00
Other	OTH	0.00	0.00	0.00
Totals		24.00	96.00	120.00
Ops Planned Next 3 Days:				
AUV Survey				

Dive Summary						
Cumulative Dives	Planned Dives Complete	Failed Dives Prior To Start of Mission	Failed Dives During Mission	Dives Aborted		
4	4	0	0	0		
Percentage	100.00%	0.00%	0.00%	0.00%		
Percentages: Survey Operations						
Description			Complete	Remain		
Mob/Demob			50%	50%		
Transit			50%	50%		
Data Acquisition						
Calculations Based On 140 Km in a 24 Hour Period						
Description	Total	Today	To Date	Complete	Remain	Days
Survey Primary	216.00	27.90	216.00	100.00%	0.00%	0.00
Survey Additional	0.00	0.00	0.00	0.00	100.00%	0.00
Rerun's Primary	0.00	0.00	0.00	0.00	100.00%	0.00
Rerun's Additional	0.00	0.00	0.00	0.00	100.00%	0.00
Battery Change + LR	Anode Changes	0	Recovery Fluid Change	0	0.00	0.00
Coring						
Calculations Based on 12 Cores Taken in a 24 Hour Period						
Description	Total	Complete	Remain	Days		
Piston	0	0	0	0.00		
Box	0	0	0	0.00		
Totals				0.00		
Comments						
C&C:						
Client:						
Contact Numbers						
R/V Northern Resolution						
Lab Voice-----Ext. 2911	VSAT	(337) 237-4242 Then Appropriate Ext.				
Bridge Voice-----Ext. 2913	SAT B	001-874-327-302-889				
Party Chief Voice-----Ext. 2912						
C&C TECHNOLOGIES						
Office	337-261-0660					
Office Fax	337-261-0192					
C&C Representative		Client Representative		Client Representative		
AUV Field Project Manager						
Scott McBay						



C & C TECHNOLOGIES SURVEY LOG (Hydro-station)						Page No. 1
JobNo.: 072265	Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i> Remote Vessel: C-Surveyor II TM		Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log	
Date: (UTC) 02/07/2007	Areas: AT Valley Blocks: 340 Units: Meters		Mission: run070207_1	Datum: NAD27 Projection: UTM Zone: 16N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-10 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 (200 kHz)	
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
0550					Transit to job site	
0600				Shift Change	B.Hollie, M.Gatch	
				WX	Winds: S 9 knots Seas: 1.0m	
0754					On location for CTD 070207a	
					lowering HiPAP ram	
0801					CTD in water	
0854					CTD on bottom Y:3060090.36 X:365507.37 WD:2318	
0934					CTD on deck CTD 070207a	
0948					Start prediver 070207_1	
1006					Prediver complete	
1019.12					Pin Pulled	
1020					AUV in water	
1118					AUV in external guidance	
1130	180	2243	1	301	SOL	
1153	180	2209	16	301	EOL	
1158	360	2209	16	302	SOL	
1200				WX	Winds: N 7 knots Seas: 1.0m	
1219	360	2243	1	302	EOL	
1223	180	2244	1	303	SOL	
1246	180	2214	16	303	EOL	
1250	360	2216	16	304	SOL	
1311	360	2242	1	304	EOL	
1315	180	2243	1	305	SOL	
1338	180	2217	16	305	EOL	
1343	360	2216	16	306	SOL	
1403	360	2240	1	306	EOL	
1408	180	2242	1	307	SOL	
1431	180	2218	16	307	EOL	
1435	360	2222	16	308	SOL	
1456	360	2245	1	308	EOL	
1500	180	2258	1	309	SOL	
1523	180	2227	16	309	EOL	



C & C TECHNOLOGIES SURVEY LOG (Hydro-station)						Page No. 2
JobNo.: 072265	Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i> Remote Vessel: C-Surveyor II TM		Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log	
Date: (UTC) 02/07/2007	Areas: AT Valley Blocks: 340 Units: Meters		Mission: run070207_1	Datum: NAD27 Projection: UTM Zone: 16N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-10 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 (200 kHz)	
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
1527	360	2232	16	310	SOL; GPS went out for a few seconds b/w SP:	
					7-5	
1548	360	2271	1	310	EOL	
1552	180	2279	1	311	SOL	
1615	180	2238	16	311	EOL	
1619	360	2241	16	312	SOL	
1641	360	2286	1	312	EOL	
1645	180	2295	1	313	SOL	
1708	180	2246	16	313	EOL	
1716	270	2251	1	403	SOL	
1739	270	2207	16	403	EOL	
1750	090	2211	16	402	SOL	
1800				WX	Winds NE 11 Kts. Seas 4'	
					Shift Change D. Aucoin C. Gibbens	
1811	090	2254	1	402	EOL	
1822	270	2294	1	401	SOL	
1845	270	2233	16	401	EOL	
1856	270	2256	12	512	SOL	
1913	270	2251	1	512	EOL	
1918	090	2246	1	513	SOL	
1933	090	2248	12	513	EOL	
1938	270	2242	12	514	SOL	
1954	270	2242	1	514	EOL	
2000	090	2238	1	515	SOL	
2015	090	2237	12	515	EOL	
2020	270	2233	12	516	SOL	
2036	270	2233	1	516	EOL	
2041	090	2227	1	517	SOL	
2057	090	2230	12	517	EOL	
2102	270	2225	12	518	SOL	
2118	270	2221	1	518	EOL	
2123	090	2213	1	519	SOL	

C & C TECHNOLOGIES SURVEY LOG (Hydro-station)						Page No. 3
JobNo.: 072265	Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i> Remote Vessel: C-Surveyor II™		Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log	
Date: (UTC) 02/07/2007	Areas: AT Valley Blocks: 340 Units: Meters		Mission: run070207_1	Datum: NAD27 Projection: UTM Zone: 16N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-10 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 (200 kHz)	
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
2139	090	2223	12	519	EOL	
2144	270	2222	12	520	SOL	
2200	270	2209	1	520	EOL	
2205	090	2207	1	521	SOL	
2221	090	2221	12	521	EOL	
2225	270	2222	12	522	SOL	
2242	270	2204	1	522	EOL	
2249	000	2210	16	501	SOL	
2312	000	2252	1	501	EOL	
2316	180	2254	1	502	SOL	
2337	180	2211	16	502	EOL	
2341	000	2212	16	503	SOL	
0000				New Day	02/08/2007 Lat. 27 39.3102 Lon. 88 24.1975	
				WX	Winds NE 10 Kts. Seas 2-3'	
0003	000	2253	1	503	EOL	
0007	180	2255	1	504	SOL	
0028	180	2213	16	504	EOL	
0031	000	2214	16	505	SOL	
0054	000	2254	1	505	EOL	
0057	180	2256	1	506	SOL Reboot ts workstation	
0119	180	2215	16	506	EOL	
0122	000	2215	16	507	SOL	
0145	000	2255	1	507	EOL	
0149	180	2254	1	508	SOL	
0209	180	2217	16	508	EOL	
0213	000	2218	16	509	SOL	
0235	000	2255	1	509	EOL	
0239	180	2256	1	510	SOL	
0301	180	2219	16	510	EOL	
0304	000	2219	16	511	SOL	
0326	000	2255	1	511	EOL Begin ascent procedures	
0440					AUV on surface	



C & C TECHNOLOGIES SURVEY LOG (Hydro-station)						Page No. 1
JobNo.: 072265	Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i> Remote Vessel: C-Surveyor II™		Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log	
Date: (UTC) 02/08/2007	Areas: Green Canyon Blocks: 852 Units: Meters		Mission: run070208_1	Datum: NAD27 Projection: UTM Zone: 15N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-10 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 (200 kHz)	
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
					Transit to job location	
1910					Arrive @ CTD location 070208a	
1946					CTD on bottom Y=3003199.01 X=682108.95 WD=1738m	
2016					CTD on deck heading to AUV drop point	
2057					Retake CTD 070208b	
2122					CTD on bottom Y=3005440.99 X=682914.15 WD=1791m	
2152					CTD on deck	
2200					Start prediver	
2235					Prediver complete	
2242					AUV in water	
2336					External Guidance	
2343	180	1700	1	601	SOL	
0000				New Day	02/09/2007 Lat. 27 06.7524 Lon. 91 10.7112	
				WX	Winds N 10 Kts. Seas 2-3'	
0018	180	1650	24	601	EOL	
0023	000	1642	24	602	SOL	
0055	000	1671	1	602	EOL	
0059	180	1642	1	603	SOL	
0134	180	1632	24	603	EOL	
0138	000	1620	24	604	SOL	
0212	000	1609	1	604	EOL	
0216	180	1581	1	605	SOL	
0250	180	1610	24	605	EOL	
0255	000	1592	24	606	SOL	
0328	000	1573	1	606	EOL	
0333	180	1555	1	607	SOL	
0407	180	1576	24	607	EOL	
0411	000	1557	24	608	SOL	
0445	000	1537	1	608	EOL	
0449	180	1526	1	609	SOL	
0523	180	1535	24	609	EOL	



C & C TECHNOLOGIES SURVEY LOG (Hydro-station)						Page No. 2
JobNo.: 072265	Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i> Remote Vessel: C-Surveyor II TM		Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log	
Date: (UTC) 02/09/2007	Areas: Green Canyon Blocks: 852 Units: Meters		Mission: run070208_1	Datum: NAD27 Projection: UTM Zone: 15N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-10 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 (200 kHz)	
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
0527	000	1552	24	610	SOL	
0600				Shift Change	B.Hollie, M.Gatch	
				WX	Winds: E 7 knots Seas: Calm	
0602	000	1535	1	610	EOL	
0605	180	1526	1	611	SOL	
0639	180	1575	24	611	EOL	
0643	000	1595	24	612	SOL	
0717	000	1546	1	612	EOL	
0721	180	1569	1	613	SOL	
0755	180	1599	24	613	EOL	
0758	000	1625	24	614	SOL	
0832	000	1578	1	614	EOL	
0836	180	1586	1	615	SOL	
0910	180	1618	24	615	EOL	
0914	000	1608	24	616	SOL	
0948	000	1603	1	616	EOL	
0956	270	1600	1	701	SOL	
1018					AUV kicked out of external guidance	
					NAV P restarted	
1022	270	1700	19	701	EOL	
1024					AUV back in external guidance; heading to line	
1035	090	1680	19	702	SOL	
1102	090	1590	1	702	EOL	
1113	270	1606	1	703	SOL	
1140	270	1693	19	703	EOL	
1152	090	1669	19	704	SOL	
1200				WX	Winds: E 3 knots Seas: .5m	
1218	090	1602	1	704	EOL; job complete; starting ascent procedures	
1219					AUV stopped external guidance	
1340					AUV in van	



C & C TECHNOLOGIES SURVEY LOG (Hydro-station)						Page No. 1
JobNo.: 072265	Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i> Remote Vessel: C-Surveyor II™		Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log	
Date: (UTC) 2-9-07	Areas: Walker Ridge Blocks: 269 Units: Meters		Mission: run070209_1	Datum: NAD27 Projection: UTM Zone: 15N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-10 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 (200 kHz)	
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
1350					transit to job site	
1716					On location; preparing CTD cast 070209a	
1803					CTD on bottom Y=2950608.54 X=630655.54 Z=2034m	
1837					CTD on deck – Start Prediver	
1909					Prediver Complete	
1915					AUV in water	
2009					External Guidance	
2018	067	1994	22	808	SOL	
2048	067	1944	1	808	EOL	
2052	247	1948	1	807	SOL	
2123	247	1997	22	807	EOL	
2127	067	2018	22	806	SOL	
2157	067	1967	1	806	EOL	
2202	247	1961	1	805	SOL	
2233	247	2018	22	805	EOL	
2237	067	2019	22	804	SOL	
2308	067	1974	1	804	EOL	
2312	247	1975	1	803	SOL	
2343	247	2011	22	803	EOL	
2347	067	2023	22	802	SOL	
0000				New Day	02/10/2007 Lat. 26 41.2369 Lon. 91 40.2744	
				WX	Winds N 2 Kts Seas Calm	
0018	067	1977	1	802	EOL	
0022	247	1978	1	801	SOL	
0052	247	2013	22	801	EOL	
0100	157	2001	1	904	SOL	
0114	157	1961	10	904	EOL	
0125	337	1956	10	903	SOL	
0138	337	1964	1	903	EOL	
0150	157	1997	1	902	SOL	
0203	157	1967	10	902	EOL	
0214	337	1937	10	901	SOL	

C & C TECHNOLOGIES SURVEY LOG (Hydro-station)						Page No. 1
JobNo.: 072265	Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i> Remote Vessel: C-Surveyor II™		Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log	
Date: (UTC) 2-10-07	Areas: Alam Canyon Blocks: 601 Units: Meters		Mission: run070210_1	Datum: NAD27 Projection: UTM Zone: 15N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-10 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 (200 kHz)	
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
0420					Transit to job site	
1748					On location for CTD 070210a; lowering HiPAP & getting CTD ready for deployment	
1837					CTD on bottom Y=347560.87 X=347560.87 WD=2359m	
1920					CTD on deck Begin pre-dive	
1950					Pre-dive complete	
1955					AUV in water	
2057					Activate external guidance	
2107	010	2327	29	101	SOL	
2149	010	2327	1	101	EOL	
2153	190	2337	1	102	SOL	
2233	190	2313	29	102	EOL	
2237	010	2320	29	103	SOL	
2319	010	2342	1	103	EOL	
2323	190	2342	1	104	SOL	
0000				New Day	02/11/2007 Lat. 26 21.7806 Lon. 94 31.3067	
				WX	Winds NE 22 Kts. Seas 2m	
0003	190	2310	29	104	EOL	
0007	010	2298	28	105	SOL	
0048	010	2350	1	105	EOL	
0053	190	2356	1	106	SOL	
0131	190	2269	28	106	EOL	
0135	010	2282	28	107	SOL	
0216	010	2362	1	107	EOL	
0220	190	2361	1	108	SOL	
0258	190	2283	28	108	EOL	
0305	280	2263	11	205	SOL	
0320	280	2327	1	205	EOL	
0331	100	2332	1	204	SOL	
0347	100	2255	11	204	EOL	
0358	280	2308	11	203	SOL	
0413	280	2291	1	203	EOL	

C & C TECHNOLOGIES AUV COS SURVEY LOG						Page No. 1	
Job No: 072265		Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i>		Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log	
Mission Name:		Area: AT Valley Block: 340		Survey Units: Meters		Datum: WGS84 Projection: UTM Zone: 16N	
Date: 2/7/2007		Geophysical Equipment: Edgetech 216 FSSB Profiler (2-6 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 Multibeam (200 kHz)					
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks		
09:48					Start Prediver		
10:06					Prediver Complete		
10:19					Pin Pulled		
10:20					Aquatic Fish in Water		
10:20					AUV in Water		
10:28					AUV at 300 Pitch Roll -0.1		
10:34					AUV at 600 Pitch 3.4 Roll -0.1		
10:41					AUV at 900 Pitch -2.8 Roll -0.1		
10:49					AUV at 1200 Pitch -2.3 Roll -0.2		
10:56					AUV at 1500 Pitch 3.8 Roll -0.1		
11:03					AUV at 1800 Pitch 3.6 Roll 0.1		
11:10					AUV at 2100 Pitch 3.3 Roll -0.2		
11:13					AUV at 2180 Pitch 3.3 Roll -0.2		
11:18					AUV on External Guidance		
11:30	180	2243	1	301	SOL		
11:53	180	2209	16	301	EOL		
11:58	360	2209	16	302	SOL		
12:19	360	2243	1	302	EOL		
12:23	180	2244	1	303	SOL		
12:46	180	2214	16	303	EOL		
12:50	360	2216	16	304	SOL		

C & C TECHNOLOGIES AUV COS SURVEY LOG						Page No. 2
Job No: 072265 Mission Name:			Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i>	Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log
Date: 2/7/2007		Area: AT Valley Block: 340		Survey Units: Meters	Datum: WGS84 Projection: UTM Zone: 16N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-6 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 Multibeam (200 kHz)
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
13:11	360	2242	1	304	EOL	
13:15	180	2243	1	305	SOL	
13:38	180	2217	16	305	EOL	
13:43	360	2216	16	306	SOL	
14:03	360	2240	1	306	EOL	
14:08	180	2242	1	307	SOL	
14:31	180	2218	16	307	EOL	
14:35	360	2222	16	308	SOL	
14:56	360	2245	1	308	EOL	
15:00	180	2258	1	309	SOL	
15:23	180	2227	16	309	EOL	
15:27	360	2232	16	310	SOL	
15:48	360	2271	1	310	EOL	
15:52	180	2279	1	311	SOL	
16:15	180	2238	16	311	EOL	
16:19	360	2241	16	312	SOL	
16:41	360	2286	1	312	EOL	
16:45	180	2295	1	313	SOL	
17:08	180	2246	16	313	EOL	
17:16	270	2251	1	403	SOL	
17:39	270	2207	16	403	EOL	

C & C TECHNOLOGIES AUV COS SURVEY LOG						Page No. 3
Job No: 072265 Mission Name:			Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i>	Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log
Date: 2/7/2007		Area: AT Valley Block: 340		Survey Units: Meters	Datum: WGS84 Projection: UTM Zone: 16N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-6 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 Multibeam (200 kHz)
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
1750	090	2211	16	402	SOL	
1800					Shif Change D. Aucoin C. Gibbens	
1811	090	2254	1	402	EOL	
1822	270	2294	1	401	SOL	
1845	270	2233	16	401	EOL	
1856	270	2256	12	512	SOL	
1913	270	2251	1	512	EOL	
1918	090	2246	1	513	SOL	
1933	090	2248	12	513	EOL	
1938	270	2242	12	514	SOL	
1954	270	2242	1	514	EOL	
2000	090	2238	1	515	SOL	
2015	090	2237	12	515	EOL	
2020	270	2233	12	516	SOL	
2036	270	2233	1	516	EOL	
2041	090	2227	1	517	SOL	
2057	090	2230	12	517	EOL	
2102	270	2225	12	518	SOL	
2118	270	2221	1	518	EOL	
2123	090	2213	1	519	SOL	

C & C TECHNOLOGIES AUV COS SURVEY LOG						Page No. 4
Job No: 072265 Mission Name:			Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i>	Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log
Date:		Area: AT Valley Block: 340	Survey Units: Meters	Datum: WGS84 Projection: UTM Zone: 16N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-6 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 Multibeam (200 kHz)	
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
2139	090	2223	12	519	EOL	
2144	270	2222	12	520	SOL	
2200	270	2209	1	520	EOL	
2205	090	2207	1	521	SOL	
2221	090	2221	12	521	EOL	
2225	270	2222	12	522	SOL	
2242	270	2205	1	522	EOL	
2249	000	2210	16	501	SOL	
2312	000	2252	1	501	EOL	
2316	180	2254	1	502	SOL	
2337	180	2211	16	502	EOL	
2341	000	2212	16	503	SOL	
0003	000	2253	1	503	EOL	
0007	180	2255	1	504	SOL	
0028	180	2213	16	504	EOL	
0031	000	2214	16	505	SOL	
0054	000	2257	1	505	EOL	
0057	180	2256	1	506	SOL	
0119	180	2215	16	506	EOL	
0122	000	2215	16	507	SOL	
0144	000	2255	1	507	EOL	

C & C TECHNOLOGIES AUV COS SURVEY LOG						Page No. 1	
Job No: 072265		Client: HYDRO Gulf of Mexico, LLC		Vessel: R/V <i>Northern Resolution</i>		Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log	
Mission Name:		Area: Green Canyon Block: 852		Survey Units: Meters		Datum: WGS84 Projection: UTM Zone: 15N	
Date: 2 / 8 / 07		Geophysical Equipment: Edgetech 216 FSSB Profiler (2-6 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 Multibeam (200 kHz)					
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks		
2215					Start Prediver		
2235					Prediver Complete		
2241					Pin Pulled		
2243					AUV In Water		
2247					Aquatic Fish In Water		
2252					AUV At 300 Pitch 3.1 Roll .2		
2259					AUV At 600 Pitch 3.6 Roll 0.2		
2305					AUV At 900 Pitch 3.3 Roll 0.3		
2312					AUV At 1200 Pitch 4.0 Roll 0.2		
2316					AUV At 1400 Pitch 3.6 Roll 0.1		
2319					AUV At 1500 Pitch 4.4 Roll 0.1		
2322					AUV At 1600 Pitch 2.8 Roll 0.0		
2328					AUV At 1700 Pitch 2.5 Roll 0.1		
2336					AUV On External Guidance		
2343	180	1700	1	601	SOL		
0018	180	1650	24	601	EOL		
0023	000	1642	24	602	SOL		
0055	000	1671	1	602	EOL		
0059	180	1642	1	603	SOL		
0134	180	1632	24	603	EOL		
0138	000	1620	24	604	SOL		

C & C TECHNOLOGIES AUV COS SURVEY LOG						Page No. 2
Job No: 072265 Mission Name:			Client: HYDRO Gulf of Mexico, LLC		Vessel: R/V <i>Northern Resolution</i>	Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log
Date: 2/8/2007		Area: Green Canyon Block: 852		Survey Units: Meters	Datum: WGS84 Projection: UTM Zone: 15N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-6 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 Multibeam (200 kHz)
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
0212	000	1609	1	604	EOL	
0216	180	1581	1	605	SOL	
0250	180	1610	24	605	EOL	
0255	000	1592	24	606	SOL	
0328	000	1573	1	606	EOL	
0333	180	1555	1	607	SOL	
0407	180	1576	24	607	EOL	
0411	000	1557	24	608	SOL	
0445	000	1537	1	608	EOL	
0449	180	1526	1	609	SOL	
0523	180	1535	24	609	EOL	
0527	000	1552	24	610	SOL	
0602	000	1535	1	610	EOL	
0605	180	1526	1	611	SOL	
0639	180	1575	24	611	EOL	
0643	000	1595	24	612	SOL	
0717	000	1546	1	612	EOL	
0721	180	1569	1	613	SOL	
0755	180	1599	24	613	EOL	
0758	000	1625	24	614	SOL	
0832	000	1578	1	614	EOL	

C & C TECHNOLOGIES AUV COS SURVEY LOG						Page No. 3
Job No: 072265 Mission Name:			Client: HYDRO Gulf of Mexico, LLC		Vessel: R/V <i>Northern Resolution</i>	Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log
Date: 2/8/07		Area: Green Canyon Block: 852		Survey Units: Meters	Datum: WGS84 Projection: UTM Zone: 15N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-6 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 Multibeam (200 kHz)
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
0836	180	1586	1	615	SOL	
0910	180	1618	24	615	EOL	
0914	000	1608	24	616	SOL	
0948	000	1603	1	616	EOL	
0956	270	1600	1	701	SOL	
1022	270	1700	19	701	EOL	
1035	090	1680	19	702	SOL	
1102	090	1590	1	702	EOL	
1113	270	1606	1	703	SOL	
1140	270	1693	19	703	EOL	
1152	090	1669	19	704	SOL	
1218	090	1602	1	704	EOL	
1219					Stop External Guidance	
1225					Set depth @ 1530	
1229					Set depth @ 1500	
1238					Set depth @ 1200	
1248					Set depth @ 900	
1251					Set depth @ 600	
1303					AUV Enter Line 24	
1325					AUV on Surface	
1338					AUV on Deck	

C & C TECHNOLOGIES AUV COS SURVEY LOG						Page No. 1
Job No: 072265		Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i>		Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log
Mission Name:		Area: Walker Ridge Block: 269		Survey Units: Meters	Datum: WGS84 Projection: UTM Zone: 15N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-6 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 Multibeam (200 kHz)
Date: 2/9/2007						
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
1900					Start Prediver	
1913					Prediver Complete	
1914					Pin Pulled	
1915					AUV In Water	
1919					Aquatic Fish In Water	
1925					AUV @ 300 Pitch 3.3 Roll 0.3	
1930					AUV @ 600 Pitch 4.0 Roll 0.3	
1937					AUV @ 900 Pitch 3.4 Roll 0.3	
1944					AUV @ 1200 Pitch 3.5 Roll 0.1	
1951					AUV @ 1500 Pitch 1.9 Roll 0.1	
2000					AUV @ 1800 Pitch 3.3 Roll 0.0	
2000					AUV @ 1900 Pitch 3.4 Roll 0.1	
2006					AUV @ 1965 Pitch 3.3 Roll 0.0	
2010					AUV On External Guidance	
2018	067	1994	22	808	SOL	
2048	067	1944	1	808	EOL	
2052	247	1948	1	807	SOL	
2123	247	1997	22	807	EOL	
2127	067	2016	22	806	SOL	
2157	067	1967	1	806	EOL	
2202	247	1961	1	805	SOL	

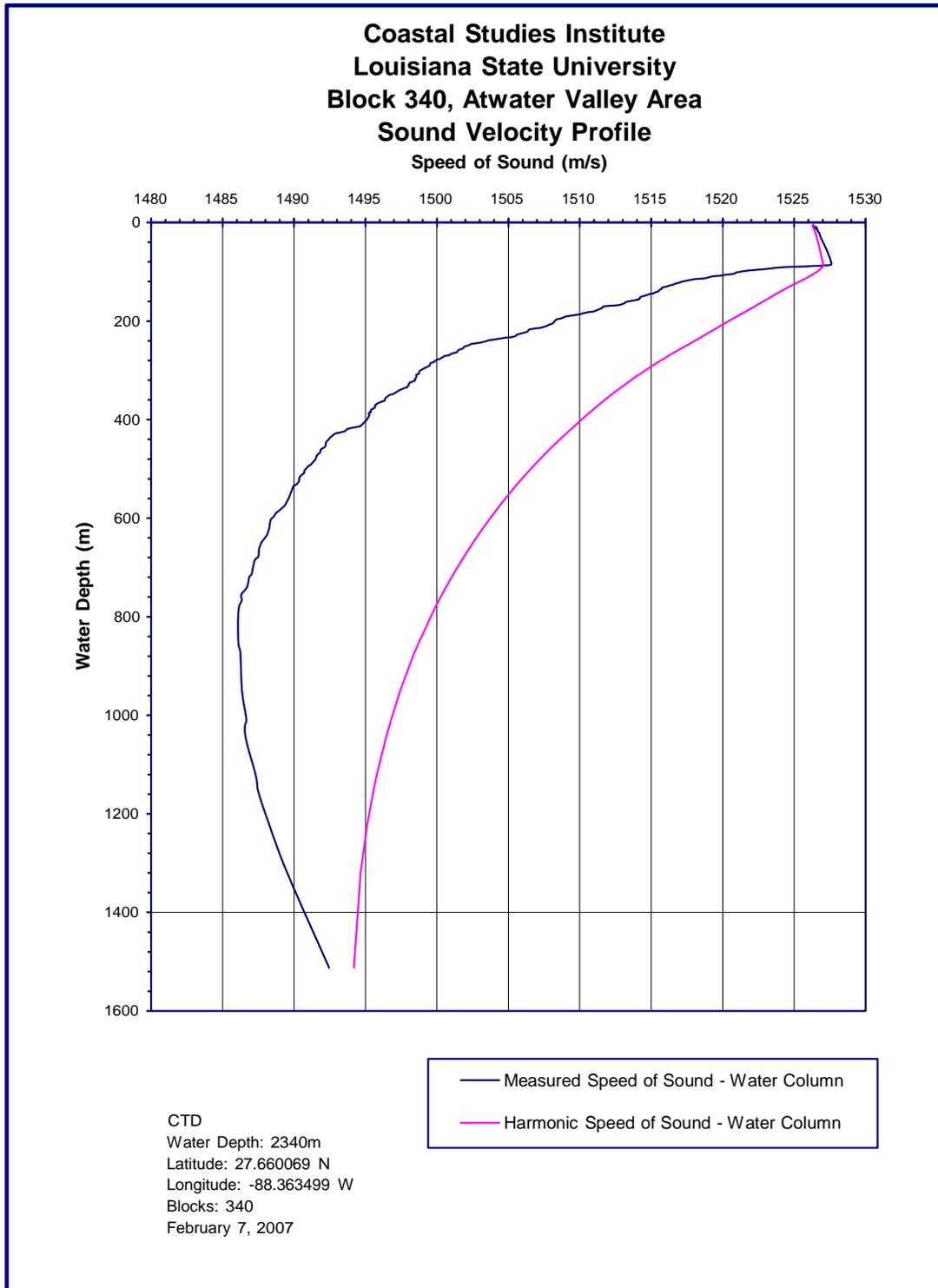
C & C TECHNOLOGIES AUV COS SURVEY LOG						Page No. 2
Job No: 072265 Mission Name:			Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i>	Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log
Date: 2/9/2007		Area: Walker Ridge Block: 269		Survey Units: Meters	Datum: WGS84 Projection: UTM Zone: 15N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-6 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 Multibeam (200 kHz)
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
2233	247	2018	22	805	EOL	
2237	067	2019	22	804	SOL	
2308	067	1974	1	804	EOL	
2312	247	1975	1	803	SOL	
2343	247	2011	22	803	EOL	
2347	067	2023	22	802	SOL	
0018	067	1977	1	802	EOL	
0022	247	1978	1	801	SOL	
0052	247	2013	22	801	EOL	
0100	157	2001	1	904	SOL	
0114	157	1961	10	904	EOL	
0125	337	1956	10	903	SOL	
0138	337	1964	1	903	EOL	
0150	157	1997	1	902	SOL	
0203	157	1967	10	902	EOL	
0214	337	1937	10	901	SOL	
0228	337	1982	1	901	EOL	
0230					Starting Ascent Procedures, Job Complete	
0232					Stop External Guidance	
0346					AUV on surface	
0358					Pin In	

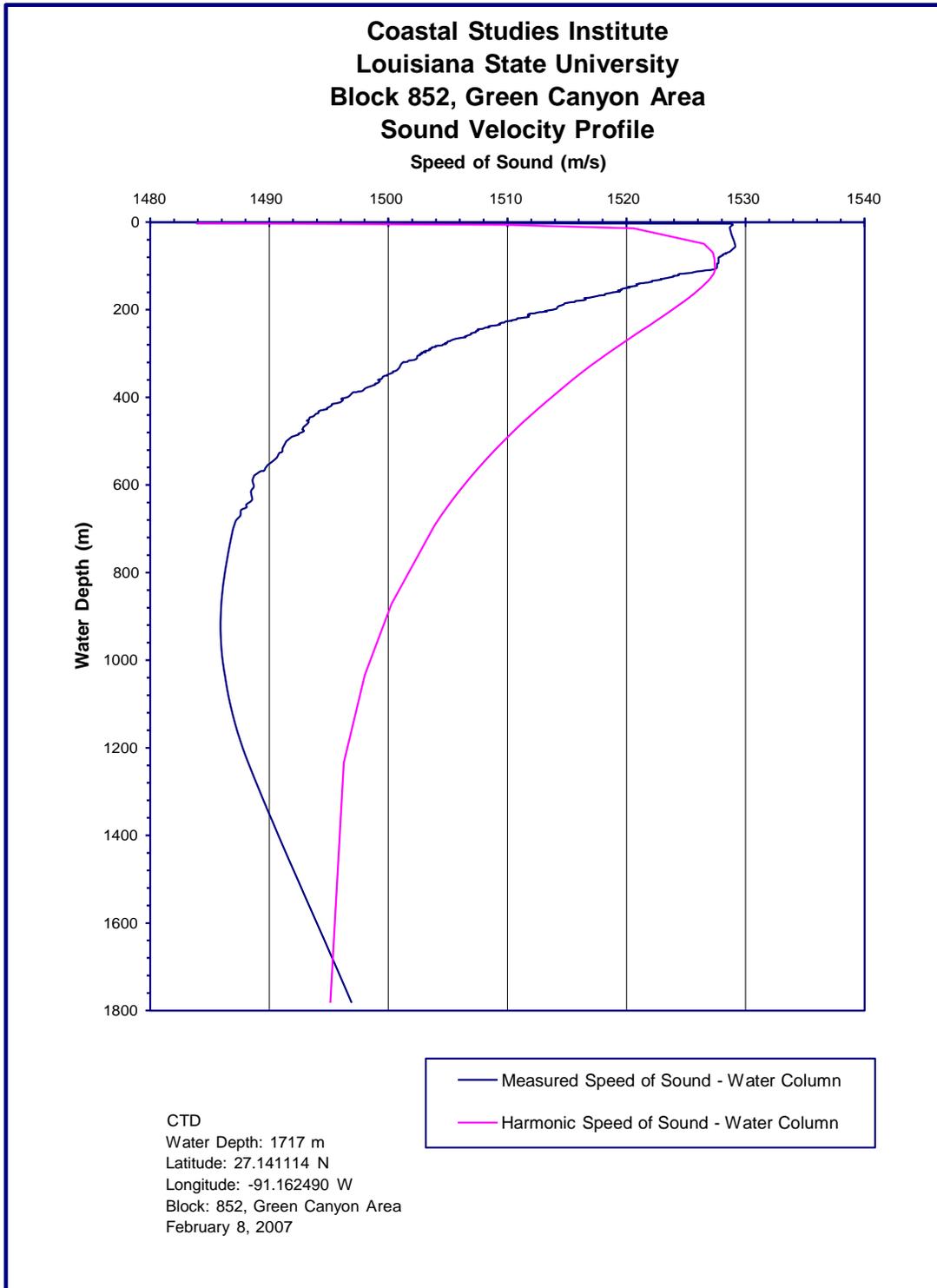
C & C TECHNOLOGIES AUV COS SURVEY LOG							Page No. 1
Job No: 072265			Client: Louisiana State University			Vessel: R/V <i>Northern Resolution</i>	Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log
Mission Name:			Area: Alam Canyon	Block: 601	Survey Units: Meters	Datum: WGS84	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-6 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 Multibeam (200 kHz)
Date:	Area: Alam Canyon	Block: 601	Survey Units: Meters	Datum: WGS84	Projection: UTM	Zone: 15N	
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks		
1935					Start Prediver		
1945					Prediver Complete		
1954					Pin Pulled		
1955					AUV In Water		
1958					Aquatic Fish In Water		
2003					AUV @ 300 Pitch 3.6 Roll -0.3		
2010					AUV @ 600 Pitch 3.7 Roll -0.5		
2016					AUV @ 900 Pitch 3.3 Roll -0.4		
2023					AUV @ 1200 Pitch 3.7 Roll -0.2		
2029					AUV @ 1500 Pitch 3.1 Roll -0.2		
2036					AUV @ 1800 Pitch 3.7 Roll -0.2		
2042					AUV @ 2100 Pitch 3.8 Roll 0.0		
2046					AUV @ 2200 Pitch 3.0 Roll -0.2		
2050					AUV @ 2300 Pitch 1.9 Roll 1.8		
2053					AUV @ 2360 Pitch 3.0 Roll -0.1		
2057					AUV On External Guidance		
2107	010	2327	29	101	SOL		
2149	010	2327	1	101	EOL		
2153	190	2337	1	102	SOL		
2233	190	2323	29	102	EOL		
2237	010	2320	29	103	SOL		

C & C TECHNOLOGIES AUV COS SURVEY LOG						Page No. 2
Job No: 072265 Mission Name:			Client: Louisiana State University		Vessel: R/V <i>Northern Resolution</i>	Survey Equipment: DGPS, Inertial Navigation, HiPAP, Doppler Speed Log
Date:		Area: Alam Canyon Block: 601		Survey Units: Meters	Datum: WGS84 Projection: UTM Zone: 15N	Geophysical Equipment: Edgetech 216 FSSB Profiler (2-6 kHz), Edgetech Dual Frequency SSS (120 & 410 kHz), Simrad EM 2000 Multibeam (200 kHz)
Time (UTC) (-6 to Local)	Heading	Water Depth	Fix No.	Line Name	Remarks	
2319	010	2342	1	103	EOL	
2323	190	2342	1	104	SOL	
0003	190	2310	29	104	EOL	
0007	010	2298	28	105	SOL	
0048	010	2350	1	105	EOL	
0053	190	2356	1	106	SOL	
0131	190	2269	28	106	EOL	
0135	010	2283	28	107	SOL	
0216	010	2362	1	107	EOL	
0220	190	2361	1	108	SOL	
0258	190	2283	28	108	EOL	
0305	280	2263	11	205	SOL	
0320	280	2327	1	205	EOL	
0331	100	2332	1	204	SOL	
0347	100	2255	11	204	EOL	
0358	280	2308	11	203	SOL	
0413	280	2291	1	203	EOL	
0424	100	2309	1	202	SOL	
0439	100	2351	11	202	EOL	
0451	280	2362	11	201	SOL	
0505	280	2333	1	201	EOL	

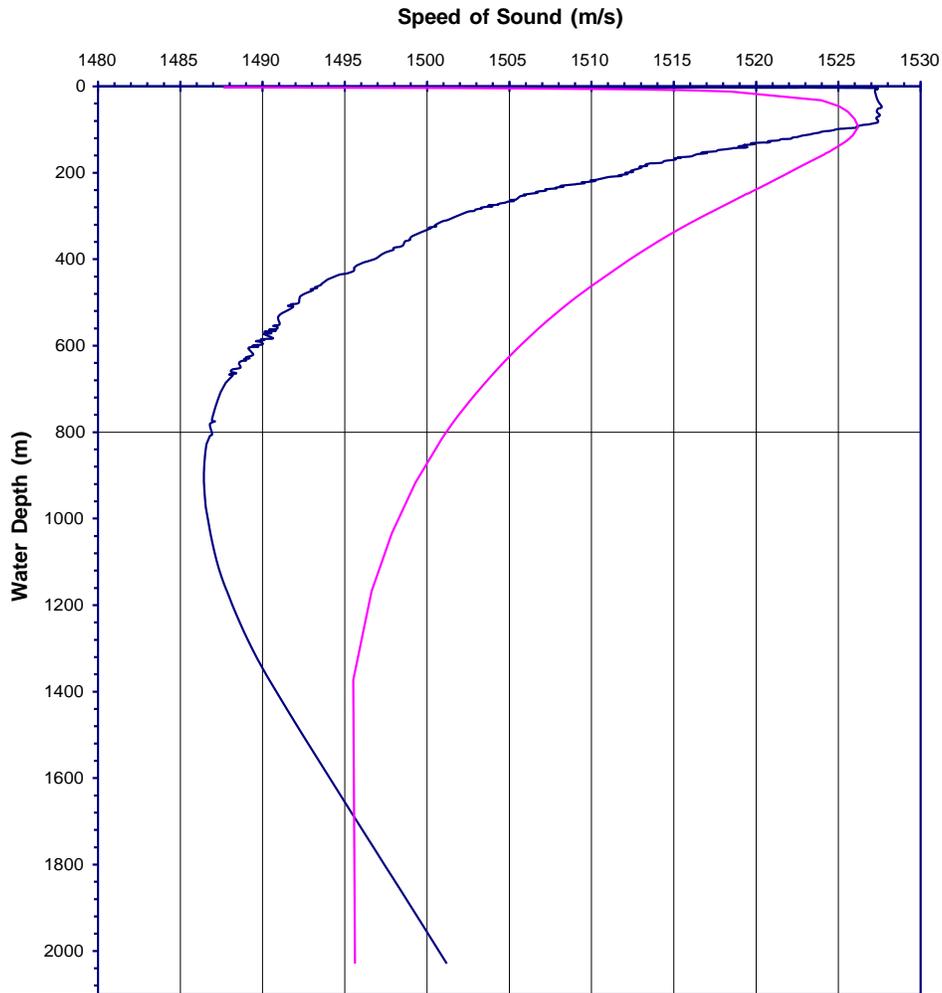
APPENDIX 3-C

Water Column Sound Velocity Profiles



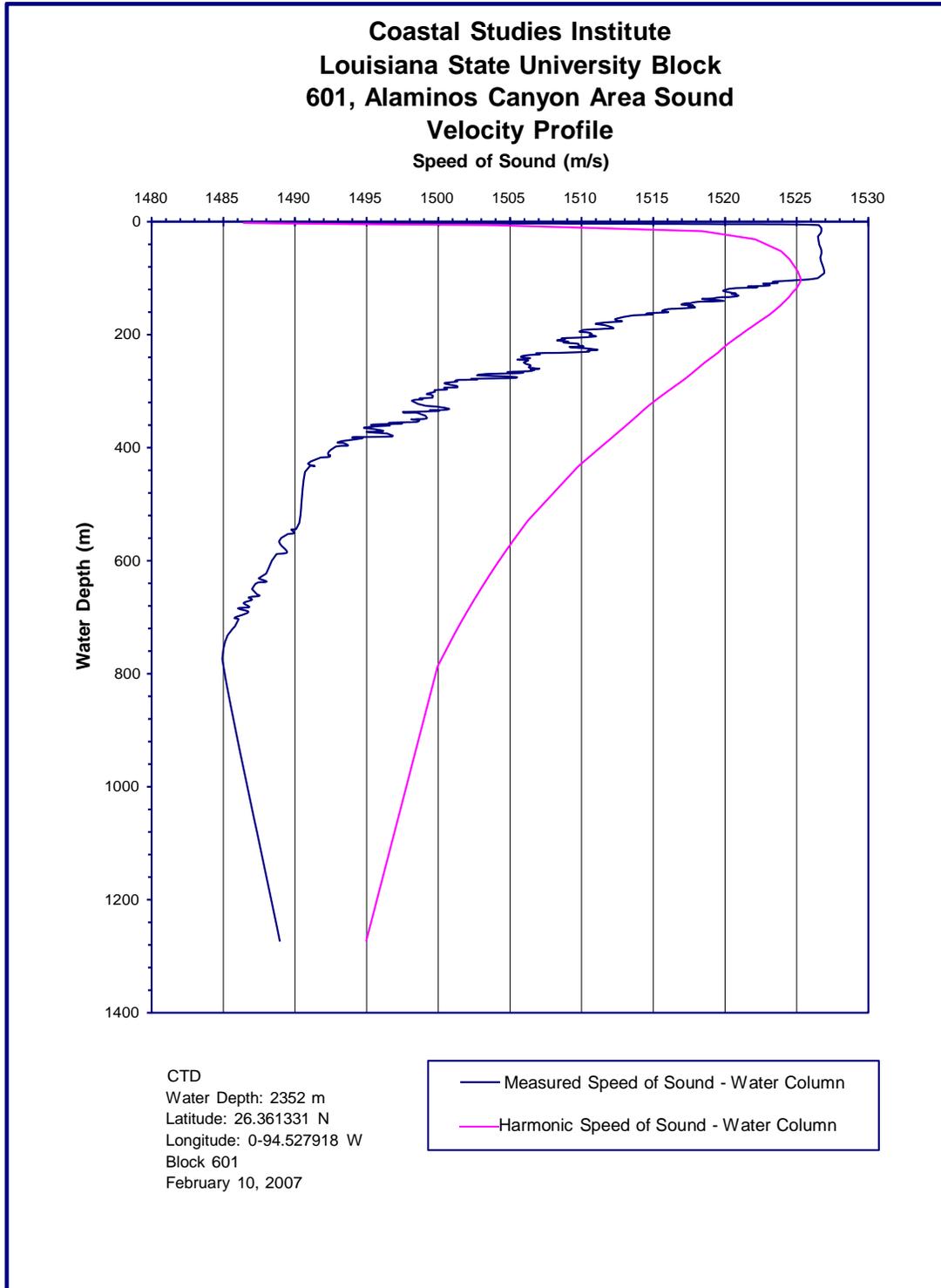


Coastal Studies Institute
Louisiana State University
Block 269, Walker Ridge Area
Sound Velocity Profile



CTD
Water Depth: 2029 m
Latitude: 26.672246 N
Longitude: -91.687049 W
Block: 269
February 9, 2007

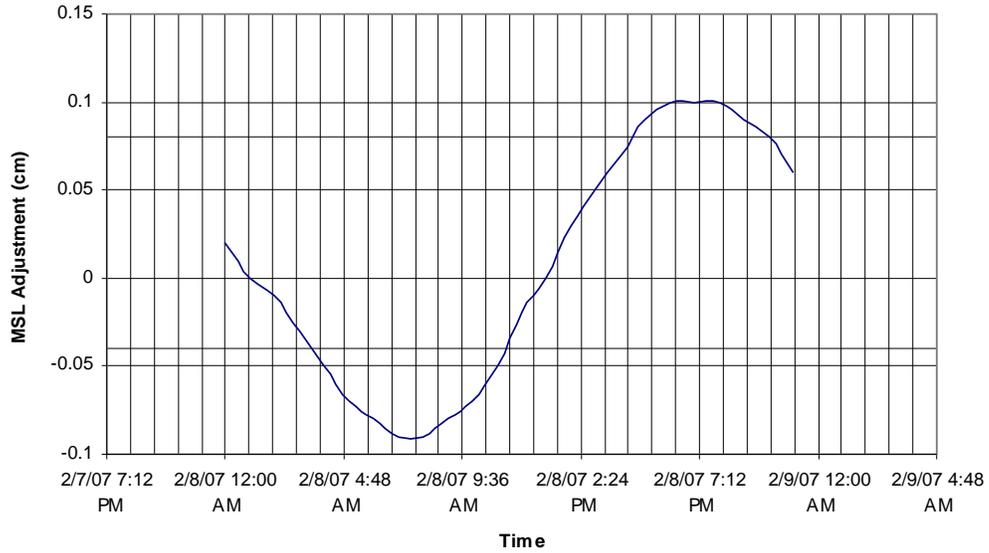
— Measured Speed of Sound - Water Column
— Harmonic Speed of Sound - Water Column



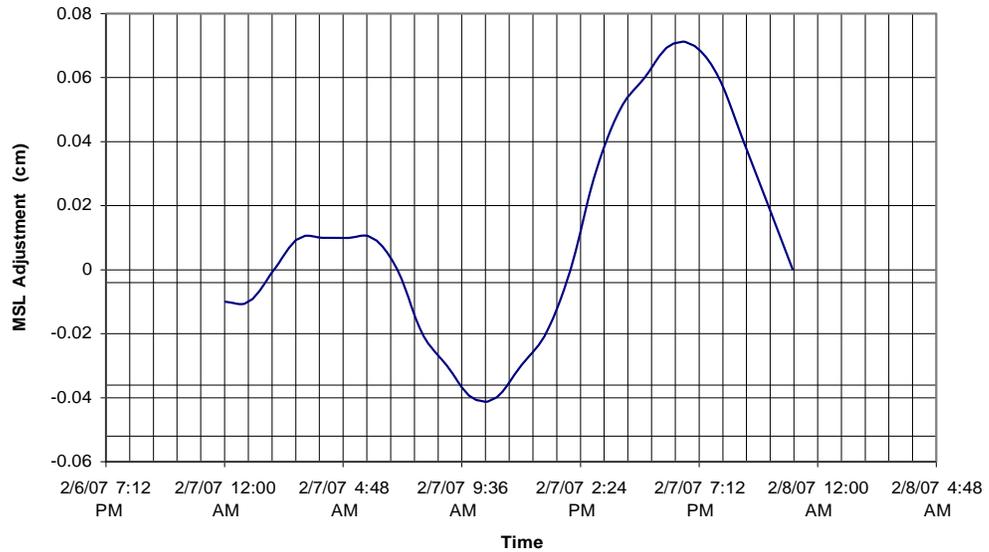
APPENDIX 3-D

Tide Curves

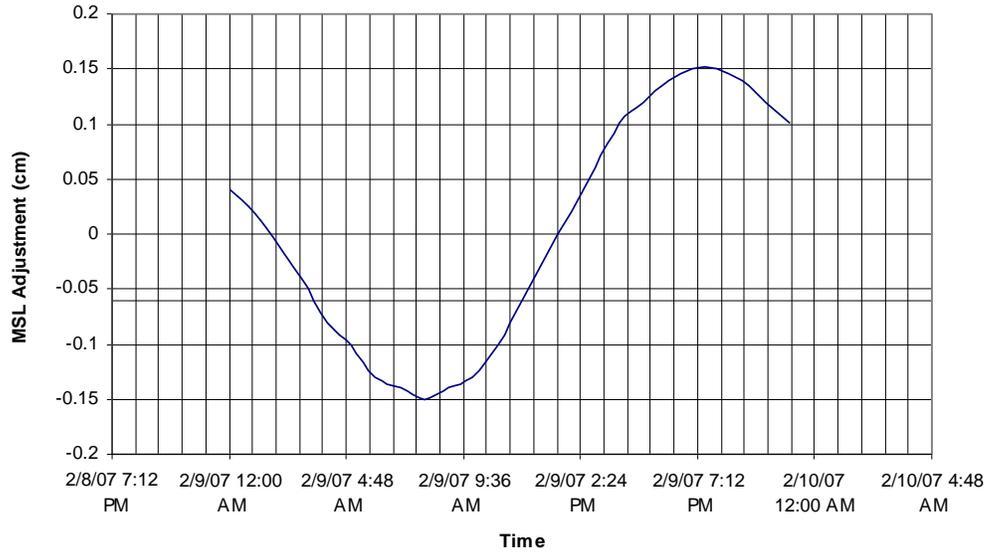
**Goddard Global Ocean Tide Model
 ARCHAEOLOGICAL ASSESSMENT STUDY
 BLOCK 852, GREEN CANYON AREA**



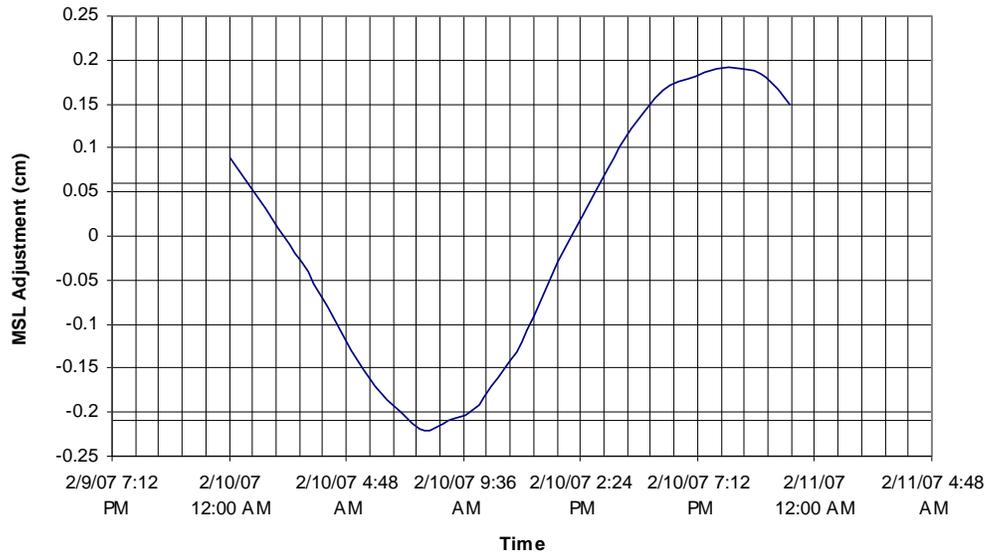
**Goddard Global Ocean Tide Model
 ARCHAEOLOGICAL ASSESSMENT STUDY
 BLOCK 340, ATWATER VALLEY AREA**



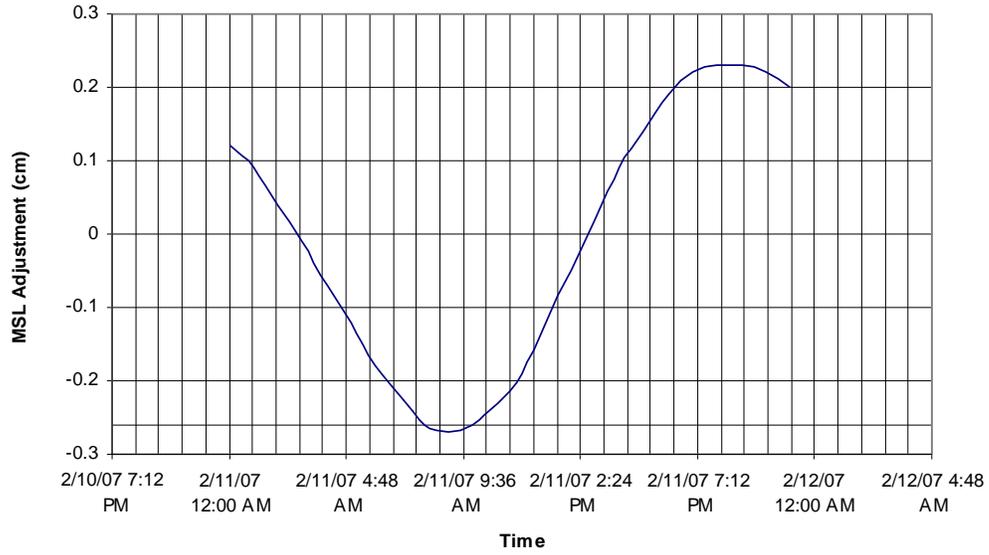
**Goddard Global Ocean Tide Model
ARCHAEOLOGICAL ASSESSMENT STUDY
BLOCK 269, WALKER RIDGE AREA**



**Goddard Global Ocean Tide Model
ARCHAEOLOGICAL ASSESSMENT STUDY
BLOCK 601, ALAMINOS CANYON AREA**

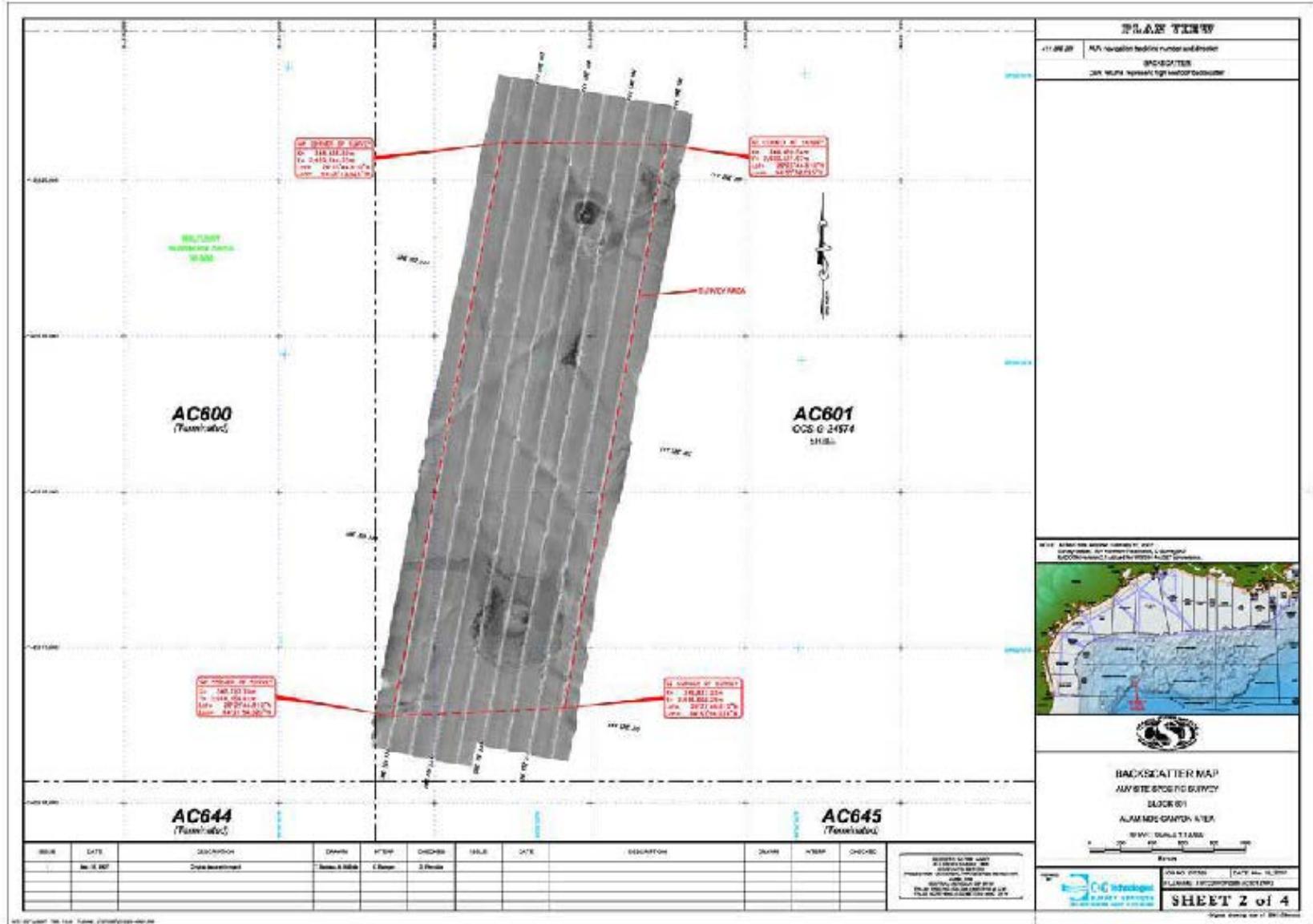


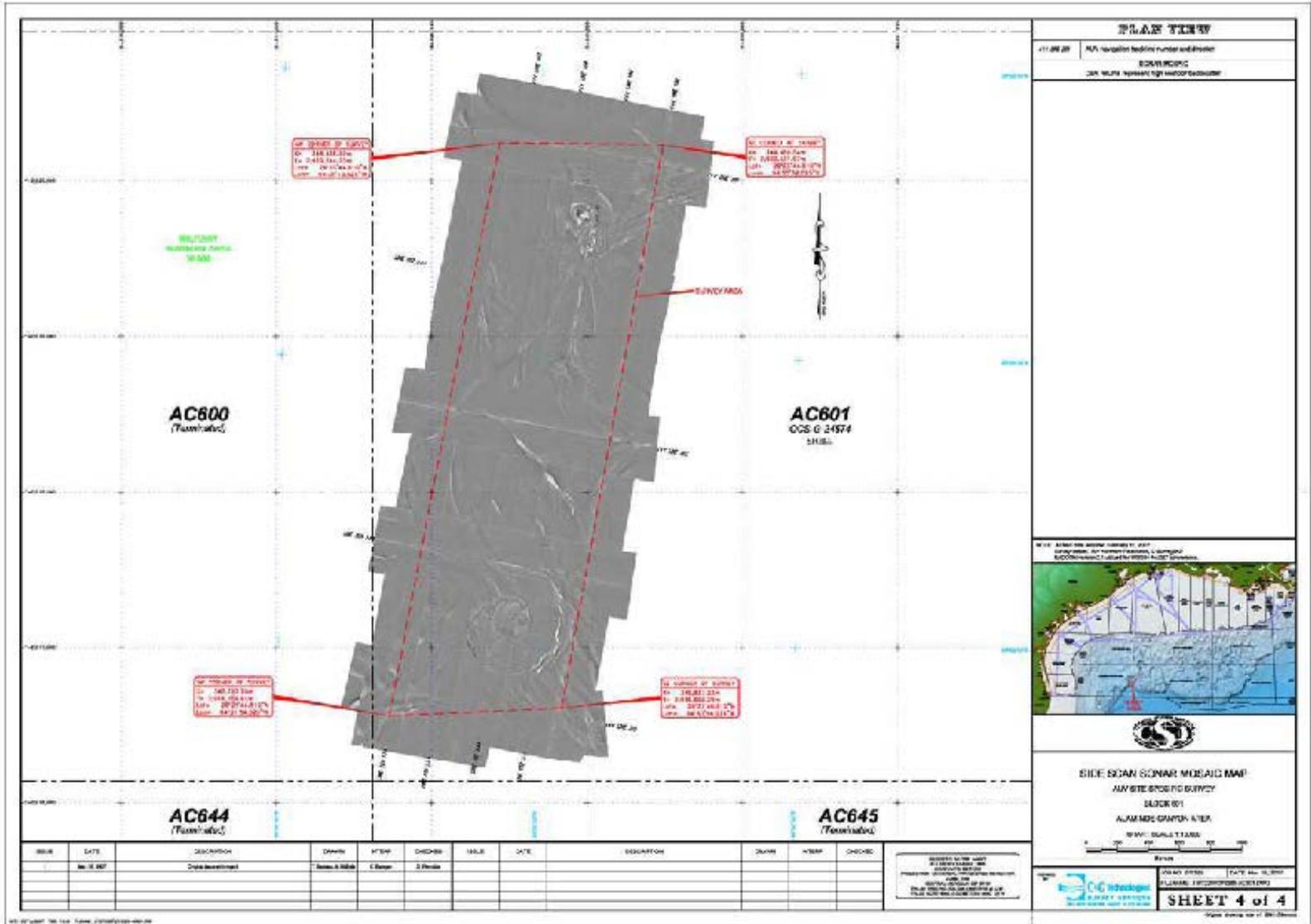
Goddard Global Ocean Tide Model
ARCHAEOLOGICAL ASSESSMENT STUDY
BLOCK 601, ALAMINOS CANYON AREA



APPENDIX 3-E
AUV Maps

AC601





PLAN VIEW
 11.08.07
 NA Navigation Station number and date
 ECHOSOUND
 200 Meters depth range hydrotransducer



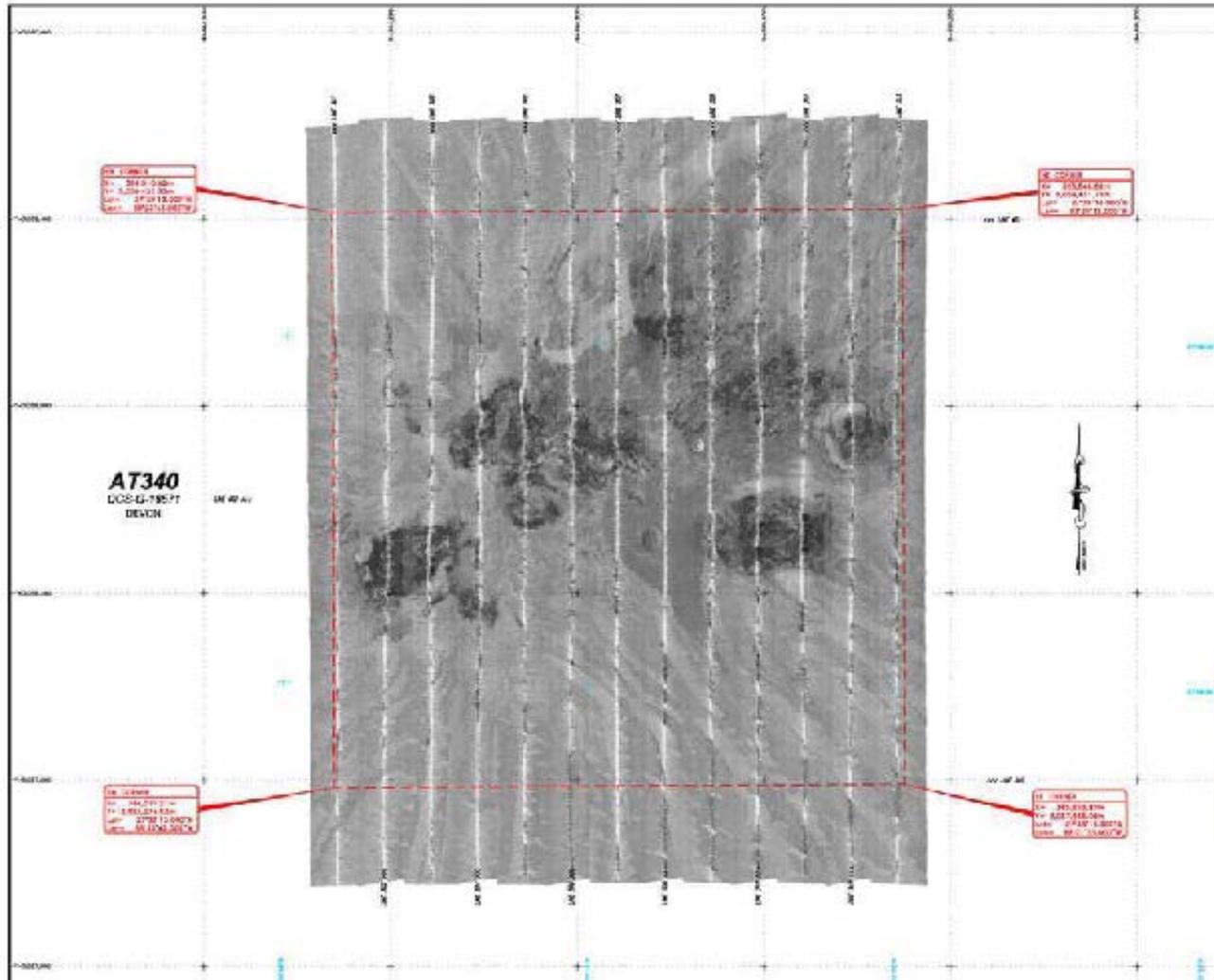
SHIP SCAN SONAR MOBLOG MAP
 ANY SITE SPECIFIC SURVEY
 SURVEY 01
 ALFAMDE GANTAN AREA
 WWW: SCALE 1:1000
 0 200 400 600 800
 Meters

DATE	DESCRIPTION	DRAWN	HT/DP	CHECKED	SCALE	DATE	DESCRIPTION	DRAWN	HT/DP	CHECKED
11.08.07	Depth measurement	Steve G. Miller	C. Brown	J. P. Miller						

SHIP SCAN SONAR MAP
 ANY SITE SPECIFIC SURVEY
 SURVEY 01
 ALFAMDE GANTAN AREA
 WWW: SCALE 1:1000
 0 200 400 600 800
 Meters

CG International
 10000 100000 1000000
 SHEET 4 of 4
 Date: 11.08.07

AT340



PLAN VIEW

1:1 Scale
N/A. Navigation bottom number will increase
BACKSCATTER
20% NULM. Maximum light water backscatter

NOTE: AROUND THE SCATTER CHANNELS BY THE
CONTOURING, AND SURROUNDING, IS SURROUND
BACKSCATTER IS USED FOR WITH AUCD CHANNELS

BACKSCATTER MAP
NAV SITE SPECIFIC SURVEY
BLOCK 118
ATWATER/WALLEN AREA

1:10000 Scale

DATE: 10/15/2010

SHEET 2 of 4

Scale: 1:10000

DATE: 10/15/2010

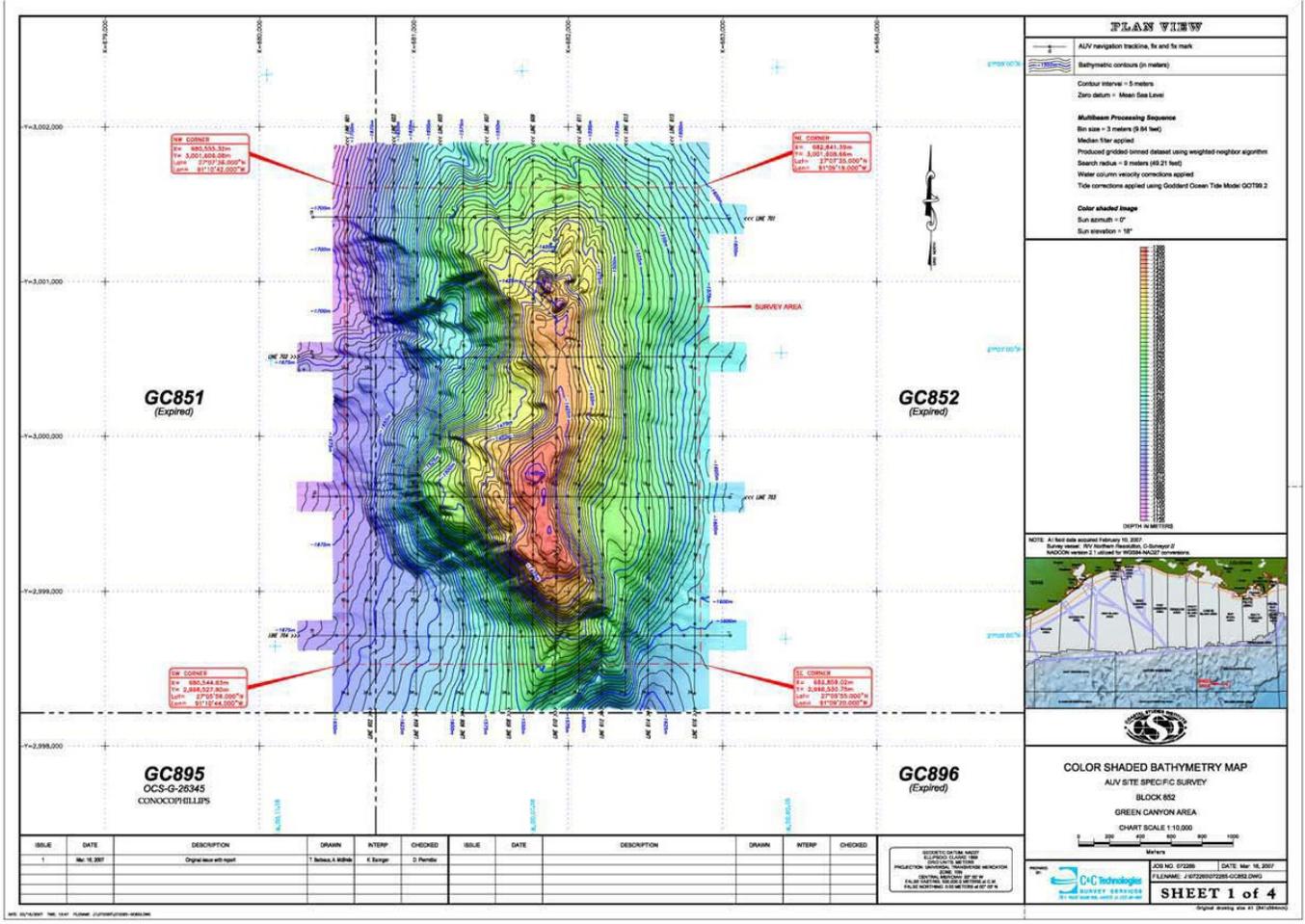
FILENAME: 095271000779.DWG

CAC Technology
S. JAMES C. CAC
10000 W. 10000 N.

ISSUE	DATE	DESCRIPTION	DRAWN	PTWP	CHECKED	SCALE	DATE	DESCRIPTION	DRAWN	PTWP	CHECKED
1	10/15/2010	Initial Development	James C. CAC	C. CAC	S. James						

ISSUED TO THE USER
BY THE USER
DATE: 10/15/2010
FILENAME: 095271000779.DWG
SCALE: 1:10000
DATE: 10/15/2010
FILENAME: 095271000779.DWG

GC852



NO.	DATE	DESCRIPTION	DRAWN	INTERP.	CHECKED	NO.	DATE	DESCRIPTION	DRAWN	INTERP.	CHECKED
1	10/18/2007	Original data report	T. Snelson & K. B. B. B.	K. B. B. B.	D. Pender						

QUALITY CONTROL CHECKED BY: [Signature]
 PROJECT: BATHYMETRY SURVEY
 DATE: 10/18/2007
 FILE NAME: [File Name]

PLAN VIEW

ALV navigation trackline, to and from mark

Bathymetric contours (in meters)

Contour interval = 5 meters
 Zero datum = Mean Sea Level

Multibeam Processing Sequence
 Bin size = 3 meters (9.84 feet)
 Median filter applied
 Produced gridded binned dataset using weighted neighbor algorithm
 Search radius = 8 meters (26.21 feet)
 Water column velocity corrections applied
 Tide corrections applied using Coastline Down Tide Model OCT09.2

Color shaded image
 Sun azimuth = 0°
 Sun elevation = 18°

DEPTH IN METERS

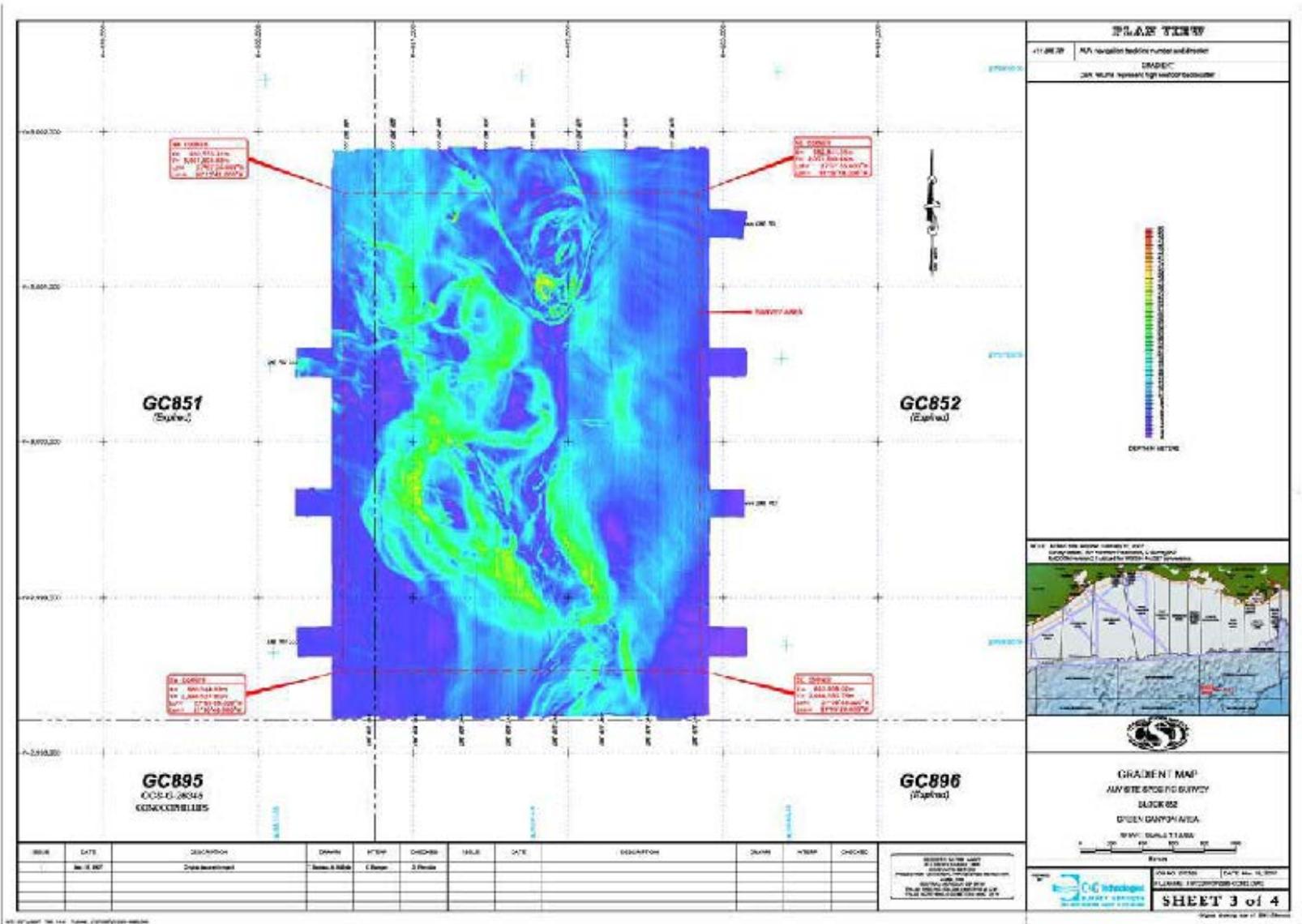
NOTE: All bath data acquired February 10, 2007
 Survey vessel: R/V Northern Renaissance, D. Snelson / D. Pender
 NOAA Chart 114 used for NOAA AOC07 corrections

CS

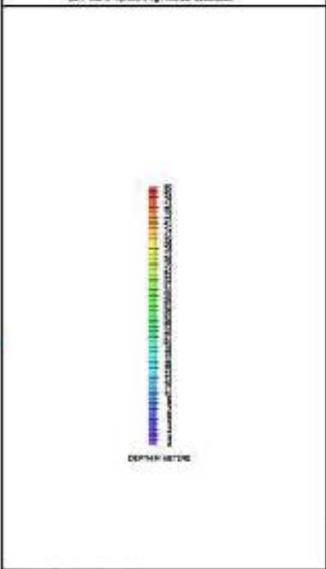
COLOR SHADED BATHYMETRY MAP
 ALV SITE SPECIFIC SURVEY
 BLOCK 852
 GREEN CANYON AREA
 CHART SCALE 1:10,000

Job No. 072386 DATE: Mar. 18, 2007
 FILE NAME: [File Name]

SHEET 1 of 4



PLAN VIEW
 N/A: location feature number and driver
 GRADE: 20% slope upward right and/or downward

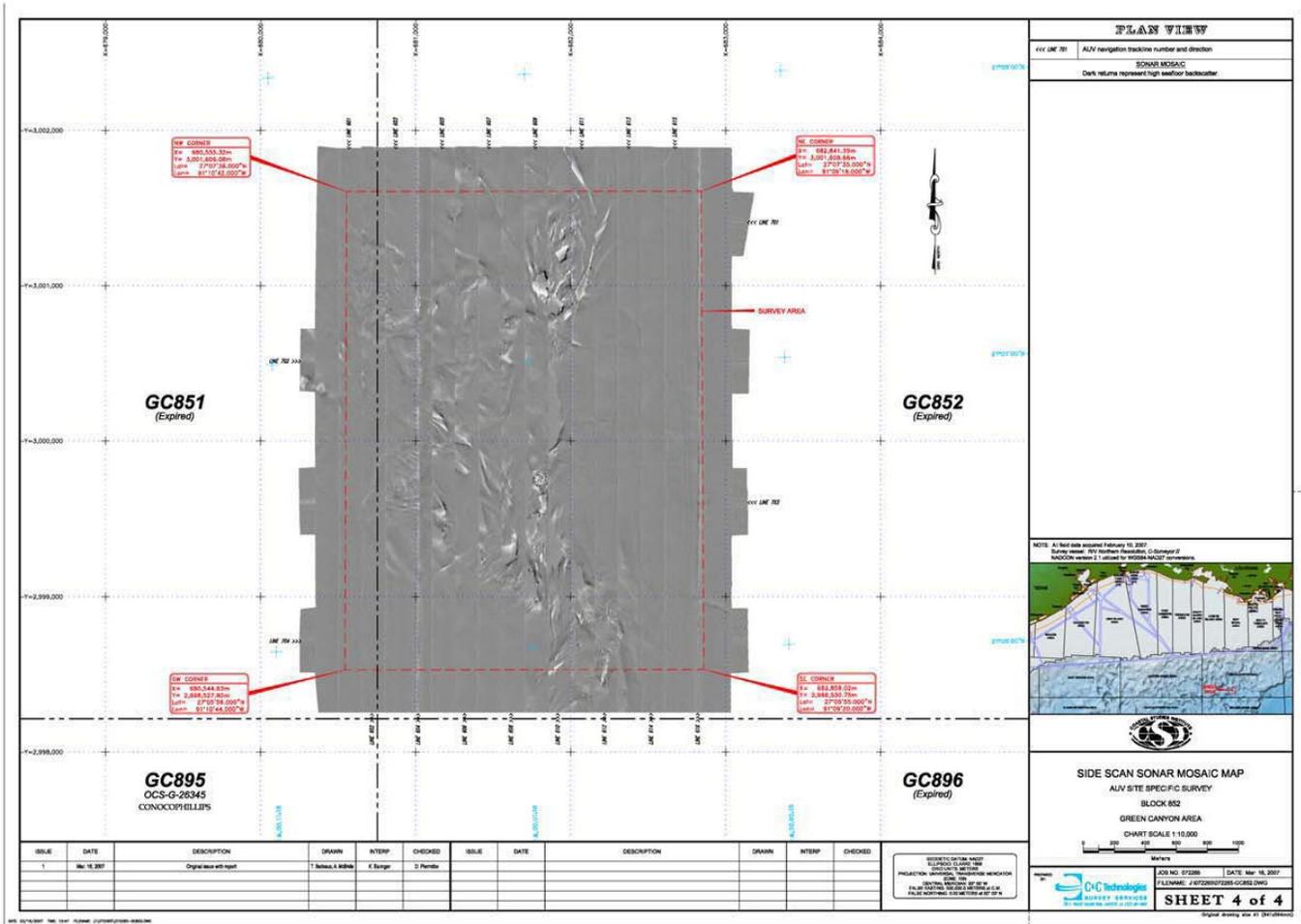


GRADIENT MAP
 ANY SITE SPECIFIC SURVEY
 BLOCK 852
 GREEN DAMPANA AREA
 SPAN: DUNLOTT AREA

NO.	DATE	DESCRIPTION	DRAWN	CHECKED	SCALE	DATE	DESCRIPTION	SCALE	DATE	DESCRIPTION
1	10/18/2017	DATA COLLECTION	James A. Miller	E. Barger	3 Feet					

DESIGNED BY THE CLIENT
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 OR A GUARANTEE OF THE
 ACCURACY OF THE DATA
 OR THE RESULTS OF THE
 ANALYSIS.

OC Technology
 SURVEY SERVICES
 10000 W. 10th Street, Suite 100
 Overland Park, KS 66204
 (913) 241-1111
SHEET 3 of 4



PLAN VIEW
 ALV track #01 ALV navigation trackline number and direction
 SONAR MOSAIC
 Dark returns represent high seafloor backscatter



GC851
(Expired)

GC852
(Expired)

GC895
OCS-G-28345
CONOCOPHILLIPS

GC896
(Expired)

SIDE SCAN SONAR MOSAIC MAP
 ALV SITE SPECIFIC SURVEY
 BLOCK 852
 GREEN CANYON AREA
 CHART SCALE 1:10,000

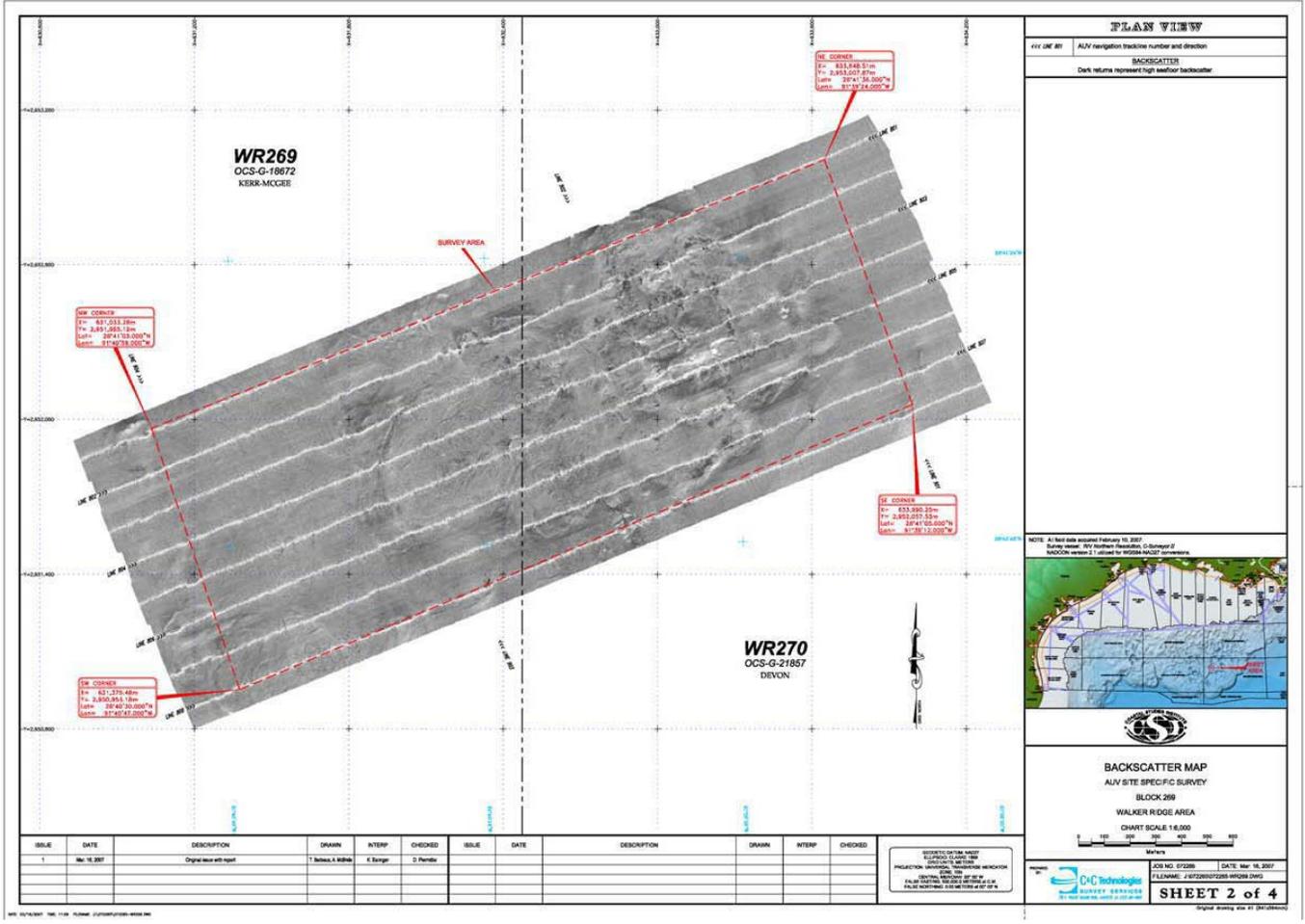
ISSUE	DATE	DESCRIPTION	DRAWN	INTERP	CHECKED	ISSUE	DATE	DESCRIPTION	DRAWN	INTERP	CHECKED
1	06/18/2007	Original data report	T. Snelson & K. Eagan	K. Eagan	D. Penick						

QUALITY CONTROL CHECKED
 PRODUCTION MANAGER, INSPECTOR
 DATE: 06/18/2007
 FILED: 06/18/2007
 PROJECT: ALV SITE SPECIFIC SURVEY
 BLOCK 852
 GREEN CANYON AREA
 CHART SCALE 1:10,000

CHC Technologies
 JOB NO. 072388 DATE: Mar 18, 2007
 FILE NAME: 072388-ALV-SPECIFIC-SURVEY
SHEET 4 of 4

NO. 072388-0001 PLAN: 072388-ALV-SPECIFIC-SURVEY

WR269



PLAN VIEW

ALV track #01 ALV navigation trackline number and direction

BACKSCATTER

Dark returns represent high seafloor backscatter

NOTE: All bath data acquired February 10, 2007
Datum used: WGS 1984 North American Datum, G-Geoid 07
MADCOG version 1.1 edited by KERR/MCCBEE



BACKSCATTER MAP

ALV SITE SPECIFIC SURVEY

BLOCK 269

WALKER RIDGE AREA

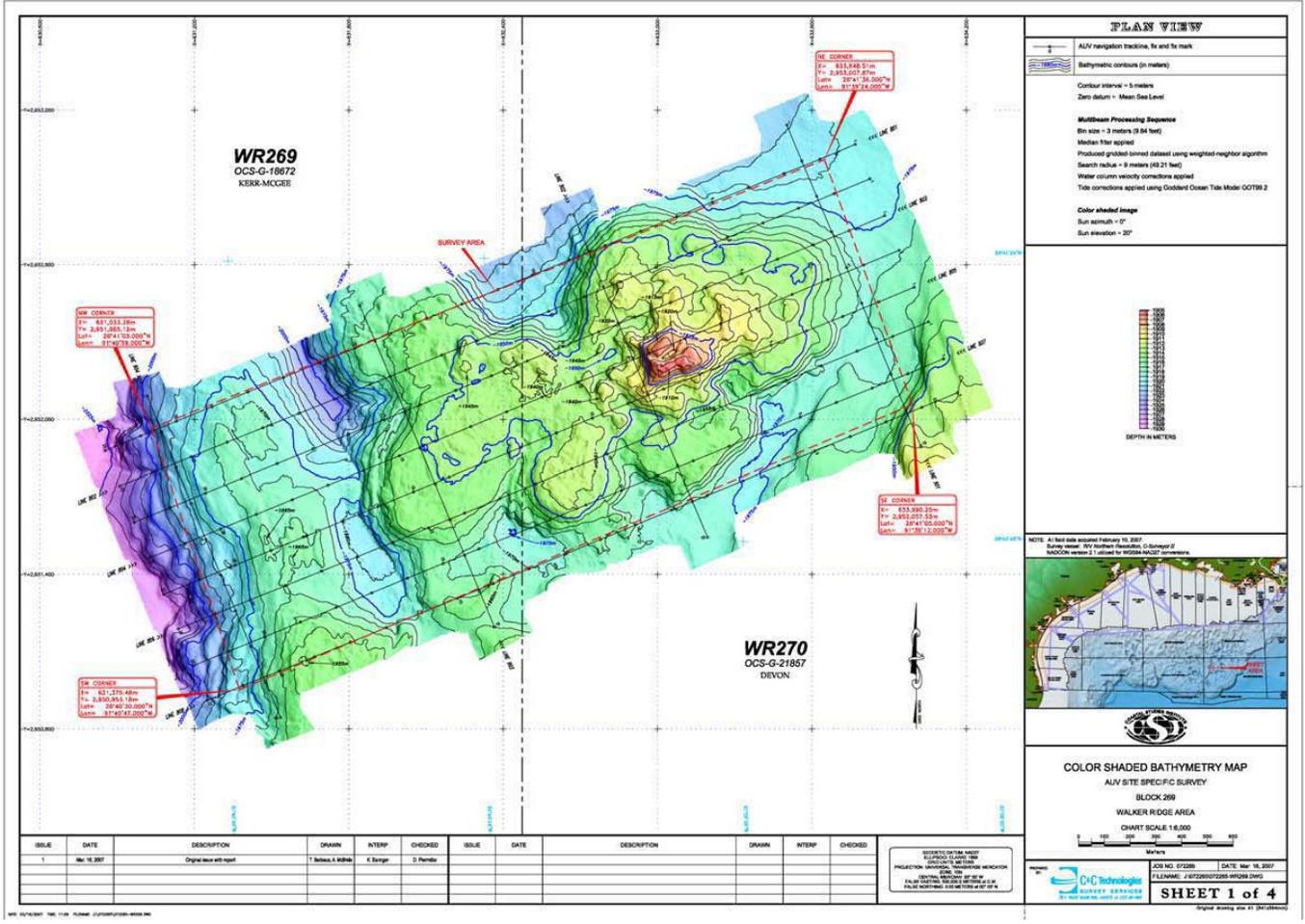
CHART SCALE 1:6,000

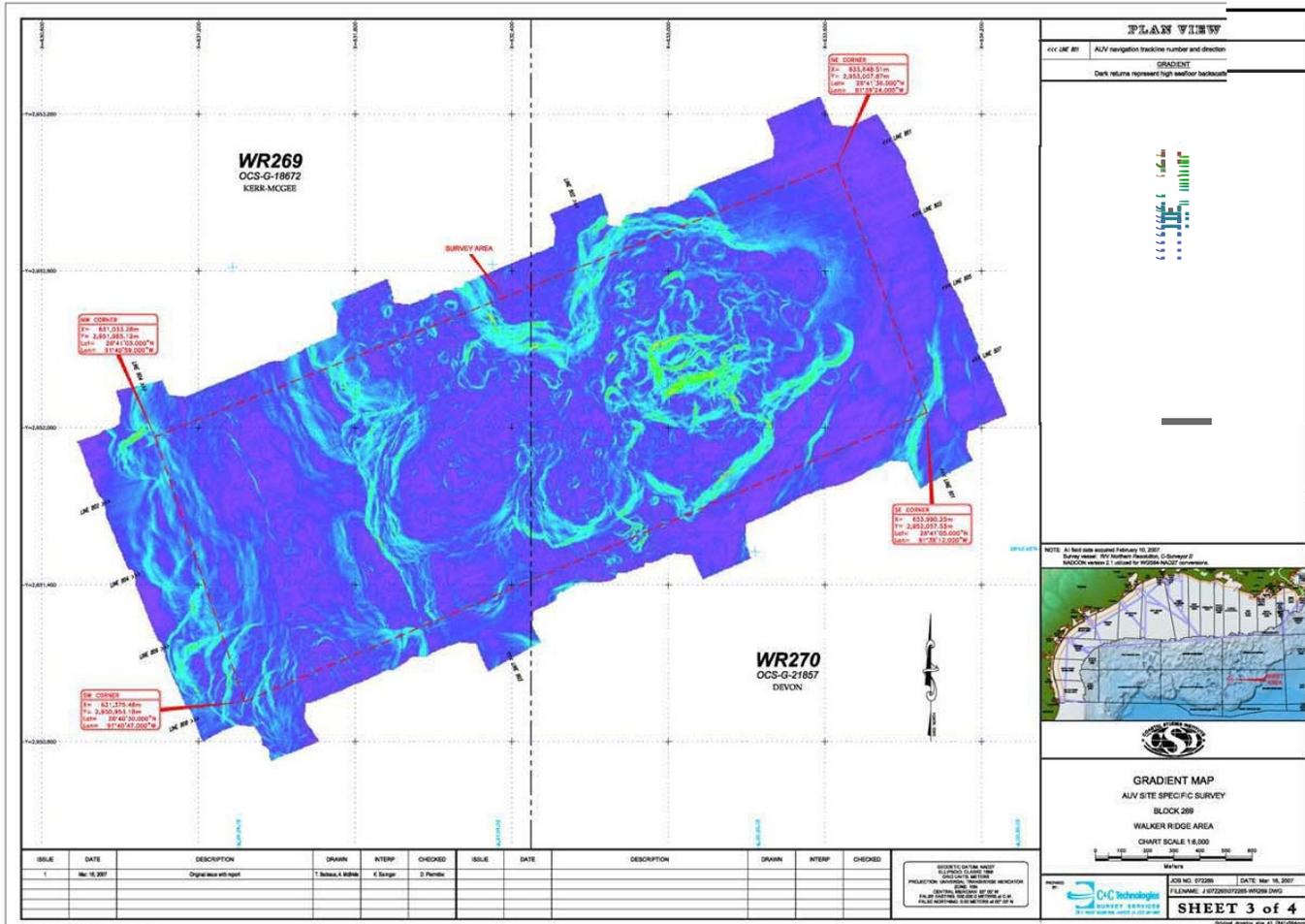


DATE	DESCRIPTION	DRAWN	INTERP	CHECKED	DATE	DESCRIPTION	DRAWN	INTERP	CHECKED
18/10/2007	Original data set report	T. Snelton & K. Kerr	K. Kerr	D. Penick					

QUALITY CONTROL CHECKED
PRODUCTION MANAGER
PRODUCTION MANAGER

CnC Technologies
JOB NO. 072588 DATE: Mar 18, 2007
FILE NAME: 1072588-000000.DWG
SHEET 2 of 4



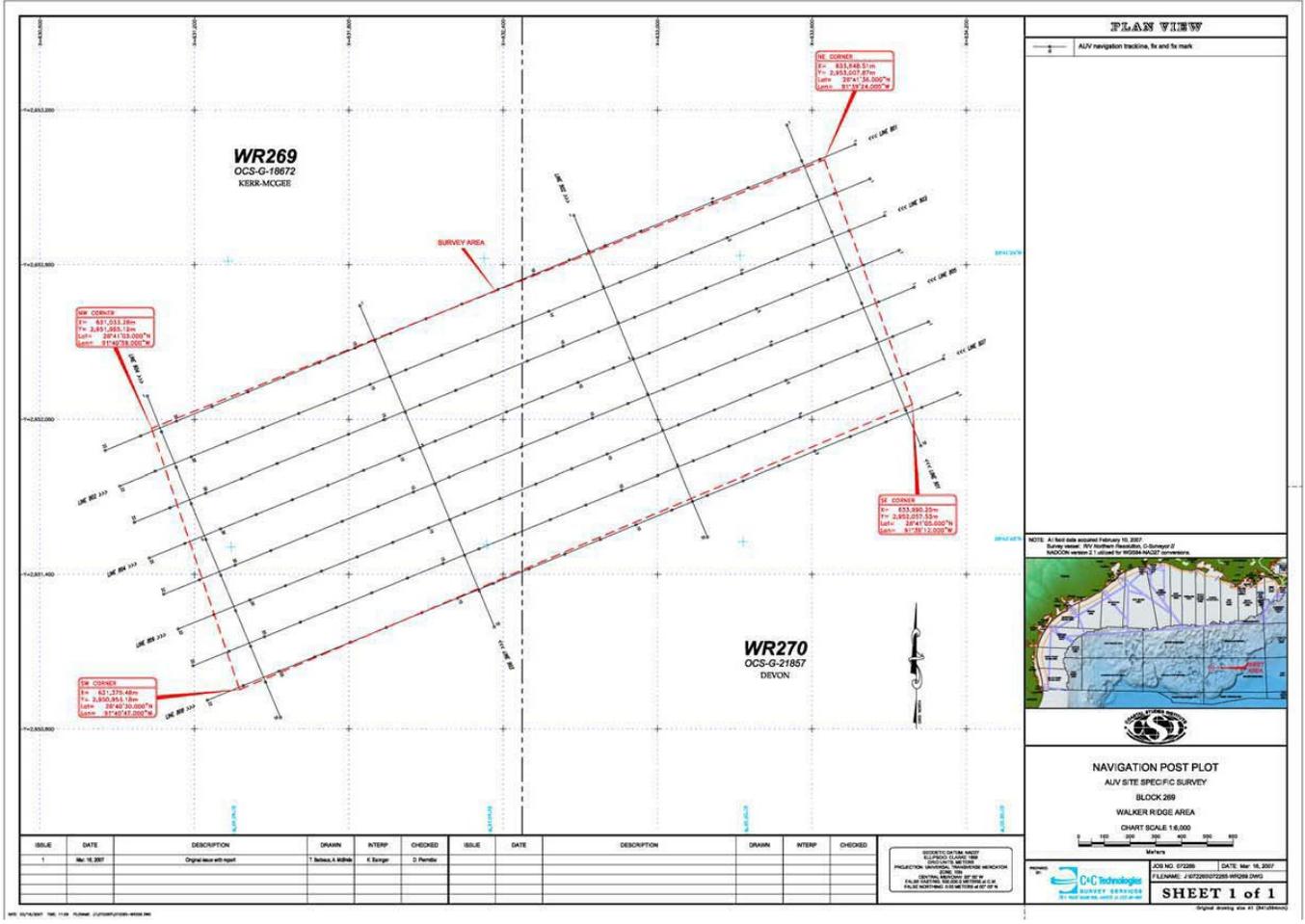


ISSUE	DATE	DESCRIPTION	DRAWN	INTERP	CHECKED	ISSUE	DATE	DESCRIPTION	DRAWN	INTERP	CHECKED
1	Mar 16 2007	Original issue with report	T. Nelson & K. Benge	K. Benge	D. Penber						

GEODETIC DATUM: NAD83
 DATUM TO METRIC UNIT
 PROJECTION: UTM
 UNIT: METRE
 ELEVATION: MEASUREMENT BY RTK
 FILED: 20070316 10:00:00 AM
 PROJECT WORKSPACE: C:\WORK\2007\WR269\



JOB NO: 072388 DATE: Mar 16, 2007
 FILENAME: J:\072388\072388_WF028.DWG
SHEET 3 of 4
Digital drawing size: 41 x 58 (inches)



NO.	DATE	DESCRIPTION	DRAWN	INTERP.	CHECKED	NO.	DATE	DESCRIPTION	DRAWN	INTERP.	CHECKED
1	Mar 18, 2007	Original site report	T. Simons & K. Benge	K. Benge	D. Penick						

QUALITY CONTROL CHECKED
 PROJECTION: NAVIGATION TRACKLINE
 SCALE: 1:6,000
 DATUM: WGS 1984 (NAD83)
 G-GEOID: G-Geoid of NAD83 version 1.1
 USED FOR WGS84/MSL CONVERSION



DATE: Mar 18, 2007
 FILENAME: ALVnavigationpostplot.dwg
SHEET 1 of 1

APPENDIX 4. *ALVIN* PRE-DIVE PLANS

Pre-dive Plans.

AT340 Dive #4173

Date 5/09/2006 Cruise AT 15-03 Site AT340
Pilot: Mark Port: Erik Cordes Starboard: Bernie Bernard

Launch Target

N27 38.84577 W088 21.72023
X 5397, Y 7102 Depth 2216 m

Equipment:

Push Core Rack, Medium Biobox, 2 mussel pots,
Milk crate for rocks, Suction pump sampler, collection net
Markers: one site bench marker, 1 ball, one ball plus float, two Ian markers

Tasks:

- i) watch for opportunities to collect softball sized pieces of carbonates. Three total over the dive is good: document setting, location, and rock with a pic
- ii) watch for opportunities to collect random fauna (crabs, big snails, starfish, Sea cukes...). use either nets or suction

1) Sit down facing North. and navigate in the sub (30 minutes, do it right).

If this is a nice spot, deploy the Bench Marker

If not a nice spot, then move to one and deploy the bench marker

2) turn on the Fornari digital camera. Head to Target 1 (original launch target) Take a look around. Head to target 8 on the way to target 11. Look around here and adjacent target 6 (60-90 minutes)

Note locations of tubeworm clumps, mussel beds, mats, carbonates etc.

3) Pick a nice mussel bed and set down to take two mussel pots. (30 – 60 min)

Take 2 mussel pots from within the same bed.

Make sure you image the ring before picking it up

Leave Liz and Cindys experiment in a "ring scar"

Stick low T probe into the mud and read (have camera on it and the t will display in the video.

Leave an Ian marker

4) Find a nice bacterial mat and take 6 push cores. (20 – 30 min)

If you havn't seen one, head to target 12 and then 5

5) Find some tubeworms. (60 min)

Sit down and take 2 Niskins if not too stirred up.

Take 6 pushcores close to tubies.

Leave a marker here.

If good for BM or growth, then do not collect

If NOA good for either , then collect some into biobox

Mark this spot with Ian marker if it is a good one

6) Find another mussel bed to mosaick. Deploy 2 markers (with balls) within area. Collect

- images for mosaick (60 min)
- 6.5) head up towards Target 3 while you are looking for rocks and animals. Then go towards Target 2
- 7) still no rocks collected. Find and collect 2 or three from different locations
- 8) How about mobile fauna? go suck and net some up.
- 9) If time remains call topside for targets.

Planned Collections: 12 pushcores, 2 mussel pots, 10 – 20 tubeworms, water, 3 carbonates, assorted fauna.

Targets (Origin = 27°35N, 88°25W)

Target	Latitude	Longitude	X	Y	Depth
1	N27 38.84577	W088 21.72023	5397	7102	2216
Launch, mussel bed and isolated tubies					
2	N27 38.91826	W088 21.77264	5311	7236	2213
3	N27 38.96198	W088 21.83758	5204	7317	2218
4	N27 38.91962	W088 21.98060	4969	7239	2207
5	N27 38.82016	W088 21.99486	4945	7055	2207
Scattered mussels and mats					
6	N27 38.63063	W088 21.90074	5100	6705	2192
7	N27 38.68041	W088 21.81164	5247	6797	2204
8	N27 38.77387	W088 21.78625	5289	6970	2213
9	N27 38.66138	W088 22.11501	4748	6799	2192
10	N27 38.84205	W088 22.41383	4256	7095	2182
11	N27 38.67360	W088 21.89610	5108	6784	2195
Tubeworm clumps and mussel bed					
12	N27 38.74590	W088 22.02100	4902	6918	2201
Bacterial mats (orange and white)					
13	N27 38.84020	W088 22.11320	4751	7092	2200
Heart urchins					

AT340
Dive #4179

Date 5/15/2006 Cruise AT 15-03 Site AT340
Pilot: Bruce Port: Chuck Starboard: Stephanie

Launch Target

Launch BM_(LatLon) N27 38.67600 W088 21.90200
Depth 2200 m

Equipment:

Bushmaster, stainer, biobox, Suction pump sampler, niskins, fishtrap
Markers: 1 ball, one ball plus float, two new markers

Plan:

Head to launch target and find the Bench marker. Set down at a heading of 60°, get a fix, then set XY appropriately.

Deploy the fish trap in this area.

Find some tubies to stain (here or towards target 11).

Fire a niskin

stain 'em

Deploy a marker

Find another to stain and do it again

Find one to collect

Fire a niskin

Collect it

Move to target 11 and find the most excellent mussel bed. Get xy

Move to target 01 and find the beer mussel bed confirm xy

Deploy 2 scale markers here

fire remaining niskins

do a mosaick

Collect a net of mussels nearby

Fire a niskin after setting down

Move to target 02 and look around

Move to target 03 and look around

Planned Collections: bushmaster, water, carbonates, mussels and assorted fauna.

Targets

New_Origin

N27 38.50000

W088 22.20000

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
New_Origin	N27 38.50000	W088 22.20000	0	0	
Launch BM_(LatLon)	N27 38.67600	W088 21.90200	494	320	2,182
1-Mussels-BeerCan	N27 38.84577	W088 21.72023	796	630	2,216
2-Lo_Amp	N27 38.91826	W088 21.77264	711	765	2,213
3-Hi_Amp_Rim	N27 38.95293	W088 21.84751	589	830	2,218
4-Lo_Amp	N27 38.91962	W088 21.98060	369	771	2,207
5-Mussels-Mats	N27 38.82016	W088 21.99486	344	587	2,207
6-Topo_High	N27 38.63063	W088 21.90074	495	236	2,192
7-Hi_Amp	N27 38.68041	W088 21.81164	642	326	2,204
8-Geo_Focal_Point	N27 38.84309	W088 22.17553	47	633	2,213
9-Hi_Amp	N27 38.66138	W088 22.11501	143	296	2,192
10-West_Topo_Hi	N27 38.84205	W088 22.41383	-345	635	2,182
11-Tubies-Mussels	N27 38.67360	W088 21.89610	503	315	2,195
12-Orange_Mat	N27 38.74590	W088 22.02100	299	451	2,201
13-Heart_Urchins	N27 38.84020	W088 22.11320	150	627	2,200
BM_XY	N27 38.70738	W088 21.94736	420	378	2,182
Old_Origin	N27 35.0000	W088 25.0000	-4,678	-6,411	

AT340
Dive #4180

Date 5/16/2006 Cruise AT 15-03
Pilot: Gavin Port: Erik Starboard: Jill

Launch Target

Launch BM_(LatLon) N27 38.67600 W088 21.90200
Depth 2200 m

Equipment:

Bushmaster, stainer, biobox, net, niskins
Markers: Three new markers

Plan:

Head to launch target and find the Bench marker. Set down at a heading near 60°, get a fix, then set XY to X 494, Y 320 and use DVL Nav

Check out fish trap in this area (just look, don't touch)

Find some tubies to stain or collect (I found them to be somewhat abundant about 50 m NE of here at x 542, y 369: there should also be some around target 11). I stained medium to medium-small worms. You should stain some bigger ones, and perhaps some smaller ones. If you see some lamellibrachia, those would be good, to collect or stain...

To stain:

Fire a niskin

stain 'em (fill to overflowing around the base and leave it for 7 minutes with a 10 – 15 second bump of stain every 2 – 3 minutes, then pump back. Watch the overflow on the return and do it gently)

Stow the stainer

Deploy a marker

Take a picture

Find another to stain and do it again

And do it again.

Find one to collect.

Fire a niskin

Collect it

Now you are looking for a good mussel bed for the scoop and also exploring to better know this site. I suggest that you move towards target 12 then towards 7 and then towards 8 (in this area). These are all geo targets so take notes. Also note that #7 is supposed to be on a topo high that is fairly focused. Try and find the top of this mound to ground truth our bathymetry. As you check out a target, do not be afraid to check out a 50 m area around it as our nav is not perfect...

Move to target 03 and look around

Move to target 04 and look around

Planned Collections: bushmaster, water, carbonates, mussels and assorted fauna.

Targets

New_Origin

N27 38.50000

W088 22.20000

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
New_Origin	N27 38.50000	W088 22.20000	0	0	
1-Launch BM_(LatLon)	N27 38.67600	W088 21.90200	494	320	2,182
2-Mussels-BeerCan	N27 38.84577	W088 21.72023	796	630	2,216
3-Lo_Amp	N27 38.91826	W088 21.77264	711	765	2,213
4-Hi_Amp_Rim	N27 38.95293	W088 21.84751	589	830	2,218
5-Lo_Amp	N27 38.91962	W088 21.98060	369	771	2,207
6-Mussels-Mats	N27 38.82016	W088 21.99486	344	587	2,207
7-Topo_High	N27 38.63063	W088 21.90074	495	236	2,192
8-Hi_Amp	N27 38.68041	W088 21.81164	642	326	2,204
9-Geo_Focal_Point	N27 38.84309	W088 22.17553	47	633	2,213
10-Hi_Amp	N27 38.66138	W088 22.11501	143	296	2,192
11-West_Topo_Hi	N27 38.84205	W088 22.41383	-345	635	2,182
12-Tubies-Mussels	N27 38.67360	W088 21.89610	503	315	2,195
13-Orange_Mat	N27 38.74590	W088 22.02100	299	451	2,201
14-Heart_Urchins	N27 38.84020	W088 22.11320	150	627	2,200
<i>Old_Origin</i>	<i>N27 35.0000</i>	<i>W088 25.0000</i>	<i>-4,678</i>	<i>-6,411</i>	

Site AT340
Dive #4181

Date 5/17/2006 Cruise AT 15-03
Pilot: Mark Port: Harry Starboard: Guy

Launch Target

West_Topo_Hi N27 38.84205 W088 22.41383
Depth 2180 m

Equipment:

Push Core Rack, Medium Biobox, 1 mussel pots, 1 small bio box, chem. Profiler, Niskin rack, Suction pump sampler, lined collection net, smaller net
Markers: two Ian markers

General notes: This dive has 6 general objectives

- 1) to boldly go where no one has gone before (and take notes)
- 2) to test the chem. profiler
- 3) to collect pushcores and urchins to characterize this community
- 4) to make a paired mussel pot and mussel bag collection
- 5) collect some push cores near tubeworms
- 6) to bring up the fish trap and Liz's experiments. Leave one hour at the end to make sure you get this done

Tasks:

- 1) Dive on target 11, the Western most geo target. Look around as needed.
 - a) If at any time during the dive you see some tubeworms in sediment:
 - i) stop, sniff them with the chemical profiler (around their plumes and around their bases,
 - ii) fire a niskin,
 - iii) take 3 push cores as close to the tubes as possible.
 - b) If at any time during the dive you see a nice bed of live mussels:
 - i) stop, sniff them with the chemical profiler (at several points right over the mussels)
 - ii) fire a nicken
 - iii) make a mussel pot collection
 - iv) make a net collection of mussels in to larger biobox
 - v) deploy a marker
- 2) go to target 9 "geo focal point" and look around. Hey, what the heck, grab a rock.
- 3) If you have not already seen a good urchin community, head to target 14 and find some urchins plowing trails through the seep stained sediments
 - a) fire a niskin
 - b) use the chem. Profiler
 - c) take 9 pushcores
 - d) Use the net in the small biobox to collect a 3-6 urchins
 - e) deploy a marker
- 4) Evaluate time and power. If you are doing well with dive objectives and have extra time, head

to target 5 and look around

5) Still no mussels? Head by target 6 where we saw some on the survey cruise and follow directions for 1b.

6) Go to target 1. find the bench marker (#1).

Still not tubeworm root cores for Helge? This is a good place.

Pick up Liz's experiments into one of the bioboxes

Pick up the fish trap

7) Time left, head to target 10 and look around.

Planned Collections: 12 pushcores, 1 mussel pot, one mussel net, 1 urchin net, carbonates, water, fish trap, E&O experiment

Targets

New_Origin

N27 35.00000

W088 25.00000

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
New_Origin	N27 38.50000	W088 22.20000	0	0	
1-Launch BM_ (LatLon)	N27 38.67600	W088 21.90200	494	320	2,182
2-Mussels-BeerCan	N27 38.84577	W088 21.72023	796	630	2,216
3-Lo_Amp	N27 38.91826	W088 21.77264	711	765	2,213
4-Hi_Amp_Rim	N27 38.95293	W088 21.84751	589	830	2,218
5-Lo_Amp	N27 38.91962	W088 21.98060	369	771	2,207
6-Mussels-Mats	N27 38.82016	W088 21.99486	344	587	2,207
7-Topo_High	N27 38.63063	W088 21.90074	495	236	2,192
8-Hi_Amp	N27 38.68041	W088 21.81164	642	326	2,204
9-Geo_Focal_Point	N27 38.84309	W088 22.17553	47	633	2,213
10-Hi_Amp	N27 38.66138	W088 22.11501	143	296	2,192
11-West_Topo_Hi	N27 38.84205	W088 22.41383	-345	635	2,182
12-Tubies-Mussels	N27 38.67360	W088 21.89610	503	315	2,195
13-Orange_Mat	N27 38.74590	W088 22.02100	299	451	2,201
14-Heart_Urchins	N27 38.84020	W088 22.11320	150	627	2,200

AT340
Dive #4183

Date 5/19/2006 Cruise AT 15-03
Pilot: Bruce Port: Chuck Starboard: Adriana

Launch Target

West_Topo_Hi N27 38.84205 W088 22.41383
Depth 2180 m

Equipment:

Bushmaster, stainer, pushcores, Suction pump sampler, net, niskins
Markers: 3 balls, one ball plus float, three new markers

Plan:

Dive on launch target. Set down and get navigated in. Take 2 push cores. Fire a niskin
Head to launch target/topo high if you are not there
Find some tubies to stain.
stain 'em and fire a niskin
Deploy a marker
Find another to stain and do it again
Do it again
Find one to collect
Collect it
Move to X375, Y375 and find the most excellent Urchin field (alternate Urchin field at X 640, Y 200).
Fire a niskin
Take 10 pushcores
Net a few urchins
Move to the mussel brick road (X680, Y310 to X 685, Y 370)
Cruise up the road dropping markers every 15 meters (4 total).
Run three mosaick lines.
Head north to targets 3, 4, and 5: and look around.

Planned Collections: bushmaster, carbonates, push cores, urchins and pictures.

Targets

New_Origin

N27 38.50000

W088 22.20000

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
New_Origin	N27 38.50000	W088 22.20000	0	0	
1-Launch BM_(LatLon)	N27 38.67600	W088 21.90200	494	320	2,182
2-Mussels-BeerCan	N27 38.84577	W088 21.72023	796	630	2,216
3-Lo_Amp	N27 38.91826	W088 21.77264	711	765	2,213
4-Hi_Amp_Rim	N27 38.95293	W088 21.84751	589	830	2,218
5-Lo_Amp	N27 38.91962	W088 21.98060	369	771	2,207
6-Mussels-Mats	N27 38.82016	W088 21.99486	344	587	2,207
7-Topo_High	N27 38.63063	W088 21.90074	495	236	2,192
8-Hi_Amp	N27 38.68041	W088 21.81164	642	326	2,204
9-Geo_Focal_Point	N27 38.84309	W088 22.17553	47	633	2,213
10-Hi_Amp	N27 38.66138	W088 22.11501	143	296	2,192
11-West_Topo_Hi	N27 38.84205	W088 22.41383	-345	635	2,182
12-Tubies-Mussels	N27 38.67360	W088 21.89610	503	315	2,195
13-Orange_Mat	N27 38.74590	W088 22.02100	299	451	2,201
14-Heart_Urchins	N27 38.84020	W088 22.11320	150	627	2,200

GC600
Dive #4184

Date 5/20/2006 Cruise AT 15-03
Pilot: Gavin Port: Stephane Starboard: Marshall

Launch: Target

1: N27° 22.390, W90° 34.526
Depth 1250m

Equipment:

Bushmaster, Push Core Rack, 1 Bioboxs, Mussel Pot, Niskin rack(?), Suction pump sampler, 1 lined collection net, one unlined square net

Markers:

one bench marker, 1 ian marker

Plan:

- 1) Dive on Target 1. Land, and get navigated in. Go to target 1
- 2) Land heading N and deploy the Bench Marker (#2) Turn on Dan Cam and put strobes out.
- 3) Find a tubeworm bush to collect. Bob saw stuff round here. If you find nothing here then head N to Target 9 and then E to Target 10
- 4) Give up on tubeworms, or done, head to target 3, and keep your eyes open for live clams or mussels
- 5) If you don't see them then pass on by to target 11.
- 6) When you find some mussels:
Set down and fire two niskins
 Take a mussel pot
Collect some into a net
 Take 6 push cores as close to the mussel as possible
 Deploy a marker
- 7) When you find some clams (try target 12 if you haven't found any yet):
 Set down and fire two niskins
Take six push cores around the live clams
Collect a few (3-4) into a net: put net in milk crate
 Deploy a marker
- 8) If you are having a bad day, or running out of time before finding mussels and/or clams, take 6 push cores in a mat, or at least in the mud.
- 9) if you see something cool running around, suck it up
- 10) if you find a good carbonate, pick it up

Planned Collections: 12 pushcores, 1 mussel scoop, clams, carbonates, assorted fauna, bushmaster

Targets (Origin 27°N 21.90, 90°W 34.70)

Target	Latitude	Longitude	Local X (m)	Local Y (m)
Local_Origin	N27 21.9	W090 34.7	0	0
1 TWs	N27 22.38960	W090 34.52590	270	910
2 Mats	N27 22.35650	W090 34.50360	307	849
3 clams	N27 22.16180	W090 34.28370	677	497
4 Geo	N27 22.13070	W090 34.06731	1,035	446
5 Geo	N27 22.29970	W090 34.33556	587	750
6 Geo	N27 22.15775	W090 33.92080	1,276	501
7 Geo	N27 22.12116	W090 33.94481	1,237	433
8 Geo	N27 22.38280	W090 34.43158	425	900
9 Geo	N27 22.46869	W090 34.51759	280	1,056
10 Geo	N27 22.44819	W090 34.36051	540	1,023
11 Mussels	N27 22.01970	W090 33.84760	1,401	249
12 Clams	N27 21.98000	W090 33.81300	1,460	176

GC 600 Dive #4174

Date 5/10/2006 Cruise AT 15-03
Pilot: Pat Port: Bob Carney Starboard: Helge Neimann

Launch Target

N 27 22.390 W 090 34.526
X 2431, Y 2567 Depth ~1250 m

Equipment:

Push Core Rack, Medium Biobox, 2 mussel pots, Chem. Profiler,
Milk crate for rocks, Suction pump sampler, collection net
Markers: one site bench marker, 1 ball, one ball plus float, two Ian markers

Tasks:

- i) watch for opportunities to collect softball sized pieces of carbonates. Three total over the dive is good: document setting, location, and rock with a pic
- ii) watch for opportunities to collect random fauna (crabs, big snails, starfish, Sea cukes...). use either nets or suction
- iii) Lots of notes on X,Y, new targets, and all depths...

1) Sit down facing North. and navigate in the sub (30 minutes, do it right).

If this is a nice spot, deploy the Bench Marker

If not a nice spot, then move to Target 1 (launch target) and deploy the bench marker

2) Take a good look around here and at Target 2 (about 75 m to the SE)

3) These are the two targets with mussels and tubeworms confirmed and even those are scarce.

After a quick survey of this area:

If you see an area to mussel pot, set down.

Try out the Chem Profiler at multiple locations in mussel bed

Make mussel pot collections (see mussel pot directions) Stick the low t probe in mussel bed

Try and collect a few tubeworms, even if they are solitary (here or nearby). Chem profiler first (at plumes and bases)

if any of the places you set down here look seepy and there is enough sediment, then take a series of 6 push cores.

If any of the areas look like an interesting area for a 10 by 10 m mosaick, do it (check out mosaick directions). If you are time rich, do some Chem surveys in the area mosaicked with careful doc of probe position.

4) Move to target 8 and look around : move to target 5 and look around

5) Head to target 4. it's a long run (about a km), but stay in site of bottom and keep your eyes peeled

6) Look around target 4 and head to 7 and look around.

7) move towards target 12 (you will pass through target 11 which had some live mussels) Target 12 is an area with live vesicomid clams and lots of dead shells.

Find live clams (or at least clams in live position) Survey sediment surface with Chem profiler. Collect some clam(s) (4-6), take a set of 6 push cores here, stick the low T probe in the

mud, and deploy an Ian marker

8) still no rocks collected. Find and collect 2 or three from different locations

9) How about mobile fauna? go suck and net some up.

10) If time remains look around here then head to target 3.

Planned Collections: 12 pushcores, 2 mussel pots, 10 – 20 tubeworms, clams, 3 carbonates, assorted fauna.

Targets (origin 27°21 N, 90°36 W)

Target	Lat	Long	X	Y	
1	N27 22.390	W090 34.526	2431	2567	
Isolated tubeworms					
2	N27 22.356	W090 34.504	2467	2504	
Bacterial mats					
3	N27 22.162	W090 34.284	2839	2144	
Live clams					
4	N27 22.130	W090 34.067	3188	2087	
5	N27 22.30	W090 34.335	2746	2504	
6	N27 22.158	W090 33.921	3428	2138	
7	N27 22.121	W090 33.945	3389	2070	
8	N27 22.383	W090 34.431	2587	2554	
9	N27 22.469	W090 34.518	2444	2713	
10	N27 22.448	W090 34.360	2705	2674	
11	N27 22.020	W090 33.848	3549	1884	
Few live mussels					
12	N27 21.980	W090 33.813	3606	1809	
Group of live vesicomid clams					

WR269/270
Dive # 4191

Date 5/26/2006 Cruise AT 15-03
Pilot: Pat Port: Harry Roberts Starboard: Matt

Launch Target Lat 26 41.15 Long 91 39.57
Dive target: X = 1540 , Y = 1201 Depth = 1953

Equipment:

Push Core Rack, niskins, Biobox, 1 mussel pot, Ian cool pix,
Milk crate for rocks, Suction pump sampler, collection net (unlined)
Markers: One marker; #2

Tasks:

- i) Thorough job on Pogo community
- ii) Explore and document
- iii) Nice photos and voucher collections of chemos as found
- iv) Deploy Marker #2 at a lush site away from Target #1 (if found)

Plan:

- 1) Sit down and navigate in the sub.
- 2) Go to Bench marker. The pogo's should be here. Before stirring it up, take a collection of Dan Cam shots looking down at the pogos.
- 3) Land at the BM, facing north and
Record XY
Reset DVL XY to X=1540 , Y =1201
- 4) If not already among the Pogos, land among them and:
Use cool pix to take a bunch of photos
Take all 12 push cores in the pogos, with pogos
Slurp up a bunch of 'em (then nothing else in the slurp) Take 2 niskin bottle samples
- 5) AT mussels:
Take some cool pix
Take a mussel pot
Take 1 niskins over mussels
- 6) At clams
Take some cool pix
Net a few (3 is enough to id, 5-6 is plenty)
Take 1 niskin over clams
- 7) At tubeworms
Take cool pix
Grab some into biobox
Take 1 niskin over tubeworms

This site does not have camera ground truthing over the areas considered prime targets from the geophysical records. Therefore there is a strong reconnaissance element to this dive. We will

start at the east end of the area with strong surface reflectivity on the 3D seismic data.

A) Target 1 constitutes a highly reflective area that is to the southeast of a low amplitude feature considered to be a likely mud vent site. This is the pogos site. This is the marker and pogo site.

B) Target 2 is a circular low reflectivity feature interpreted as a mud vent from the geophysical records. This is the area where tube worms and mussels were found on the first dive to this site that was cut short by rough seas. This is the mussel site.

C) Target 3 is a highly reflective area to the NW of the apparent vent site. Transit to this area and if it turns out to be a chemosynthetic use the same sampling suggested for Target 2. D) Target 4 is a very highly reflective area to the SW of the interpreted vent sit at Target 2. If this site is a chemosynthetic community site, use the sampling protocols used at other sites as sampling gear permits. Take pictures.

E) Target 5 is to the west of Target 4. The same sampling will be used at this site as Target 4.

F) Target 6 is directly south of Target 5. This site is another highly reflective area of the If this is a chemosynthetic community site take pictures and use any remaining sampling gear.

Collections planned : 12 pushcores, 1 mussel pot, tubeworms, clams, at least 2 carbonate substrate samples

Target	Latitude	Longitude	X (m)	Y (m)	Depth (m)
Local_Origin	N26 40.50000	W091 40.50000	0	0	
1 launch/pogo	N26 41.15132	W091 39.57046	1,540	1,201	1953
2 mussel site	N26 41.17146	W091 39.74929	1,246	1,239	1908
3 Geo target	N26 41.21387	W091 39.96005	882	1,327	1945
4 Geo target	N26 40.99515	W091 40.17158	535	920	1951
5 Geo target	N26 41.01827	W091 40.34520	247	960	1957
6 Geo target	N26 40.72553	W091 40.30552	318	420	1960

WR 269/270 Dive #4175

Date 5/11/2006 Cruise AT 15-03
Pilot: Bruce Port: Harry Roberts Starboard: Valdimir Samarkin

Launch Target

Lat 26 41.14132 Long 91 39.56046
X 2388.21 , Y 1184.24 Depth m

Equipment:

Push Core Rack, Medium Biobox, 1 mussel pot, Chem. Profiler,
Milk crate for rocks, Suction pump sampler, collection net
Markers: one site bench marker, 1 ball, one ball plus float, two Ian markers

Tasks:

- i) watch for opportunities to collect softball sized pieces of carbonates. Three total over the dive is good: document setting, location, and rock with a pic
- ii) watch for opportunities to collect random chemo and other fauna (Tubeworms, mussels, crabs, big snails, starfish, Sea cukes...). use either nets or suction
- iii) Lots of notes on X,Y, new targets, and all depths...

1) Sit down facing North. and navigate in the sub (30 minutes, do it right).

If this is a nice spot, deploy the Bench Marker

If not a nice spot, then move to Target 1 (launch target) and deploy the bench marker

2) Take a good look around here and

Planned Collections: 12 pushcores, 2 mussel pots, 10 – 20 tubeworms, water, 3 carbonates, assorted fauna.

This site does not have camera ground truthing over the areas considered prime targets from the geophysical records. Therefore there is a strong reconnaissance element to this dive. We will start at the east end of the area with strong surface reflectivity on the 3D seismic data.

- 3) Target 1 constitutes a highly reflective area that is to the east of a low amplitude feature considered to be a likely mud vent site. If Target 1 represents a chemosynthetic community, the usual sampling protocols will be used including mussel pot if mussels are present, tube worm sampling, and samples of lithified seafloor. Coring of bacterial mats or areas new tube worms should be done. Turn on vertical camera for entire dive.
- 4) Target 2 is a circular low reflectivity feature interpreted as a mud vent from the geophysical records. If this is a mud vent, use the chemical profiler and the low temp thermistor. Survey the edge of the vent to see if there are any associated chemosynthetic communities. Photograph the vent and move on. Use the suction sampler on organisms of opportunity.
- 5) Target 3 is a highly reflective area to the NW of the apparent vent site. Transit to this area and if it turns out to be a chemosynthetic use the same sampling suggested for Target 1. If Target 1 is a chemosynthetic community site and it is sampled, Target 3 will be the last site for taking our suite of 6 cores. Photograph the area.
- 6) Target 4 is a very highly reflective area to the SW of the interpreted vent sit at Target 2. If

this site is a chemosynthetic community site, use the sampling protocols used at other sites. If Targets 1 and 3 are chemosynthetic community sites, no cores will be available for this site. If available, we will take cores. Continue to photographically log the area.

7) Target 5 is to the west of Target 4. The same sampling will be used at this site as Target 4.

8) Target 6 is directly south of Target 5. This site is another highly reflective area of the If this is a chemosynthetic community site the same sampling scheme is to be used.

Collections planned : 12 pushcores, 1 mussel pot, tubeworms, clams, at lease 2 carbonate substrate samples, and organisms of opportunity.

Targets (origin 26 40.5 N: 91 40.5 W)

Target	Latitude	Longitude	X (m)	Y (m)	Depth (m)
Local_Origin	N26 40.50000	W091 40.50000	0	0	
1	N26 41.14132	W091 39.56046	1,546	1,200	
2	N26 41.14446	W091 39.74229	1,244	1,203	
3	N26 41.21387	W091 39.96005	882	1,327	
4	N26 40.99515	W091 40.17158	535	920	
5	N26 41.01827	W091 40.34520	247	960	
6	N26 40.72553	W091 40.30552	318	420	

KC243 Dive #4176

Date 5/12/2006 Cruise AT 15-03
Pilot: Gavin Port: Stephane Starboard: PIT

Launch Target

26N 43.812 92W 49.835
X 273, Y 207 Depth ~1610m

Equipment:

Push Core Rack, Medium Biobox, 2 mussel pots, Ian cool pix camera,
Milk crate for rocks, Suction pump sampler, collection net
Markers: one site bench marker, 1 ball, one ball plus float, two Ian markers

Remember:

- i) watch for opportunities to collect softball sized pieces of carbonates. Three total over the dive is good: document setting, location, and rock with a pic
- ii) watch for opportunities to collect random fauna: use either nets or suction
- iii) keep your eyes open for bushmasterable tubies and record XYs if found
- iv) Take lots of notes on X,Y, new targets, and all depths...
- v) Leave time (20 minutes at this site) to return to the bench marker to check nav drift (get X,Y, do not resurvey).
- vi) Try out ian's camera

Tasks:

- 1) Sit down facing North. and navigate in the sub (30 minutes, do it right).
If this is within 100m of targets 1 or 2, deploy the Bench Marker.
If not, then move to Target 1 (launch target) and deploy the bench marker. Note X,Y
- 2) Take a good look around here for mussels
- 3) Choose a nice area of live mussels to work
 - 3.1) Mosaick first:
Deploy the two markers with balls within the 10 x 10 m mosaick area. Run the image collection pattern at about 3 m altitude (see mosaicing notes)
 - 3.2) Use the mussel pots to get some mussels. If you don't get a good pot, use the net to get a few more. Leave an Ian marker here
- 4) Take 6 push cores near here
- 5) move to target 2 and look around.
- 6) find a nice tubeworm group, that is not good for bushmaster
 - 6.1) Take some macro shots with Ian's camera
 - 6.2) Suction the tubie clump
 - 6.3) Collect a nice handful (up to 20)
 - 6.4) Take 6 push cores here (near tubeworms)
- 7) move to target 3. look around and take notes. Run a search pattern over this target. If you find something different, make a collection, take some pics

- 8) still no rocks collected. Find and collect 2 or three from different locations
- 9) How about mobile fauna? go suck and net some up if room remains.
- 9.5) did you try the camera yet? Now is a good time.
- 10) At the end of the dive circle back to the Bench marker and note XY when at the marker (facing N) to check drift on doppler nav.

Planned Collections: 12 pushcores, 2 mussel pots, 10 – 20 tubeworms, 3 carbonates, assorted fauna.

Targets (origin 26°43.7 N, 92°50.0 W) NOTE, this is the correct origin

Targets	Latitude	Longitude	X	Y
1-mussels	N26 43.81200	W092 49.83500	273	207
2-tubeworms	N26 43.83600	W092 49.86600	222	251
3-geo anomaly	N26 43.87339	W092 49.78109	362	321

GC852 Dive #4190

Date 5/25/2006 Cruise AT 15-03
Pilot: Melbert Port: Bob Starboard: Meg

Launch:

N 27 06.6, W091 09.93 (for a bottom target of X 431, Y 1018)
Depth ~1410m

Equipment:

Ian cool Pix camera, push core rack, niskins, two bio box, net (unlined)
Markers: Mosaic #4 and 2 balls

Tasks:

- i) deploy camera
- ii) Collect corals
- iii) pushcore
- iv) Mosaic
- v) image and collect mussels and clams
- vi) let Dan cam run, with strobes out, whenever in transit.
- vii) recover SEAS experiments and fish trap

Plan:

- 1) Dive on Bench Marker #2 (Target 14: X 431, Y 1018)
- 2) Land and evaluate nav. If you are sure LBL is good, proceed to BM#2
Record XY
Reset DVL XY to X 431, Y 1018
- 3) Deploy Ians camera near marker 5 and stained tubeworms X 443 Y1064 find a flat spot
- 4) Go find some hard corals and make a collection. If in a good spot, take some cool pix first: X 370 Y 934
- 5) Transit to BM #1 (Target 13; X 379, Y 516).
Pick up SEAS experiment into biobox
- 6) At a small mussel patch:
Collect 6 push cores and 3 niskins
- 7) At an area with clams:
Shoot some cool pix
Collect 6 push cores near clams and 2 niskins
Collect a few clams into the net
- 8) Find An area with mixed chemo's (small mussel patches, clams, some tubies etc) and low relief (perhaps this is it)
Place the markers in the area, 3-5 meters apart (without landing)
Follow the mosaic directions. If you stir things up, go get the fish trap and come back
- 9) Leave at least 30 min: return to BM #1:, pick up fish trap.
- 10a) Either: finish up mosaic if it is ready to go and needs some more lines (the mud should be

clear by now)

or

10b) if power/time remains cruise around the edges of the site (drive the perimeter to delineate it's extent)

Planned collections: Mussel pot, fauna, push cores, fish trap, SEAS expt.

Targets (origin= 27N 06.1, 91W 10.2)

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N27 06.1000	W091 10.2000	0	0	
1-tubes_mussels	N27 06.320	W091 09.962	387	412	
2-mussels_tubes	N27 06.378	W091 09.959	391	519	
3-soft_corals	N27 06.586	W091 09.927	438	904	
4-red_soft_coral	N27 06.626	W091 09.975	358	977	
5-soft_reflector	N27 06.20083	W091 09.93492	435	193	
6-high_reflector	N27 06.49466	W091 10.09557	162	731	
7-topo_high	N27 06.60334	W091 10.01904	286	934	
8-geo_reflector	N27 06.72200	W091 09.86759	533	1,157	
9-topo_high_reflector	N27 06.87347	W091 09.79281	652	1,438	
10-Jason_geoA	N27 07.09276	W091 09.95591	377	1,839	
11-Jason_geoB	N27 07.21342	W091 09.95762	371	2,062	
12-Jason_geoC	N27 07.14364	W091 09.82149	597	1,936	
13 Bench Marker #1			379	516	
14 Bench Marker #2			431	1018	
15 Monika Coral			402	919	

GC 852
Dive #4177

Date 5/13/2006 Cruise AT 15-03
Pilot: Mark Port: Ian Starboard: Monika

Launch Target

27°06.320 N, 91°09.962W
X 387, Y 412 Depth ~ 1450m

Equipment:

Push Core Rack, Small Biobox, 2 mussel pots, Ian handheld camera, Ian rotary camera on spikes for deployment

Milk crate for rocks, Suction pump sampler, collection net, Liz experiments

Markers: one site bench marker, 1 ball, one ball plus float, two Ian markers

Tasks:

i) watch for opportunities to collect softball sized pieces of carbonates. Three total over the dive is good: document setting, location, and rock with a pic

ii) watch for opportunities to collect random fauna (crabs, big snails, starfish, Sea cukes...). use either nets or suction

iii) keep your eyes open for bushmasterable tubies and record XYs if found

iv) Take lots of notes on X,Y, new targets, and all depths...

v) leave enough time at the end to return to the bench marker to check nav drift.

1) Sit down and navigate in the sub (30 minutes, do it right).

2) move to Target 1 (launch target) and deploy the rotary camera

3) find a good spot to deploy the bench marker. Land heading north and deploy the bench marker. Note XY

4) Find a nice area for a mosaick

Deploy the two markers with balls within the 10 x 10 m mosaick area.

Run the image collection pattern at about 3.5 - 4 m altitude

5) Go to target 2 and find a nice live mussel bed (unless you have already found one). Set down and take 2 mussel pots

5.1 Deploy Liz's experiments

Deploy one in a mussel pot scar

Deploy the other next to the mussel bed

5.2) Leave an Ian marker here

5.3) Take 6 push cores here

6) go to target 3 and survey the corals here with the cameras Don't collect any yet. Set down for some close ups and take 6 push cores here.

6.5) perhaps slurp up some associated fauna

7) *still no rocks collected. Find and collect 2 or three from different locations*

8) *How about mobile fauna? go suck and net some up.*

9) Evaluate your time.

If less than 30 minutes left then go to target 7 and then to 6. leave downlooking camera running and take notes of fauna and terrain. If more time head back to bench mark and get xy (check drift).

If more then 1 hr left head to target 8 and then 9 with camera on and looking around. Then head East and look for Corals on the slope..

Planned Collections: 12 pushcores, 2 mussel pots, 3 carbonates, assorted fauna, lots of pictures and a mosaick

Targets (origin= 27N 06.1, 91W 10.2)

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N27 06.1000	W091 10.2000	0	0	
1-tubes_mussels	N27 06.320	W091 09.962	387	412	
2-mussels_tubes	N27 06.378	W091 09.959	391	519	
3-soft_corals	N27 06.586	W091 09.927	438	904	
4-red_soft_coral	N27 06.626	W091 09.975	358	977	
5-soft_reflector	N27 06.20083	W091 09.93492	435	193	
6-high_reflector	N27 06.49466	W091 10.09557	162	731	
7-topo_high	N27 06.60334	W091 10.01904	286	934	
8-geo_reflector	N27 06.72200	W091 09.86759	533	1,157	
9-topo_high_reflector	N27 06.87347	W091 09.79281	652	1,438	
10-Jason_geoA	N27 07.09276	W091 09.95591	377	1,839	
11-Jason_geoB	N27 07.21342	W091 09.95762	371	2,062	
12-Jason_geoC	N27 07.14364	W091 09.82149	597	1,936	

GC 852
Dive #4185

Date 5/21/2006 Cruise AT 15-03
Pilot: Mark Port: Monika Starboard: Cheryl

Launch Target

Ian's camera: N27 06.359, W91 09.961
Depth ~1410m

Equipment:

Ian cool Pix camera, 3 bioboxes, suction sampler, one net (no lining), niskins
Markers: Second Bench marker: #2

Tasks:

- i) watch for opportunities to collect softball sized pieces of carbonates. Three total over the dive is good: document setting, location, and rock with a pic. Can go in a biobox, or if large on top
 - ii) watch for opportunities to collect random fauna (crabs, big snails, starfish, Sea cukes...). use either nets or suction
 - iii) keep your eyes open for bushmasterable tubies and record XYs if found
 - iv) Take lots of notes on X,Y, new targets, and all depths...
 - v) let Dan cam run, with strobes out, whenever in transit.
- Note: your map's bathymetry is off.

1) Dive on Ian's camera (X 391, Y 472), Depth 1408.

Get XY and reset you DVL Nav to X 391, Y 472

Send it up

Pick up the crab trap and put it in a bio box

Turn on the Dam cam with strobes out.

2) head for Target 3. This is the coral site. Look around. Tend W towards the topographic high (target 7). Deploy the Bench Marker #2 here when you set down to work some corals. Also fire two niskins when you set down to work corals the first two times, and the last the third time. Check out the edges of this high point. Corals are likely on the "windward shore" (which ever that is). At this point you are mostly on your own. When you see cool corals, set down, get fixes, take pics, and collect at will. I suggest you temper your collections with explorations as this is the first dive to this area and the very best area may be just around the corner. Since there is likely to be a good bit of transit in this dive, a good estimate is that you will be heading up by 2:30 local time. When you are ready to move on:

3) head N-NE to target 8. This is a 3D seismic reflector and should be a good spot. do not be afraid to deviate to check out ridges. You may also want to use the side scan sonar to look for hard returns (carbonates).

4) keep heading N-NE towards target 9 (another geo-reflector).

Don't forget to pick up some rocks when opportunity presents and use the suction sampler

Planned Collections: corals, pictures, fishtrap, and a rotary camera

Targets (origin= 27N 06.1, 91W 10.2)

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N27 06.1000	W091 10.2000	0	0	
1-tubes_mussels	N27 06.320	W091 09.962	387	412	
2-mussels_tubes	N27 06.378	W091 09.959	391	519	
3-soft_corals	N27 06.586	W091 09.927	438	904	
4-red_soft_coral	N27 06.626	W091 09.975	358	977	
5-soft_reflector	N27 06.20083	W091 09.93492	435	193	
6-high_reflector	N27 06.49466	W091 10.09557	162	731	
7-topo_high	N27 06.60334	W091 10.01904	286	934	
8-geo_reflector	N27 06.72200	W091 09.86759	533	1,157	
9-topo_high_reflector	N27 06.87347	W091 09.79281	652	1,438	
10-Jason_geoA	N27 07.09276	W091 09.95591	377	1,839	
11-Jason_geoB	N27 07.21342	W091 09.95762	371	2,062	
12-Jason_geoC	N27 07.14364	W091 09.82149	597	1,936	
Bench Marker			379	516	
Ian Camera	N27 06.359	91 09.961	391	472	

GC 852
Dive #4186

Date 5/22/2006 Cruise AT 15-03
Pilot: Pat Port: Chuck Starboard: Erin

Launch

N 27 05.7, W 91 09.96
(for a bottom target of N27 06.36, W 91 09.96)
Depth ~1410m

Equipment:

Ian cool Pix camera, Bushmaster, stainer, mussel pot, suction sampler, milk crate, fish Trap down
Markers: Three markers for Stainer (numbers 5,6, and 7 or any old ones), two sets of markers for mosaicks (number 3 and 4 and 4 balls)

Tasks:

- i) watch for opportunities to collect softball sized pieces of carbonates: document setting, location, and rock with a pic. Can go in a biobox, or if large on top
- ii) watch for opportunities to collect random fauna (crabs, big snails, starfish, Sea cukes...).**
use suction
- iii) let Dan cam run, with strobes out, whenever in transit.**

Note: map's bathymetry is off bio targets may be 25 m E and 50m N of where shown on map.

Plan:

- 1) Dive on Bench Marker #1: X 379, Y 516, deploy fish trap
- 2) Set down heading N at BM and log LBL XY, then enter DVL XY (above)
- 3) Find Tubeworms to stain and collect. Take some cool pix . If nothing at this site, then head to target 6 (geo marker) then to bench marker #2. (X 431, Y 1018 DEPTH 1404)
- 4) Find area(s) to mosaick (BM #1??) See if this is good for rotary camera
- 5) Find mussels to pot. Take some cool pix
- 6) Slurp coral associates. (X 402, Y 919) Take some cool pix
- 7) grab a few rocks
- 8) explore ridges for corals. Try W edges.

Planned collections: Bushmaster, Mussel pot, carbonates, slurpetes, pictures

Targets (origin= 27N 06.1, 91W 10.2)

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N27 06.1000	W091 10.2000	0	0	
1-tubes_mussels	N27 06.320	W091 09.962	387	412	
2-mussels_tubes	N27 06.378	W091 09.959	391	519	
3-soft_corals	N27 06.586	W091 09.927	438	904	
4-red_soft_coral	N27 06.626	W091 09.975	358	977	
5-soft_reflector	N27 06.20083	W091 09.93492	435	193	
6-high_reflector	N27 06.49466	W091 10.09557	162	731	
7-topo_high	N27 06.60334	W091 10.01904	286	934	
8-geo_reflector	N27 06.72200	W091 09.86759	533	1,157	
9-topo_high_reflector	N27 06.87347	W091 09.79281	652	1,438	
10-Jason_geoA	N27 07.09276	W091 09.95591	377	1,839	
11-Jason_geoB	N27 07.21342	W091 09.95762	371	2,062	
12-Jason_geoC	N27 07.14364	W091 09.82149	597	1,936	
Bench Marker #1			379	516	
Bench Marker #2			431	1018	
Monika Coral			402	919	
If land S, (a guess)			375	409	

GC 852
Dive #4187

Date 5/23/2006 Cruise AT 15-03
Pilot: Bruce Port: Erik Starboard: PIT Sean

Launch

N 27 06.3, W091 10.10
(south of a bottom target of X 175, Y800)
Depth ~1410m

Equipment:

Ian cool Pix camera, Bushmaster, stainer, mussel pot, suction sampler, biobox, net
Markers: Two markers for Stainer (5,7), One sets of markers for mosaicks (number 3 and 2 balls)

Tasks:

- i) watch for opportunities to collect softball sized pieces of carbonates: document setting, location, and rock with a pic. Can go in a biobox, or if large on top
- ii) watch for opportunities to collect random fauna (crabs, big snails, starfish, Sea cukes...). use suction
- iii) let Dan cam run, with strobes out, whenever in transit.

Note: map's bathymetry is off set

Plan:

- 1) Dive on X175, Y800 New Target: lucky # 13
- 2) Land and get surveyed in. Proceed to lucky #13: There is likely nothing here, so drive up and over the top from here heading towards X 402, Y 919 Monika's coral site. Keep your eyes open for the lush chemo site. When you see it, work it. If not, pass over the corals for now and proceed on to Bench Marker #2 X 431, Y 1018. Sit down heading north and reset the nav if necessary.
- 3) Find Tubeworms to stain and collect. Take some cool pix
- 4) Find area(s) to mosaick
- 5) Find mussels to pot. Take some cool pix
- 6) Slurp coral associates. Take some cool pix
- 7) grab a few rocks
- 8) explore ridges for corals

Planned collections: Bushmaster, Mussel pot, carbonates, slurpetes, pictures

Targets (origin= 27N 06.1, 91W 10.2)

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N27 06.1000	W091 10.2000	0	0	
1-tubes_mussels	N27 06.320	W091 09.962	387	412	
2-mussels_tubes	N27 06.378	W091 09.959	391	519	
3-soft_corals	N27 06.586	W091 09.927	438	904	
4-red_soft_coral	N27 06.626	W091 09.975	358	977	
5-soft_reflector	N27 06.20083	W091 09.93492	435	193	
6-high_reflector	N27 06.49466	W091 10.09557	162	731	
7-topo_high	N27 06.60334	W091 10.01904	286	934	
8-geo_reflector	N27 06.72200	W091 09.86759	533	1,157	
9-topo_high_reflector	N27 06.87347	W091 09.79281	652	1,438	
10-Jason_geoA	N27 07.09276	W091 09.95591	377	1,839	
11-Jason_geoB	N27 07.21342	W091 09.95762	371	2,062	
12-Jason_geoC	N27 07.14364	W091 09.82149	597	1,936	
13 launch target 4187			175	800	
Bench Marker #1			379	516	
Bench Marker #2			431	1018	
Monika Coral			402	919	

GC852
Dive #4188

Date 5/24/2006 Cruise AT 15-03

Pilot: Gavin Port: Ian

Starboard: Cheryl

Launch

N 27 06.6, W091 09.95 (for a bottom target of X 431, Y 1018)

Depth ~1410m

Equipment:

Ian cool Pix camera, push core rack, niskins, rotary camera, room to carry up the rotary camera, bio-boxes as space allows, no nets, no suction sampler

Markers: NONE

Tasks:

i) deploy camera

ii) pushcore

iii) image and collect corals

iv) watch for opportunities to collect softball sized pieces of carbonates: document setting, location, and rock with a pic. Can go in a biobox, or if large on top

v) let Dan cam run, with strobes out, whenever in transit.

Note: the world is crooked: Maps generally good, but non-confirmed targets are offset ...

Plan:

1) Dive on Bench Marker #2 X 431, Y 1018

2) Land and evaluate nav. If you are sure LBL is good, proceed to BM#2 to set DVL navigation. If not get surveyed in.

3) Go to BM #2 (X 431, Y 1018). Land heading N with BM in front of basket a

Record XY

Reset DVL XY to X 431, Y1018

While you are here, watch for good sized mat for 12 push cores: drop a (digital) target if you see one.

4) Go to Monika's coral site X 402, Y919. Deploy the camera.

5) leave (for now) and go get 12 push cores in a bacterial mat

Fire 2 niskins before coring

6) Return to the coral area and image/collect corals (and carbonates) as directed by Cheryl.

Fire 3 niskins together here

7) Pick up the camera and head home

Planned collections: Corals, push cores, carbonates, pictures of corals and Alvin.

Targets (origin= 27N 06.1, 91W 10.2)

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N27 06.1000	W091 10.2000	0	0	
1-tubes_mussels	N27 06.320	W091 09.962	387	412	
2-mussels_tubes	N27 06.378	W091 09.959	391	519	
3-soft_corals	N27 06.586	W091 09.927	438	904	
4-red_soft_coral	N27 06.626	W091 09.975	358	977	
5-soft_reflector	N27 06.20083	W091 09.93492	435	193	
6-high_reflector	N27 06.49466	W091 10.09557	162	731	
7-topo_high	N27 06.60334	W091 10.01904	286	934	
8-geo_reflector	N27 06.72200	W091 09.86759	533	1,157	
9-topo_high_reflector	N27 06.87347	W091 09.79281	652	1,438	
10-Jason_geoA	N27 07.09276	W091 09.95591	377	1,839	
11-Jason_geoB	N27 07.21342	W091 09.95762	371	2,062	
12-Jason_geoC	N27 07.14364	W091 09.82149	597	1,936	
16 launch target 4187			175	800	
13 Bench Marker #1			379	516	
14 Bench Marker #2			431	1018	
15 Monika Coral			402	919	

MC853

Dive #4178

Date 5/14/2006 Cruise AT 15-03
Pilot: Pat Port: Mandy Starboard: Bill Shedd

Launch Target

28° 07.643 N, 89° 08.470W
X 398, Y 1,181 Depth ~1070m

Equipment:

Push Core Rack, Medium Biobox, 2 mussel pots, chem. profiler
Niskin rack, Suction pump sampler, collection net/collection scoop
Markers: one site bench marker, two Ian markers

General notes:

Mussel beds, bacterial mats, clams, and an isolated tubeworm have been reported from this site. It is the shallowest of our deep sites and very important for the depth related biogeographic questions. Faunal occurrence is NOT well constrained by the information at our disposal. The first 2 targets are our “best guess” of the general area of the previous reports of macrofauna and mats. It seems that mats are widely distributed from previous Alvin topside logs. If you don't find everything near the first 2 targets, then transiting through the rest of the targets will have you pass over our estimates (from the geophysical and bathymetric data) of where seepage will be localized. Leave the down looking camera on for all transits and stay low enough (4-5 m or so) to survey as you transit.

Tasks:

- i) Find mussel bed and some tubeworms, and bacterial mats.
- ii) pick up carbonates when you get a chance: softball sized pieces
- iii) keep your eyes open for bushmasterable tubies and record XYs if found
- iv) Take lots of notes on X,Y, new targets, and all depths...
- v) take two sets of 6 push cores

Plan:

- 1) Sit down and navigate in the sub (30 minutes, do it right).
- 2) move to Target 1 (launch target). Land heading north and deploy the bench marker. Note XY
- 3) Look around here and then in vicinity of target 2: for tubeworms, mussel beds, mats and clams. Note XYs as you see them. If you find a nice live mussel bed Set down and:
 - 3.1) fire off 2 niskins
 - 3.2) take 2 mussel pots
 - 3.3) Leave an Ian marker here
 - 3.4) Take 6 push cores near here
- 4) If you see only scattered mussels, and not enough for a pot, then net some into the bio box. Fire off 2 niskins (any carbonates here?)
- 5) If you see any tubeworms, make a collection of them. If it is a clump, then suction it first. Fire a niskin (any carbonates here?)

- 6) If you see live clams, take a set of push cores here and then scoop up some clams. Fire a niskin
- 7) If you see a mat that gives you goose bumps, set down, fire a niskin, core it
- 8) If no luck in the vicinity of targets 1 and 2, head for target 3
- 9) Then to target 4, then 5, then 6. These tracks and areas were chosen to maximize your exposure to seeping areas...
- 10) If you have been striking out consistently, head up hill and transit over the top and 100 m past the topo high on the other side. Repeat this a few times in a search pattern using the topo high as the center of radiating lines.
- 11) When you are down to about 30 minutes head back to the bench marker to check drift on the Doppler nav (just note X and Y when in the same position as the deployment of the bench mark). This is a lower priority than the collections, but if you've had a good dive then it is very worthwhile.

Planned Collections: 12 pushcores, 2 mussel pots, 3 carbonates, assorted fauna, lots of pictures and a mosaick

Targets (Origin 28°N 07.00, 89°W 08.70)

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N28 07.0000	W089 08.7000	0	0	
1-IanA	N28 07.64310	W089 08.46960	398	1,181	
2-IanB	N28 07.64610	W089 08.60440	178	1,191	
3-topo_high	N28 07.38005	W089 08.38549	527	693	
4-geoA	N28 07.31668	W089 08.54517	264	580	
5-geoB	N28 07.12567	W089 08.26496	717	220	
6-geoC	N28 07.23794	W089 08.15560	899	424	

MC640
Dive # 4182

Date 5/18/2006 Cruise AT 15-03
Pilot: Pat Port: Bob Carney Starboard: PIT

Launch: Target

10; N28 21.282, W088 47.708 Depth 1410m

Equipment:

Push Core Rack, 2 Medium Bioboxs, 1 mussel pot, Niskin rack, Suction pump sampler, 2 lined collection nets

Markers: one bench marker, 2 Ian markers

General notes: This dive has 6 general objectives

- 1) to boldly go where no one has gone before (and take notes)
- 2) to make a paired mussel pot and mussel bag collection
- 3) Collect some tubeworms if they exist (both species)
- 4) collect some push cores near tubeworms
- 5) Collect some push cores through mats
- 6) Slurp some cool stuff
- 7) grab some cool rocks

Plan:

- 1) Sit down and navigate in the sub (30 minutes, do it right). Turn on Dan Cam with strobes out every time you cruise
- 2) move to Target 10 (launch target). Look around. If there is any "action" here, Land heading north and deploy the bench marker (if not wait you see some action). Note XY
- 3) Head up to Target 3. Look around
- 4) head to Target 1 then 2 and look around
- 5) head to Target 4 and look around
- 6) head to back toward Target 7 (while looking around). If you have seen good stuff, then make some decisions. If not circle through Targets 6, 5, and 9.
- 7) Go back to the best mussel bed you found:
 - 7.1) fire off 2 niskins
 - 7.2) take the mussel pot
 - 7.3) use one of the nets to get a sample of mussels and associates
 - 7.3.5) IF you have NOT seen any tubeworms on this dive, then take 6 push cores here
 - 7.4) Leave an Ian marker here
 - 7.5) any carbonates here? Grab one
 - 7.6) pick up, strobes out, Dan cam on
- 8) Go back to the best tubeworm bush you found in sediment
 - 8.1) fire off 2 niskins
 - 8.2) Take 6 push cores
 - 8.3) Grab a bunch of tubeworms, look for two species.
 - 8.4) decide if you want to slurp the tubeworm bush. If it is "rich" with little critters, please do so

and keep track of what else you add to it.

8.5) pick up, strobes out, dan cam on

9) Head for the best mat area you found

9.1) fire a niskin

9.2) take 6 push cores in the mat

10) IF you have not seen tubeworms, nor used the other biobox, then go back to a different mussel bed (or different area of the same big one) and do another mussel bed net collection with niskins and leave a marker

11) Explore more. Try transiting the mound and down the sides a bit in different directions

11) When you are down to about 30 minutes head back to the bench marker to check drift on the Doppler nav (just note X and Y when in the same position as the deployment of the bench mark). This is a lower priority than the collections, but if you've had a good dive then it is very worthwhile.

Planned Collections: 12 pushcores, 1 mussel pot, 3 carbonates, assorted fauna, lots of pictures and a mosaick

Targets (Origin 28°N 21.20, 88°W 47.70)

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N28 21.2	W088 47.7	0	0	
1-Bio	N28 21.4147	W088 47.5508	250	393	
2-Bio	N28 21.3885	W088 47.5411	265	344	
3-Bio	N28 21.4436	W088 47.6221	134	448	
4-Bio	N28 21.2580	W088 47.5443	256	103	
5-topo_high	N28 21.31234	W088 47.57106	214	204	
6-hi_amp	N28 21.36221	W088 47.56422	226	296	
7-hi_amp	N28 21.39477	W088 47.61252	148	358	
8-edge_amp	N28 21.44488	W088 47.64491	97	451	
9-hi_amp	N28 21.35398	W088 47.67408	47	284	
10-flow?	N28 21.28187	W088 47.70783	-11	151	

AC818
Dive # 4195

Date 5/30/2006 Cruise AT 15-03
Pilot: Pat Port: Erik Starboard: Liz

Launch Target:

N26°10.74, W 94°37.4

Dive target: Target 5: X = 559 , Y = 799, 100m south of the wellhead
Depth = 2,750m

Equipment:

Bushmaster, stainer, Biobox, Ian cool pix,
Suction pump sampler, milk crate with 3 push cores, collection net (lined) in biobox
Markers: Benchmark #2 and three staining markers (#3,4, and 5)

Tasks:

- i) Explore and document
- ii) stain and bushmaster

Plan:

- 1) Move towards Target 4 (Well head). X=555, Y=892
Use the side scan. Its 2 m high, and gives a good signal
If you find chemos, look around...
- 2) You need to set you DVL nav at either the wellhead (to X 555, Y 892) or at the bench marker (to X534, Y 958), when you are pulled up to the target heading North
- 3) After setting the DVL nav, head in a northerly direction following the seep action and staining. You may want to use sonar as well, but the expectation (and evidence so far) is that the feature is linear and trends almost due north (perhaps a smidge W of due N). Go past the bench marker site for at least 200m, and more if the signs of seepage persist. When you find the mother load of tubeworms, mussels and trilobites, it's time to get to work. If you have moved substantially, deploy the Benchmark #2 at some point while working.
- 4) When you set up to stain a large clump of tubeworms (multiple stains), ask topside to nav you in. This is to calibrate the Alvin nav with the wellhead based xy's we are using. DO NOT reset your DVL.
- 5) If the clump is nice, use the cool pix first.
- 6) Stain a bunch of clumps, but leave us each one to BM IF you are going to recommend I come back the next dive (stain BM sized bushes last...)
- 7) When you do the bushmaster, follow it up with the three push cores taken from under where the bush came from.
- 8) Grab a carbonate or two
- 9) cool pix and net some mussels or clams

10) FYI, the hose on the starboard with the T-handle is the inlet for the suction sampler...

Collections planned : Bushmaster, carbonates, mussels or clams, slurpets

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N26 10.3	W094 37.7	0	0	
1-geo	N26 11.10067	W094 37.32450	644	1,470	
2-geo	N26 10.99434	W094 37.36435	575	1,275	
3-geo	N26 10.87071	W094 37.35272	592	1,046	
4- WELLHEAD	N26 10.78663	W094 37.37362	555	892	
5-geo	N26 10.73630	W094 37.37069	559	799	
6-geo	N26 10.60057	W094 37.50598	330	551	
7-geo	N26 10.39953	W094 37.61391	146	182	
8- ROV chemo	N26 10.80933	W094 37.38367	539	934	
Bench Marker 1			534	958	2744

AC818
Dive # 4192

Date 5/27/2006 Cruise AT 15-03
Pilot: Bruce Port: Stephane Starboard: Mike the PIT

Launch Target:

N26°11.0, W 94°37.4
Dive target: Geo Target 3: X = 575 , Y = 1275
Depth = 2,800m

Equipment:

Push Core Rack, niskins, Biobox, 1 mussel pot, Ian cool pix,
Milk crate for rocks, Suction pump sampler, collection net (unlined)
Markers: Bench marker #1, Homer Probe on a spike

Tasks:

- i) Explore and document
- ii) Nice photos and voucher collections of chemos as found

Plan:

- 1) Sit down and navigate in the sub.
- 2) Move towards Target 4 (Well head). X=555, Y=892
 Use the side scan. Its only 2 m high, but should be a good signal
 If you find chemos, look around, drop a digital target and move on.
- 3) Pull up to the well head and land heading north
 note your XY
 Change the XY in the DVL nav to X 555, Y 892
 Note your offset if you need it to get back to targets later...
- 4) head to the ROV chemo site: X 539, Y934

When you find it look around a little then run its perimeter to get an idea of its size. Harry thinks that we will find that this site is small and basically a linear feature, perhaps will small sites strung out in a line like “pearls on a string”. So, after looking around here you are going to visit a set of potential pearls heading north. You should follow communities and side scan targets for the most part, but can also go through Geo 3, Geo 2 and Geo 1 as you head North. When you have found extensive areas of tubeworms, mussels and trilobites, it’s time to get to deploy the Benchmark and the Homer probe on a spike, then get to work

- 5) AT mussels:

 Take 2 niskins, some cool pix, and 6 cores

 Take a mussel pot , and grab a carbonate

- 6) At clams

 Take a niskin and some cool pix

 Net a few (5-6 is plenty)

7) At tubeworms

Take cool pix, 2 niskins, and 6 cores

Grab a few into biobox (but not from good stain or bm possibilities)

Grab a carbonate

8) If not successful finding tubeworms or mussels, take the remaining cores in bacterial mats

Grab a carbonate

9) if time left then run the perimeter of the site(s) and/or go check out the geo targets S of the wellhead

Collections planned: 12 pushcores, 1 mussel pot, tubeworms, clams, at least 2 carbonate substrate samples

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N26 10.3	W094 37.7	0	0	
1-geo	N26 11.10067	W094 37.32450	644	1,470	
2-geo	N26 10.99434	W094 37.36435	575	1,275	
3-geo	N26 10.87071	W094 37.35272	592	1,046	
4- WELLHEAD	N26 10.78663	W094 37.37362	555	892	
5-geo	N26 10.73630	W094 37.37069	559	799	
6-geo	N26 10.60057	W094 37.50598	330	551	
7-geo	N26 10.39953	W094 37.61391	146	182	
8- ROV chemo	N26 10.80933	W094 37.38367	539	934	

AC601
Dive #4196

Date 5/30/2006 Cruise AT 15-03
Pilot: Bruce Port: Chuck Starboard: Jeremy

Launch Target: N26° 23.55, W94° 30.85
Dive target is Target 4: X 259, Y 454
Depth: 2330 m

Equipment:

Push Core Rack, niskin(s) for brine sampling, Biobox, Ian cool pix,
Bushmaster
Milk crate for rocks, Suction pump for sea monkeys, collection net (lined)
Markers: Bench marker #1

Tasks:

- i) Brine pool brine sample
- ii) push cores from the fluff zone on the edge of the pool
- iii) push cores from the subtidal zone, taken from the edge
- iv) suction sample of brine critters
- v) bushmaster
- vi) assorted cool pix
- vii) scoop of mussels

Plan:

- 1) Sit down and navigate in the sub.
- 2) Move towards Target 4: X 259, Y 454.
- 3) Move to the center of the brine pool
 - Collect the niskin sample (s)
 - Slurp brine to collect sea monkeys
- 4) Move to the edge and run the perimeter cleanly
- 5) Set down to Push core
 - Take cool pix
 - PC In fluff
 - PC in Sediment below brine
- 6) Back to the crater rim
 - Deploy the Bench Marker
 - Run the rim.

- 7) Bushmaster
- 8) Scoop net of mussels on carbonates
- 9) Cool pix

Collections planned: Brine, seamonkeys, pushcores, bushmaster, carbonate substrate samples, net of mussels or clams

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N26 23.3	W094 31.0	0	0	
1-southern_amp	N26 23.35948	W094 30.87494	209	107	
2-topo_high	N26 23.43701	W094 30.80559	326	249	
3-hi_amp_NE	N26 23.50382	W094 30.76258	399	372	
4-lo_amp	N26 23.54766	W094 30.84760	259	454	
5-hi_amp_NW	N26 23.52115	W094 30.95653	77	407	
6-hi_amp_W	N26 23.43895	W094 30.90413	162	255	
Tubeworms			265	130	

AC 601
Dive # 4193

Date 5/28/2006 Cruise AT 15-03
Pilot: Gavin Port: Harry Starboard: Mandy

Launch Target:

N26° 23.36, W94° 30.87
Dive target: X 209, Y 107
Depth: 2330 m

Equipment:

Push Core Rack, niskins, Biobox, 1 mussel pot, Ian cool pix,
Milk crate for rocks, Suction pump sampler, collection net (unlined)
Markers: Bench marker #2

This is an exploratory dive. Take push cores and collect carbonates as desired. Spend a good bit of time looking around before committing to animal collections. If you see a place you may want to come back to, drop a digital target. a guide of activities for each type of faunal community you may encounter are listed under “tasks”. This may be our only dive at this site, so voucher collections are important. If you don’t see clams, net some extra mussels from a second area please.

Tasks:

- i) Explore and document (with Dan Cam running and strobes out)
- ii) Nice photos and voucher collections of chemos as found
- iii) At mussels: Take a mussel pot, and grab a carbonate
- iv) At clams; Take some cool pix, Net a few (5-6 is plenty)
- v) At tubeworms: Take cool pix, Grab a few into biobox

Plan:

- 1) Sit down and navigate in the sub.
- 2) Move towards Target 1:X209, Y107 (check and see if strobes for Dan Cam are out)
- 3) From there head uphill and explore the topo high (Target 2) and take push cores for Mandy, then work your way through the targets:3, 4, 5, and 6. when you see good stuff, drop a digital target.
- 4) After exploring, go back to the best area and land and deploy the bench marker, with a sub heading of due N (or close)
- 5) make appropriate Macrofaunal collections
- 6) If you have time and it is appropriate after what you have learned, you can run the perimeter of an area to get an (exact) plot of it’s size and shape (keep mud out one porthole and chemo’s out the other.

Collections planned : 12 pushcores, 1 mussel pot, tubeworms, clams, at least 2 carbonate substrate samples

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N26 23.3	W094 31.0	0	0	
1-southern_amp	N26 23.35948	W094 30.87494	209	107	
2-topo_high	N26 23.43701	W094 30.80559	326	249	
3-hi_amp_NE	N26 23.50382	W094 30.76258	399	372	
4-lo_amp	N26 23.54766	W094 30.84760	259	454	
5-hi_amp_NW	N26 23.52115	W094 30.95653	77	407	
6-hi_amp_W	N26 23.43895	W094 30.90413	162	255	

AC645
Dive # 4194

Date 5/29/2006 Cruise AT 15-03
Pilot: Mark lar Port: Bob Starboard: Cindy

Launch Target:

N26 21.168, W94 30.438
Dive target: X -561 (negative 561), Y 131
2210 m depth

Equipment:

Push Core Rack, niskins, Biobox, 2 mussel pots,
Milk crate for rocks, Suction pump sampler, collection net (unlined)
Markers: Bench marker #1

The biotarget was dived on in 2003. We know there are other sites nearby. There was also a single glass ball deployed 50m off the bottom in the area in 1990 as a passive sonar target (exact location is unknown, but it should be between 100 and 200 m away from the bio target if it is still there, we did not see it in 2003). Be aware of the fact that there are negative Xs when to the west of the biotarget area.

Tasks (generally prioritized):

- i) Explore and document unknown areas (with Dan Cam running and strobes out) If you find good stuff before you get to the known bio target, look around and work in this area. Perhaps run it's perimeter which will provide an exact map of its size. If you find nothing, move to the biotarget.
- ii) Two push cores in background and 10 in active seep area (mats or near mussels etc)
- iii) make some mussel collections and clams if you see them. If the clams are in a thick bed of live animals, make both mussel pots in the clam bed. (if not use the net)
- iv) take the mussel pots in different locations (diff. Mussel beds)
- v) Watch for soft corals (last seen in area of bio target) and collect.
- vi) don't forget about the suction sampler
- vii) grab a hand full or two of tubeworms into the biobox.

Plan:

- 1) Sit down and navigate in the sub. If not in a seep area, take two push cores.
- 2) Go to Target 4 (Low amp W) X -561 (negative 561), Y 131 (check and see if strobes for Dan Cam are out)
- 3) When you are close head up the slope and look around, this target is supposed to be near the local topo high
- 4) If you don't find anything here proceed to Target 3 (mod amp W) X 152, Y 152 and look around
- 5) Still nothing, head to Target 5 (biotarget) X 409 Y 332

Collections planned : 2 mussel pot, tubeworms, clams, at least 2 carbonate substrate samples

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N26 21.1	W094 30.1	0	0	
1-hi_amp_crest	N26 21.22265	W094 29.82120	466	221	2210
2-mod_amp_NW	N26 21.32091	W094 29.89063	353	404	
3-mod_amp_W	N26 21.18310	W094 30.00991	152	152	2215
4-lo_amp_W	N26 21.16761	W094 30.43800	-561	131	2220
5 biotarget	N26 21.282	W94 29.856	409	332	2210

AC 645
Dive #4197

Date 6/1/2006 Cruise AT 15-03
Pilot: Gavin Port: Ian Starboard: Kazumi Shibata (ssssc)

Launch Target:

N26 21.282, W94 29.856
Dive target: X 375, Y 270
2210 m depth

Equipment:

2 mussel pots, Ian's Aquapix, Milk crate for rocks, net for octopus
Markers: none

Tasks:

- 1) Take 2 mussel pots in different beds
- 2) take cool pix of your choice
- 3) catch an octopus

Plan:

- 1) Sit down and navigate in the sub.
- 2) head towards the old markers: X 375, Y 270
- 3) Mussel pot and pix at first opportunity
- 4) If you find the old markers, and are in the right place, search around for banded tubies. Image them, do not collect.
- 5) DFU

Collections planned: 2 mussel pots, cool pix

Target	Latitude	Longitude	Local X (m)	Local Y (m)	Depth (m)
Local_Origin	N26 21.1	W094 30.1	0	0	
1-hi_amp_crest	N26 21.22265	W094 29.82120	466	221	2210
2-mod_amp_NW	N26 21.32091	W094 29.89063	353	404	
3-mod_amp_W	N26 21.18310	W094 30.00991	152	152	2215
4-lo_amp_W	N26 21.16761	W094 30.43800	-561	131	2220
5 biotarget	N26 21.282	W94 29.856	409	332	2210
Old markers			375	270	

APPENDIX 5. *ALVIN* DIVE ACTIVITIES

Record of Dive Activities

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4173	AT340	2216	5/9/2006	14:59	27.64780486	-88.36231220	Mark Spear	Erik Cordes	Bernie Bernard	Nav set 5462 7065
4173	AT340	2216	5/9/2006	16:08	27.64552701	-88.36329334	Mark Spear	Erik Cordes	Bernie Bernard	1 rock sample
4173	AT340	2216	5/9/2006	16:20	27.64550965	-88.36328493	Mark Spear	Erik Cordes	Bernie Bernard	Yellow cores near mussels and tubeworms
4173	AT340	2216	5/9/2006	16:31	27.64551074	-88.36328422	Mark Spear	Erik Cordes	Bernie Bernard	Mussel scoop
4173	AT340	2216	5/9/2006	16:37	27.64552198	-88.36328749	Mark Spear	Erik Cordes	Bernie Bernard	3 rock samples
4173	AT340	2216	5/9/2006	16:37	27.64552198	-88.36328749	Mark Spear	Erik Cordes	Bernie Bernard	Grab of mussels
4173	AT340	2216	5/9/2006	18:39	27.64463321	-88.36499541	Mark Spear	Erik Cordes	Bernie Bernard	Red cores near tubeworms
4173	AT340	2216	5/9/2006	18:55	27.64463424	-88.36499630	Mark Spear	Erik Cordes	Bernie Bernard	Deployed SEAS experiments
4173	AT340	2216	5/9/2006	18:59	27.64463549	-88.36499424	Mark Spear	Erik Cordes	Bernie Bernard	Collected 1 rock sample
4173	AT340	2216	5/9/2006	18:59	27.64463549	-88.36499424	Mark Spear	Erik Cordes	Bernie Bernard	Collected small clump of tubeworms
4173	AT340	2216	5/9/2006	19:20	27.64460149	-88.36503358	Mark Spear	Erik Cordes	Bernie Bernard	Deployed Marker 1
4174	GC600	1250	5/10/2006	14:04	27.37334615	-90.57041377	Pat Hickey	Bob Carney	Helge Neimann	Surveyed in
4174	GC600	1250	5/10/2006	15:01	27.37323726	-90.57566860	Pat Hickey	Bob Carney	Helge Neimann	Chem sensor deployed, malfunctions
4174	GC600	1250	5/10/2006	15:05	27.37324361	-90.57566171	Pat Hickey	Bob Carney	Helge Neimann	Tubeworm collection
4174	GC600	1250	5/10/2006	15:40	27.37307240	-90.57463477	Pat Hickey	Bob Carney	Helge Neimann	Red pushcores of white bacterial mat
4174	GC600	1250	5/10/2006	17:55	27.36870709	-90.56634925	Pat Hickey	Bob Carney	Helge Neimann	Yellow pushcores of white bacterial mat
4174	GC600	1250	5/10/2006	18:13	27.36869295	-90.56632326	Pat Hickey	Bob Carney	Helge Neimann	Mussel pot collection-failed

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4174	GC600	1250	5/10/2006	18:18	27.36869140	-90.56632375	Pat Hickey	Bob Carney	Helge Neimann	Marker yellow #3 deployed
4174	GC600	1250	5/10/2006	18:20	27.36870575	-90.56633456	Pat Hickey	Bob Carney	Helge Neimann	Large grey carbonate collection- 3 samples
4174	GC600	1250	5/10/2006	18:24	27.36871251	-90.56636470	Pat Hickey	Bob Carney	Helge Neimann	Slurp sample- shrimp and galatheids
4174	GC600	1250	5/10/2006	18:39	27.36797549	-90.56670115	Pat Hickey	Bob Carney	Helge Neimann	Anemone collection
4175	WR269	1950	5/11/2006	16:20	26.68583938	-91.65952070	Bruce Strickrott	Harry Roberts	Vladimir Samarkin	Deployed benchmark #1
4175	WR269	1950	5/11/2006	16:20	26.68583938	-91.65952070	Bruce Strickrott	Harry Roberts	Vladimir Samarkin	Suction sample of tube-like hairy growth and holothurians
4175	WR269	1950	5/11/2006	16:51	26.68626982	-91.66259904	Bruce Strickrott	Harry Roberts	Vladimir Samarkin	Mussel pot collection- failed
4176	KC243	1610	5/12/2006	14:29	26.73097869	-92.83170483	Gavin Eppard	Stephane Hourdez	Mike McCarthy	Deployed benchmarker
4176	KC243	1610	5/12/2006	15:18	26.73073188	-92.83041777	Gavin Eppard	Stephane Hourdez	Mike McCarthy	Deployed ball marker
4176	KC243	1610	5/12/2006	15:29	26.73068558	-92.83045916	Gavin Eppard	Stephane Hourdez	Mike McCarthy	Mussel pot collection
4176	KC243	1610	5/12/2006	16:07	26.73069054	-92.83048721	Gavin Eppard	Stephane Hourdez	Mike McCarthy	2 small rock samples
4176	KC243	1610	5/12/2006	16:07	26.73069054	-92.83048721	Gavin Eppard	Stephane Hourdez	Mike McCarthy	Scooping mussels
4176	KC243	1610	5/12/2006	17:11	26.73073259	-92.83039082	Gavin Eppard	Stephane Hourdez	Mike McCarthy	Mosaic
4177	GC852	1450	5/13/2006	15:27	27.10593737	-91.16603396	Mark Spear	Ian MacDonald	Monika Bright	Deploy rotary camera
4177	GC852	1450	5/13/2006	16:07	27.10635324	-91.16620915	Mark Spear	Ian MacDonald	Monika Bright	Mussel pot collection- failed
4177	GC852	1450	5/13/2006	16:33	27.10635092	-91.16618529	Mark Spear	Ian MacDonald	Monika Bright	SEAS RUST #4 and #5 experiment deployed
4177	GC852	1450	5/13/2006	16:50	27.10633883	-91.16619351	Mark Spear	Ian MacDonald	Monika Bright	Deployed benchmarker #1
4177	GC852	1450	5/13/2006	16:56	27.10633774	-91.16619309	Mark Spear	Ian MacDonald	Monika Bright	Red pushcores

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4177	GC852	1450	5/13/2006	17:10	27.10630550	-91.16618850	Mark Spear	Ian MacDonald	Monika Bright	Rock collection
4177	GC852	1450	5/13/2006	17:40	27.10625979	-91.16607717	Mark Spear	Ian MacDonald	Monika Bright	Tubeworm collection
4177	GC852	1450	5/13/2006	18:29	27.10632465	-91.16590704	Mark Spear	Ian MacDonald	Monika Bright	2 small rock samples
4177	GC852	1450	5/13/2006	18:29	27.10632465	-91.16590704	Mark Spear	Ian MacDonald	Monika Bright	Mussel Scoop
4178	MC853	1070	5/14/2006	14:35	28.12734069	-89.14123695	Pat Hickey	Mandy Joye	Bill Shedd	Deployed marker #1
4178	MC853	1070	5/14/2006	14:55	28.12725063	-89.14149671	Pat Hickey	Mandy Joye	Bill Shedd	Deployed marker #2
4178	MC853	1070	5/14/2006	14:55	28.12725063	-89.14149671	Pat Hickey	Mandy Joye	Bill Shedd	Red cores near bacterial mat
4178	MC853	1070	5/14/2006	15:00	28.12725391	-89.14148473	Pat Hickey	Mandy Joye	Bill Shedd	Slurp surface fauna
4178	MC853	1070	5/14/2006	15:12	28.12726679	-89.14145702	Pat Hickey	Mandy Joye	Bill Shedd	Slurp animals from carbonate
4178	MC853	1070	5/14/2006	15:27	28.12699717	-89.14203478	Pat Hickey	Mandy Joye	Bill Shedd	Slurp large siphonophore
4178	MC853	1070	5/14/2006	15:44	28.12741575	-89.14307532	Pat Hickey	Mandy Joye	Bill Shedd	Mussel pot #1
4178	MC853	1070	5/14/2006	16:11	28.12742335	-89.14307010	Pat Hickey	Mandy Joye	Bill Shedd	Net of mussels
4178	MC853	1070	5/14/2006	16:45	28.12556342	-89.14171007	Pat Hickey	Mandy Joye	Bill Shedd	Fired niskins #4 and 5
4178	MC853	1070	5/14/2006	17:12	28.12383968	-89.14039497	Pat Hickey	Mandy Joye	Bill Shedd	Net of mussels
4178	MC853	1070	5/14/2006	17:29	28.12299006	-89.13980296	Pat Hickey	Mandy Joye	Bill Shedd	Yellow pushcores
4178	MC853	1070	5/14/2006	17:59	28.12303414	-89.13942237	Pat Hickey	Mandy Joye	Bill Shedd	Deployed marker #3
4178	MC853	1070	5/14/2006	18:13	28.12208425	-89.14164213	Pat Hickey	Mandy Joye	Bill Shedd	Clam and mussel scoop
4178	MC853	1070	5/14/2006	18:31	28.12194479	-89.14206153	Pat Hickey	Mandy Joye	Bill Shedd	Marker deployed

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4178	MC853	1070	5/14/2006	18:41	28.12156428	-89.14246169	Pat Hickey	Mandy Joye	Bill Shedd	1 carbonate sample and 1 barite sample
4178	MC853	1070	5/14/2006	19:01	28.12045830	-89.14117104	Pat Hickey	Mandy Joye	Bill Shedd	Niskins 2 and 3
4178	MC853	1070	5/14/2006	19:02	28.12045892	-89.14117084	Pat Hickey	Mandy Joye	Bill Shedd	Mussel pot #2
4179	AT340	2200	5/15/2006	14:47	27.64468997	-88.36498100	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	On bench marker #1
4179	AT340	2200	5/15/2006	14:52	27.64455472	-88.36499410	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	Deployed fish trap, reset nav
4179	AT340	2200	5/15/2006	15:17	27.64496778	-88.36451021	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	Marker 2 deployed in mussel bed, ball marker deployed
4179	AT340	2200	5/15/2006	15:39	27.64497002	-88.36446480	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	Mosaic in progress
4179	AT340	2200	5/15/2006	16:27	27.64494116	-88.36459931	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	Niskin #5 deployed
4179	AT340	2200	5/15/2006	16:27	27.64494116	-88.36459931	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	Staining tubeworms, marker #3 deployed
4179	AT340	2200	5/15/2006	17:20	27.64496206	-88.36454942	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	Shrimp slurped
4179	AT340	2200	5/15/2006	17:31	27.64491791	-88.36481012	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	Grab of holothurian
4179	AT340	2200	5/15/2006	18:05	27.64461380	-88.36464289	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	Bushmaster sample
4179	AT340	2200	5/15/2006	18:56	27.64493215	-88.36440101	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	1 carbonate sample

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4179	AT340	2200	5/15/2006	18:56	27.64493215	-88.36440101	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	Staining tubeworms, marker #15 deployed
4179	AT340	2200	5/15/2006	19:20	27.64491725	-88.36442337	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	More tubeworm staining, deployed marker 6
4179	AT340	2200	5/15/2006	###	27.64757016	-88.36181058	Bruce Strickrott	Chuck Fisher	Stephanie Lessard-Pilon	Net of mussels
4180	AT340	2200	5/16/2006	16:45	27.64460498	-88.36502738	Gavin Eppard	Erik Cordes	Jill Petersen	Reset nav, at benchmark
4180	AT340	2200	5/16/2006	17:03	27.64485193	-88.36464174	Gavin Eppard	Erik Cordes	Jill Petersen	Tubies stained, marker deployed- failed, marker recovered
4180	AT340	2200	5/16/2006	17:17	27.64485272	-88.36464627	Gavin Eppard	Erik Cordes	Jill Petersen	Niskin #5 fired
4180	AT340	2200	5/16/2006	17:23	27.64485243	-88.36464715	Gavin Eppard	Erik Cordes	Jill Petersen	1 large carbonate collection
4180	AT340	2200	5/16/2006	17:42	27.64463373	-88.36475435	Gavin Eppard	Erik Cordes	Jill Petersen	Niskin #4 fired
4180	AT340	2200	5/16/2006	18:32	27.64463456	-88.36470480	Gavin Eppard	Erik Cordes	Jill Petersen	Niskin #3 fired
4180	AT340	2200	5/16/2006	18:43	27.64463854	-88.36470252	Gavin Eppard	Erik Cordes	Jill Petersen	Bushmaster collection, deployed marker 10
4180	AT340	2200	5/16/2006	18:55	27.64487636	-88.36479546	Gavin Eppard	Erik Cordes	Jill Petersen	Deployed marker 11
4180	AT340	2200	5/16/2006	18:56	27.64487591	-88.36479545	Gavin Eppard	Erik Cordes	Jill Petersen	Fired niskin #2
4180	AT340	2200	5/16/2006	19:09	27.64487344	-88.36480341	Gavin Eppard	Erik Cordes	Jill Petersen	Mussel scoop
4180	AT340	2200	5/16/2006	19:09	27.64487344	-88.36480341	Gavin Eppard	Erik Cordes	Jill Petersen	Tubeworm collection
4181	AT340	2200	5/17/2006	16:22	27.64769809	-88.37371885	Mark Spear	Harry Roberts	Guy Telesnicki	Niskin sample #1
4181	AT340	2200	5/17/2006	16:38	27.64771148	-88.37372086	Mark Spear	Harry Roberts	Guy Telesnicki	Mussel scoop sample #1

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4181	AT340	2200	5/17/2006	17:16	27.64724248	-88.37009942	Mark Spear	Harry Roberts	Guy Telesnicki	1 small carbonate sample from mussel pot #2
4181	AT340	2200	5/17/2006	17:16	27.64724248	-88.37009942	Mark Spear	Harry Roberts	Guy Telesnicki	Deployed marker #4 next to brine lake
4181	AT340	2200	5/17/2006	17:16	27.64724248	-88.37009942	Mark Spear	Harry Roberts	Guy Telesnicki	Mussel pot collection
4181	AT340	2200	5/17/2006	17:16	27.64724248	-88.37009942	Mark Spear	Harry Roberts	Guy Telesnicki	Mussel scoop sample #2
4181	AT340	2200	5/17/2006	17:20	27.64723154	-88.37009544	Mark Spear	Harry Roberts	Guy Telesnicki	Niskin #2
4181	AT340	2200	5/17/2006	18:57	27.64486525	-88.36546289	Mark Spear	Harry Roberts	Guy Telesnicki	Three red pushcores #1,2,3 near tubie bush
4181	AT340	2200	5/17/2006	19:36	27.64496980	-88.36487699	Mark Spear	Harry Roberts	Guy Telesnicki	Pick up SEAS experiment
4181	AT340	2200	5/17/2006	19:39	27.64497012	-88.36487623	Mark Spear	Harry Roberts	Guy Telesnicki	Niskin #3 sample
4181	AT340	2200	5/17/2006	19:43	27.64494568	-88.36492379	Mark Spear	Harry Roberts	Guy Telesnicki	Retrieve fish trap
4182	MC640	1410	5/18/2006	15:37	28.35701639	-88.79243328	Pat Hickey	Bob Carney	PIT	Niskins #1,2 fired
4182	MC640	1410	5/18/2006	15:41	28.35701663	-88.79243354	Pat Hickey	Bob Carney	PIT	Yellow marker #1 deployed
4182	MC640	1410	5/18/2006	15:45	28.35701595	-88.79243416	Pat Hickey	Bob Carney	PIT	Mussel pot
4182	MC640	1410	5/18/2006	15:56	28.35701214	-88.79242785	Pat Hickey	Bob Carney	PIT	Yellow pushcores # 1,2,3
4182	MC640	1410	5/18/2006	16:00	28.35701531	-88.79243203	Pat Hickey	Bob Carney	PIT	Slurp sample, single brachyuran crab
4182	MC640	1410	5/18/2006	16:08	28.35700960	-88.79242800	Pat Hickey	Bob Carney	PIT	Net scoop, 1 small sample carbonate
4182	MC640	1410	5/18/2006	16:25	28.35684735	-88.79275408	Pat Hickey	Bob Carney	PIT	Niskin 3 and 4
4182	MC640	1410	5/18/2006	16:33	28.35682499	-88.79276285	Pat Hickey	Bob Carney	PIT	Pushcores in bacterial mat Yellow # 4, 5, 6 and Red 1, 2, 3

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4182	MC640	1410	5/18/2006	17:37	28.35638800	-88.79307935	Pat Hickey	Bob Carney	PIT	1 large carbonate slab
4182	MC640	1410	5/18/2006	17:37	28.35638800	-88.79307935	Pat Hickey	Bob Carney	PIT	Mussel net
4182	MC640	1410	5/18/2006	17:42	28.35637943	-88.79308487	Pat Hickey	Bob Carney	PIT	Niskin #5
4182	MC640	1410	5/18/2006	17:43	28.35637711	-88.79308268	Pat Hickey	Bob Carney	PIT	Push cores red #4,5,6
4183	AT340	2175	5/19/2006	14:58	27.64716006	-88.37394226	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Two control push cores
4183	AT340	2175	5/19/2006	16:07	27.64743598	-88.37392894	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Marker #12 deployed, tubies stained
4183	AT340	2175	5/19/2006	16:36	27.64740908	-88.37394170	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Marker #8 deployed, tubies stained
4183	AT340	2175	5/19/2006	16:49	27.64742126	-88.37395479	Bruce Strickrott	Chuck Fisher	Adriana Leiva	More tubies stained close to marker #8
4183	AT340	2175	5/19/2006	17:30	27.64747180	-88.37407465	Bruce Strickrott	Chuck Fisher	Adriana Leiva	1 small sample carbonate
4183	AT340	2175	5/19/2006	17:30	27.64747180	-88.37407465	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Baby tubeworms grabbed
4183	AT340	2175	5/19/2006	17:47	27.64719816	-88.37395332	Bruce Strickrott	Chuck Fisher	Adriana Leiva	1 small sample carbonate
4183	AT340	2175	5/19/2006	17:47	27.64719816	-88.37395332	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Bushmaster collection
4183	AT340	2175	5/19/2006	18:28	27.64566399	-88.37047091	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Coring urchins (10 cores)
4183	AT340	2175	5/19/2006	18:44	27.64566905	-88.37046218	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Collecting net of urchins
4183	AT340	2175	5/19/2006	19:00	27.64567445	-88.37041617	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Slurp of hermit crabs and shrimp
4183	AT340	2175	5/19/2006	19:30	27.64463582	-88.36313513	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Deployed marker 5
4183	AT340	2175	5/19/2006	19:39	27.64449399	-88.36310889	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Mosaic of Mussel brick road
4183	AT340	2175	5/19/2006	19:45	27.64505625	-88.36310903	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Ball marker dropped

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4183	AT340	2175	5/19/2006	19:48	27.64520603	-88.36308171	Bruce Strickrott	Chuck Fisher	Adriana Leiva	Ball marker dropped
4184	GC600	1250	5/20/2006	14:25	27.37323512	-90.57566438	Gavin Eppard	Stephane Hourdez	Marshall Bowles	Dropped benchmarker 2
4184	GC600	1250	5/20/2006	17:12	27.37198656	-90.57340318	Gavin Eppard	Stephane Hourdez	Marshall Bowles	Niskins #1, 2
4184	GC600	1250	5/20/2006	17:23	27.37199002	-90.57340311	Gavin Eppard	Stephane Hourdez	Marshall Bowles	2 small carbonate samples from clam site 1
4184	GC600	1250	5/20/2006	17:23	27.37199002	-90.57340311	Gavin Eppard	Stephane Hourdez	Marshall Bowles	Yellow pushcores by clams
4184	GC600	1250	5/20/2006	17:41	27.37199935	-90.57341006	Gavin Eppard	Stephane Hourdez	Marshall Bowles	Clam collection - 2 carbonate samples
4184	GC600	1250	5/20/2006	17:55	27.37200733	-90.57342351	Gavin Eppard	Stephane Hourdez	Marshall Bowles	Rock collection
4184	GC600	1250	5/20/2006	19:12	27.36650148	-90.56391870	Gavin Eppard	Stephane Hourdez	Marshall Bowles	Niskins #3, 4, 5
4184	GC600	1250	5/20/2006	19:16	27.36651657	-90.56392994	Gavin Eppard	Stephane Hourdez	Marshall Bowles	Dropped Ian marker #5, took red pushcores with rock underneath
4184	GC600	1250	5/20/2006	19:22	27.36650222	-90.56392320	Gavin Eppard	Stephane Hourdez	Marshall Bowles	2 small bags of carbonate from clam site 2
4184	GC600	1250	5/20/2006	19:22	27.36650222	-90.56392320	Gavin Eppard	Stephane Hourdez	Marshall Bowles	Clam scoop
4184	GC600	1250	5/20/2006	19:35	27.36651593	-90.56392333	Gavin Eppard	Stephane Hourdez	Marshall Bowles	Slurping galatheids, crabs and shrimp
4185	GC852	1410	5/21/2006	14:45	27.10590706	-91.16572768	Mark Spear	Monika Bright	Cheryl Morrison	Deploy camera
4185	GC852	1410	5/21/2006	14:52	27.10591292	-91.16572970	Mark Spear	Monika Bright	Cheryl Morrison	Set DVL nav
4185	GC852	1410	5/21/2006	15:05	27.10586444	-91.16601322	Mark Spear	Monika Bright	Cheryl Morrison	Recover crab trap
4185	GC852	1410	5/21/2006	16:23	27.10968413	-91.16540625	Mark Spear	Monika Bright	Cheryl Morrison	Collect anemones
4185	GC852	1410	5/21/2006	16:45	27.10959154	-91.16549012	Mark Spear	Monika Bright	Cheryl Morrison	Collect anemones
4185	GC852	1410	5/21/2006	17:52	27.11085603	-91.16565289	Mark Spear	Monika Bright	Cheryl Morrison	Collection of 3 rock samples near benchmark

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4185	GC852	1410	5/21/2006	17:52	27.11085603	-91.16565289	Mark Spear	Monika Bright	Cheryl Morrison	Deployed benchmarker #2
4185	GC852	1410	5/21/2006	17:52	27.11085603	-91.16565289	Mark Spear	Monika Bright	Cheryl Morrison	Sponge collection
4185	GC852	1410	5/21/2006	18:05	27.11087553	-91.16562954	Mark Spear	Monika Bright	Cheryl Morrison	Crab collection
4185	GC852	1410	5/21/2006	18:12	27.11088447	-91.16563330	Mark Spear	Monika Bright	Cheryl Morrison	Collect rock
4185	GC852	1410	5/21/2006	18:20	27.11091394	-91.16561953	Mark Spear	Monika Bright	Cheryl Morrison	Collect crab with manipulator
4185	GC852	1410	5/21/2006	18:48	27.10995915	-91.16593877	Mark Spear	Monika Bright	Cheryl Morrison	Collect bamboo coral
4186	GC852	1410	5/22/2006	15:56	27.10635657	-91.16618318	Pat Hickey	Chuck Fisher	Erin Becker	at benchmarker 1
4186	GC852	1410	5/22/2006	16:08	27.10638635	-91.16612887	Pat Hickey	Chuck Fisher	Erin Becker	Deploy fish trap
4186	GC852	1410	5/22/2006	16:24	27.10619126	-91.16613587	Pat Hickey	Chuck Fisher	Erin Becker	Mussel pot collection
4186	GC852	1410	5/22/2006	17:43	27.10619210	-91.16613065	Pat Hickey	Chuck Fisher	Erin Becker	Deployed Ian marker 6 about 2-3 meters from stained tubeworms
4186	GC852	1410	5/22/2006	18:05	27.10595746	-91.16622784	Pat Hickey	Chuck Fisher	Erin Becker	Bushmaster collection
4186	GC852	1410	5/22/2006	18:22	27.10595072	-91.16623594	Pat Hickey	Chuck Fisher	Erin Becker	Carbonate collection- 2 rocks
4186	GC852	1410	5/22/2006	18:22	27.10595072	-91.16623594	Pat Hickey	Chuck Fisher	Erin Becker	Slurp collection
4187	GC852	1410	5/23/2006	14:19	27.10627679	-91.16612168	Bruce Strickrott	Erik Cordes	PIT Sean	At benchmarker 1, reset nav
4187	GC852	1410	5/23/2006	16:15	27.11092930	-91.16563683	Bruce Strickrott	Erik Cordes	PIT Sean	Mussel pot- 1 small carbonate sample
4187	GC852	1410	5/23/2006	16:38	27.11093301	-91.16559239	Bruce Strickrott	Erik Cordes	PIT Sean	Deployed marker #8, staining tubeworms
4187	GC852	1410	5/23/2006	17:25	27.11126986	-91.16554374	Bruce Strickrott	Erik Cordes	PIT Sean	Bushmaster
4187	GC852	1410	5/23/2006	17:55	27.11113716	-91.16543614	Bruce Strickrott	Erik Cordes	PIT Sean	Reset nav again

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4187	GC852	1410	5/23/2006	18:13	27.11109414	-91.16533438	Bruce Strickrott	Erik Cordes	PIT Sean	Deployed marker #5, staining tubeworms
4187	GC852	1410	5/23/2006	18:38	27.11073273	-91.16558741	Bruce Strickrott	Erik Cordes	PIT Sean	Mussel scoop
4187	GC852	1410	5/23/2006	19:30	27.10994806	-91.16591835	Bruce Strickrott	Erik Cordes	PIT Sean	Mosaic
4187	GC852	1410	5/23/2006	20:19	27.11002441	-91.16599061	Bruce Strickrott	Erik Cordes	PIT Sean	Grabbed rock- 1 sample from mound top
4189	GC852	1410	5/24/2006	16:39	27.10962838	-91.16583993	Gavin Eppard	Ian MacDonald	Cheryl Morrison	Deployed camera
4189	GC852	1410	5/24/2006	16:56	27.10956311	-91.16596107	Gavin Eppard	Ian MacDonald	Cheryl Morrison	Coral collection
4189	GC852	1410	5/24/2006	17:09	27.10956207	-91.16596204	Gavin Eppard	Ian MacDonald	Cheryl Morrison	Three niskins # 1,2,3
4189	GC852	1410	5/24/2006	17:15	27.10956263	-91.16596135	Gavin Eppard	Ian MacDonald	Cheryl Morrison	Carbonate/anemone collection
4189	GC852	1410	5/24/2006	17:28	27.10954937	-91.16591027	Gavin Eppard	Ian MacDonald	Cheryl Morrison	Sampled corals with manipulator
4189	GC852	1410	5/24/2006	17:48	27.11073239	-91.16542413	Gavin Eppard	Ian MacDonald	Cheryl Morrison	Reset nav
4189	GC852	1410	5/24/2006	18:03	27.11082444	-91.16568254	Gavin Eppard	Ian MacDonald	Cheryl Morrison	Fired 2 niskin bottles- #4,5
4189	GC852	1410	5/24/2006	18:10	27.11082626	-91.16568493	Gavin Eppard	Ian MacDonald	Cheryl Morrison	Red pushcores
4189	GC852	1410	5/24/2006	18:50	27.11063536	-91.16593047	Gavin Eppard	Ian MacDonald	Cheryl Morrison	Yellow pushcores
4189	GC852	1410	5/24/2006	19:07	27.10974384	-91.16615795	Gavin Eppard	Ian MacDonald	Cheryl Morrison	Collected camera
4189	GC852	1410	5/24/2006	19:55	27.10968478	-91.16643060	Gavin Eppard	Ian MacDonald	Cheryl Morrison	Collecting corals
4190	GC852	1410	5/25/2006	14:33	27.11089199	-91.16556501	Mark Spear	Bob Carney	Meg Bernier	Camera deployed
4190	GC852	1410	5/25/2006	15:55	27.10988105	-91.16605704	Mark Spear	Bob Carney	Meg Bernier	Corals (hard and soft) collected
4190	GC852	1410	5/25/2006	18:13	27.10634876	-91.16662567	Mark Spear	Bob Carney	Meg Bernier	Recover SEAS experiments and fish trap

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4190	GC852	1410	5/25/2006	18:13	27.10634876	-91.16662567	Mark Spear	Bob Carney	Meg Bernier	Trip all 5 Niskins at BM 2
4191	WR269	1950	5/26/2006	15:25	26.68584842	-91.65950000	Pat Hickey	Harry Roberts	Matt Kupchik	Mosaic of pogonopheran field
4191	WR269	1950	5/26/2006	16:13	26.68585277	-91.65943294	Pat Hickey	Harry Roberts	Matt Kupchik	Niskins #1 and #2
4191	WR269	1950	5/26/2006	16:34	26.68585359	-91.65943805	Pat Hickey	Harry Roberts	Matt Kupchik	12 pushcores in pogonopheran field
4191	WR269	1950	5/26/2006	16:45	26.68584936	-91.65943976	Pat Hickey	Harry Roberts	Matt Kupchik	Slurp of pogos and friends
4191	WR269	1950	5/26/2006	17:45	26.68623861	-91.66249239	Pat Hickey	Harry Roberts	Matt Kupchik	Scoop of mussels for biobox with manipulator and scoop
4191	WR269	1950	5/26/2006	18:02	26.68623575	-91.66249352	Pat Hickey	Harry Roberts	Matt Kupchik	Niskins #3 and #4
4191	WR269	1950	5/26/2006	18:08	26.68621371	-91.66252919	Pat Hickey	Harry Roberts	Matt Kupchik	Tubeworm sampling and niskin #5
4191	WR269	1950	5/26/2006	18:25	26.68614540	-91.66273958	Pat Hickey	Harry Roberts	Matt Kupchik	Mussel pot sampling
4191	WR269	1950	5/26/2006	18:41	26.68614449	-91.66273524	Pat Hickey	Harry Roberts	Matt Kupchik	Niskin #5
4191	WR269	1950	5/26/2006	18:41	26.68614449	-91.66273524	Pat Hickey	Harry Roberts	Matt Kupchik	Tubeworm sampling
4191	WR269	1950	5/26/2006	18:43	26.68615072	-91.66268446	Pat Hickey	Harry Roberts	Matt Kupchik	Carbonate sample- 1 rock sample
4192	AC818	2740	5/27/2006	16:34	26.18007124	-94.62332043	Bruce Strickrott	Stephane Hourdez	Mike McCarthy	Mussel pot- 1 small carbonate sample from mussel pot
4192	AC818	2740	5/27/2006	16:34	26.18007124	-94.62332043	Bruce Strickrott	Stephane Hourdez	Mike McCarthy	Reset nav
4192	AC818	2740	5/27/2006	18:15	26.18031058	-94.62299540	Bruce Strickrott	Stephane Hourdez	Mike McCarthy	Deployed benchmarker #1
4192	AC818	2740	5/27/2006	18:25	26.18032212	-94.62299783	Bruce Strickrott	Stephane Hourdez	Mike McCarthy	Grab of tubeworms
4192	AC818	2740	5/27/2006	18:38	26.18033419	-94.62299176	Bruce Strickrott	Stephane Hourdez	Mike McCarthy	Red pushcores

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4192	AC818	2740	5/27/2006	19:22	26.18033930	-94.62299229	Bruce Strickrott	Stephane Hourdez	Mike McCarthy	Mussel scoop
4192	AC818	2740	5/27/2006	19:41	26.18033421	-94.62299557	Bruce Strickrott	Stephane Hourdez	Mike McCarthy	Rock collection- 1 small sample of carbonate
4192	AC818	2740	5/27/2006	20:10	26.18063365	-94.62306222	Bruce Strickrott	Stephane Hourdez	Mike McCarthy	Yellow pushcores in urchins
4193	AC601	2340	5/28/2006	14:27	26.39109301	-94.51640515	Gavin Eppard	Harry Roberts	Mandy Joye	Reset nav
4193	AC601	2340	5/28/2006	14:46	26.38917276	-94.51498331	Gavin Eppard	Harry Roberts	Mandy Joye	Two pushcores (Y5 and Y6) and drop marker #8
4193	AC601	2340	5/28/2006	15:06	26.38997174	-94.51398619	Gavin Eppard	Harry Roberts	Mandy Joye	Sample tubeworms
4193	AC601	2340	5/28/2006	15:34	26.39031791	-94.51352748	Gavin Eppard	Harry Roberts	Mandy Joye	Rock sample
4193	AC601	2340	5/28/2006	15:56	26.39001010	-94.51400350	Gavin Eppard	Harry Roberts	Mandy Joye	Slurp sample
4193	AC601	2340	5/28/2006	16:03	26.39001444	-94.51399530	Gavin Eppard	Harry Roberts	Mandy Joye	Pushcore Y3 and Y4 near tubeworm bush
4193	AC601	2340	5/28/2006	17:08	26.39185364	-94.51487329	Gavin Eppard	Harry Roberts	Mandy Joye	Niskins 1-5
4193	AC601	2340	5/28/2006	17:12	26.39181519	-94.51491989	Gavin Eppard	Harry Roberts	Mandy Joye	#1, #2 Yellow cores in brine pool bottom
4193	AC601	2340	5/28/2006	17:30	26.39216157	-94.51492716	Gavin Eppard	Harry Roberts	Mandy Joye	#5,6 Red cores in brine pool bottom
4193	AC601	2340	5/28/2006	17:49	26.39245723	-94.51346072	Gavin Eppard	Harry Roberts	Mandy Joye	#R3,4 edge of brine pool
4193	AC601	2340	5/28/2006	17:59	26.39228399	-94.51343532	Gavin Eppard	Harry Roberts	Mandy Joye	Attempted sample of crystals
4193	AC601	2340	5/28/2006	18:09	26.39200087	-94.51355430	Gavin Eppard	Harry Roberts	Mandy Joye	Carbonate sample- 1 large rock sample from ridge crest
4193	AC601	2340	5/28/2006	18:48	26.39208202	-94.51521337	Gavin Eppard	Harry Roberts	Mandy Joye	Pushcores R1 and R2 by mixed mussel/urchin field
4193	AC601	2340	5/28/2006	18:51	26.39208131	-94.51521359	Gavin Eppard	Harry Roberts	Mandy Joye	Scoop of mussels/urchins- 1 small carbonate sample

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4194	AC645	2240	5/29/2006	14:32	26.35276965	-94.50737606	Mark Spear	Bob Carney	Cindy Petersen	2 red pushcores #1,2
4194	AC645	2240	5/29/2006	14:40	26.35448739	-94.50942685	Mark Spear	Bob Carney	Cindy Petersen	Coral and holothurian collection
4194	AC645	2240	5/29/2006	16:12	26.35433470	-94.49826002	Mark Spear	Bob Carney	Cindy Petersen	Mussel pot A taken
4194	AC645	2240	5/29/2006	16:29	26.35434411	-94.49824978	Mark Spear	Bob Carney	Cindy Petersen	Rock collection- 2 large rock samples from bottom and top of mound
4194	AC645	2240	5/29/2006	16:45	26.35435148	-94.49823508	Mark Spear	Bob Carney	Cindy Petersen	Grab of tubeworm clump
4194	AC645	2240	5/29/2006	16:58	26.35442288	-94.49841938	Mark Spear	Bob Carney	Cindy Petersen	Pushcores #3,4,5
4194	AC645	2240	5/29/2006	17:04	26.35444044	-94.49845174	Mark Spear	Bob Carney	Cindy Petersen	Pushcore #6
4194	AC645	2240	5/29/2006	17:05	26.35444043	-94.49845173	Mark Spear	Bob Carney	Cindy Petersen	Niskins 1,2,3
4194	AC645	2240	5/29/2006	17:13	26.35444820	-94.49834450	Mark Spear	Bob Carney	Cindy Petersen	Marker #1 deployed
4194	AC645	2240	5/29/2006	17:39	26.35434091	-94.49744296	Mark Spear	Bob Carney	Cindy Petersen	Soft and hard coral collection, 1 rock sample from base of soft coral
4194	AC645	2240	5/29/2006	18:22	26.35516997	-94.49865260	Mark Spear	Bob Carney	Cindy Petersen	Second mussel pot B
4194	AC645	2240	5/29/2006	18:30	26.35518301	-94.49865207	Mark Spear	Bob Carney	Cindy Petersen	Pushcores Y1-6 taken in bacterial mat
4194	AC645	2240	5/29/2006	18:41	26.35523857	-94.49863592	Mark Spear	Bob Carney	Cindy Petersen	Niskins #4, 5 fired
4194	AC645	2240	5/29/2006	19:10	26.35480803	-94.49823122	Mark Spear	Bob Carney	Cindy Petersen	Net samples of 3 holothuroids
4195	AC818	2740	5/30/2006	14:42	26.18013755	-94.62276839	Pat Hickey	Erik Cordes	Liz Goehring	Reset nav
4195	AC818	2740	5/30/2006	14:54	26.18021658	-94.62301668	Pat Hickey	Erik Cordes	Liz Goehring	At benchmark 9
4195	AC818	2740	5/30/2006	16:36	26.18017507	-94.62298908	Pat Hickey	Erik Cordes	Liz Goehring	Bushmaster- 1 bag small rocks from bushmaster

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer	Activity
4195	AC818	2740	5/30/2006	17:05	26.18014656	-94.62300305	Pat Hickey	Erik Cordes	Liz Goehring	Deployed marker #4 by stained tubeworms
4195	AC818	2740	5/30/2006	17:21	26.18021399	-94.62298475	Pat Hickey	Erik Cordes	Liz Goehring	Deployed marker #3 by 2nd stained tubie bush
4195	AC818	2740	5/30/2006	17:29	26.18031411	-94.62301068	Pat Hickey	Erik Cordes	Liz Goehring	3rd bush stained near marker #1
4195	AC818	2740	5/30/2006	18:31	26.18065005	-94.62279433	Pat Hickey	Erik Cordes	Liz Goehring	Slurp of 3 starfish, 1 squid, sea cucumber, galatheid crab and pogonophorans
4195	AC818	2740	5/30/2006	18:45	26.18084772	-94.62289617	Pat Hickey	Erik Cordes	Liz Goehring	Mussel scoop- included 1 back small carbonate rocks
4195	AC818	2740	5/30/2006	18:57	26.17987855	-94.62323654	Pat Hickey	Erik Cordes	Liz Goehring	Slurp of holothurian
4195	AC818	2740	5/30/2006	19:06	26.18013517	-94.62282694	Pat Hickey	Erik Cordes	Liz Goehring	Pushcore #2 and 3 at bushmaster scar
4195	AC818	2740	5/30/2006	19:14	26.18018699	-94.62282498	Pat Hickey	Erik Cordes	Liz Goehring	2 large carbonate collection near marker #3
4196	AC601	2330	5/31/2006	15:11	26.39235023	-94.51421983	Bruce Strickrott	Chuck Fisher	Jeremy Potter	Pelagic pump- yellow chamber
4196	AC601	2330	5/31/2006	15:27	26.39230210	-94.51411562	Bruce Strickrott	Chuck Fisher	Jeremy Potter	Pelagic pump- red chamber
4196	AC601	2330	5/31/2006	17:09	26.39208968	-94.51375551	Bruce Strickrott	Chuck Fisher	Jeremy Potter	Slurp of sargassum
4196	AC601	2330	5/31/2006	17:20	26.39244268	-94.51376537	Bruce Strickrott	Chuck Fisher	Jeremy Potter	Red pushcores of fluff
4196	AC601	2330	5/31/2006	17:31	26.39248183	-94.51380398	Bruce Strickrott	Chuck Fisher	Jeremy Potter	Coconut collection
4196	AC601	2330	5/31/2006	17:37	26.39248196	-94.51380323	Bruce Strickrott	Chuck Fisher	Jeremy Potter	Octopus collection
4196	AC601	2330	5/31/2006	17:45	26.39222156	-94.51382848	Bruce Strickrott	Chuck Fisher	Jeremy Potter	6 push cores in brine
4196	AC601	2330	5/31/2006	18:00	26.39186735	-94.51384672	Bruce Strickrott	Chuck Fisher	Jeremy Potter	Carbonate with sponges collection
4196	AC601	2330	5/31/2006	18:42	26.39031060	-94.51437619	Bruce Strickrott	Chuck Fisher	Jeremy Potter	Bushmaster

DIVENUM	Site	Depth (m)	Date	Time	Lat Mean	Lon Mean	Pilot	Port Observer	STB Observer
4196	AC601	2330	5/31/2006	19:32	26.39045026	-94.51382057	Bruce Strickrott	Chuck Fisher	Jeremy Potter
4196	AC601	2330	5/31/2006	19:34	26.39050095	-94.51356327	Bruce Strickrott	Chuck Fisher	Jeremy Potter
4196	AC601	2330	5/31/2006	19:35	26.39047826	-94.51354937	Bruce Strickrott	Chuck Fisher	Jeremy Potter
4196	AC601	2330	5/31/2006	20:21	26.39146400	-94.51488008	Bruce Strickrott	Chuck Fisher	Jeremy Potter
4197	AC645	2200	6/1/2006	14:29	26.35388547	-94.49602851	Gavin Eppard	Ian MacDonald	Kazumi Shibata
4197	AC645	2200	6/1/2006	14:57	26.35387337	-94.49601058	Gavin Eppard	Ian MacDonald	Kazumi Shibata
4197	AC645	2200	6/1/2006	15:16	26.35387452	-94.49601434	Gavin Eppard	Ian MacDonald	Kazumi Shibata
4197	AC645	2200	6/1/2006	15:33	26.35436315	-94.49729308	Gavin Eppard	Ian MacDonald	Kazumi Shibata
4197	AC645	2200	6/1/2006	15:45	26.35411139	-94.49743801	Gavin Eppard	Ian MacDonald	Kazumi Shibata
4197	AC645	2200	6/1/2006	15:45	26.35411139	-94.49743801	Gavin Eppard	Ian MacDonald	Kazumi Shibata

APPENDIX 6. *JASON II* EVENT LOG

JASON Dive Logs

Dive Log for J2-269

Date: 06/07/07
Shift: 1130-1600 EDT
Dive: J2-269
Site: AT 340

Watch Leader:
Name: Kathy Loftis

Time	Comments
16:02	off sea-floor. Start SM2000 calibration
17:27	start SM200 survey over pit
17:39	start E/W line
17:49	end line
17:49	move towards benchmark 1
17:50	began all discs 002
17:57	screen shot grab
17:59	seeing sea floor
18:02	urchins
18:16	sea cucumber
18:19	crossing 2194 contour
18:21	“ 8192 “
18:22	“ 2190 “
18:22	PC-A stopped recording
18:25	mussel shell hatch
18:29	bacterial mat
18:31	mussels
18:31	tubeworms
18:33	“ & mussels
18:40	carbonate
18:41	rat tail fish
18:49	end tubeworms, mats
18:52	tubeworms
18:54	mats (white)
18:56	mound with burrows
18:57	squid & tubeworms
18:58	began recording on PC-A again
19:00	search for bm 1
19:07	tubeworms
19:14	tubeworms and carbonates
19:17	holothoria floating
19:18	mussels
19:18	marker 11 found

19:23 tubeworms
19:30 mussel bed
19:32 blue flight bag
19:35 dead mussels
19:36 benchmarker in distance –searching

Summary:

We began the shift by carrying out a survey of a pit. Once completed, we began our search for benchmarker 1. Many beds of mussels and tubeworms were observed, however none were collected. Benchmarker 11 was observed in a mussel bed as well as a previously seeing blue flight bag.

Problems with recording: PC-A stopped recording for an extended period of time.

Date: 06/07/07
Shift: 1600-2000 EDT
Dive: J2-269
Site: AT 340

Watch Leader: Dr. Harry Roberts
Name: Bill Shedd

Time (GMT) Comments

20:31 Searching for markers #6 and #15 – plastic cup on bottom
20:33 Clump of fishing line in tubeworms
20:35 Pelagic deep purple sea cucumber on brow cam
20:42 Lush tubeworm bushes
20:47 Marker #11 found, 10 m
20:52 Mussels, science cam
20:59 Abrupt change in bottom color from light to very dark
21:11 Marker #1 spotted
21:18 DVL Nav reset
22:27 Search for urchins to sample and core
22:34 Found group of urchins, prep to core; PCA DVD deck failed
22:59 Begin coring
23:03 Sample urchin, continue coring

Watch Summary:

Located markers #1 and #11, could not locate #6 and #15, to calibrate Jason navigation with 06 Alvin navigation. Sampled sea urchins and took cores below them, in front of them, and behind them on their trails to determine what they eat.

Date: 6/8/07
Shift: 2000-0000 EDT
Dive: J2-269
Site: AT 340

Watch Leader: Harry Roberts
Name: Irmi Eichinger

Time (GMT) Comments
01:30 Getting ready for SM 2000
20m, starting in NW corner, facing west
Folder J2-269 at 340
01:50 Start of line 1
02:36 End of line 1
02:42 Start of line 2
03:18 End of line 2

Watch Summary:
Nothing interesting to see.

Date: 6/8/2007
Shift: 0000-0400 EDT
Dive: J2-269
Site: AT340

Watch Leader: Harry Roberts
Name: Nicole Morris

Time (GMT) Comments
04:15:31 Start of SM2000 survey line 3
04:52:09 End of survey line 3
04:56:?? Start of survey line 4
05:33:02 End of survey line 4
05:40:59 Start of survey line 5
06:15:32 End of survey line 5
06:23:31 Start of survey line 6
06:46:01 Dropped target (marker)
07:00:58 End of survey line 6
07:04:18 Start of survey line 7
07:39:02 End of survey line 7
07:51:08 Start of survey line 8

Watch Summary:

At the start of watch, the SM2000 survey was continuing. We surveyed lines 3 to 7. A target was dropped during survey line #6. Survey line #8 was started before the end of watch. No DVD recordings were made.

Date: 6/8/2007
Shift: 0400-0730 EDT
Dive: J2-269
Site: AT340

Watch Leader:
Name: Oscar Garcia

Time (GMT)	Comments
08:22:38	End of survey Line 8
08:32:40	Start of Survey Line 9
09:08:57	End of Survey Line 9
09:17:54	Start of Survey Line 10
09:50:10	End of Survey Line 10
09:58:21	Start of Survey Line 11
10:34:48	End of Survey Line 11
10:34:50	Start transiting to repeating survey line 6
10:34:50	Start recording DVD series 007
10:54:12	After 10:52 minutes, DVD BCW 07 fails recording.
10:56:03	DVD BCW07 was replaced and start recording in a new DVD labeled BCW7#2
11:03:54	Start repeating survey line 6
11:27:00	DVD BCA07 fails and it is replaced for a new one it is labeled BCA007#2
11:40:00	Stop Survey Line 6
11:40:00	Transiting to new site northwest.

Watch Summary:
Basically we conducted Survey lines 8,9,10 and 11, line 6 was repeated. Two DVD fails during watch time.

Date: 6/8/2007
Shift: 0730-1130 EDT
Dive: J2-269
Site: AT340

Watch Leader:
Name: Julia Zekely

Time (GMT) Comments

11.40 DVD set 7 recording (still); transit to western targeting site; appr. 2191m depth
11.52 Sea urchin field; many urchins and many trails
11.58 Holothuroids (2)
11.58 JASON hits bottom (sitz mark)
12.22 Sea whip
12.24 Sea whips (2); DVD set 8 started
13.20 Survey starts, short view on JASON instruments
14.20 End of survey (line #2)
14.26 DVDs 8 ends, no other set started due to surveys 20m off bottom
14.37 survey start (line #3); appr 2165m depth, 20m off bottom
14.48 line' track problems; survey stopped
start of survey line#5

Watch Summary:

Date: 6/8/2007
Shift: 1130-1600 EDT
Dive: J2-269
Site: AT340

Watch Leader:
Name: Kathy Loftis

Time Comments

15:33 stop survey line 4
15:35 no DVDs are recording
15:36 start line 5
15:55 end line 5
15:39 start line 6
16:19 end line 6
16:29 start line 7
16:48 end line 7
16:50 start line 8
17:11 end line 8
17:16 start line 9
17:36 end line 9
17:38 start line 10
17:59 end line 10
18:03 start line 11
18:23 end line 11
18:25 start line 12
18:47 end line 12
18:51 start line 13

19:10 end line 13
19:15 start line 14
19:35 end line 14
19:38 start line 15

Summary:

At the start of this shift, an SM2000 survey was already underway. The survey was carried out the length of the shift and still in progress at the beginning of the following shift. No observations were made as the ROV was not near the seafloor.

Date: 06/08/07
Shift: 1600-2000 EDT
Dive: J2-269
Site: AT340

Watch Leader: Dr. Harry Roberts
Name: Bill Shedd

Time (GMT) Comments

19:55 On line #15, SM 200 survey
19:59 End line #15
20:02 Begin line #16
20:24 End line #16
20:35 Begin line #17
20:55 End line #17
20:58 Begin line #18
21:22 End line #18
21:27 Begin line #19
21:50 End line #19
21:53 Begin line #20
22:19 End line #20
22:22 Begin line #20.5 (line change to transit to tie-line #21)
22:38 End line #20.5
22:45 Begin line #21 (E-W tie-line)
23:21 End first part of line #21, waiting on ship to change course
23:24 Begin calibration lines 5 m off bottom, 10 m off bottom, and 15 m off bottom
23:35 End calibration lines, waiting on ship to change course

Watch Summary:

We continued the SM2000 survey and surveyed lines 15 to 21. We performed calibration lines 5, 10, and 15 meters off the seafloor.

Date: 6/9/07
Shift: 2000-0000 EDT
Dive: J2-269
Site: AT 340

Watch Leader: Chuck Fisher
Name: Irmi Eichinger

Time (GMT)	Comments
00:39	tube worms
00:42	mussels
00:56	lamellibrachia
00:57	DvD 009-BC-W stopped after 18min recording
00:59	crab
01:06	carbonate plates + tubeworms
01:20	DvD 009-BC-A stopped after 40min
01:29	mussels
01:47	DvD 009II-BC-W and 009II-BC-A start recording
02:04	marker 12 found
02:09	315 Hdg; y:621; x: 384 marker 12
03:25	weights off from elevator
03:43	elevator goes up
03:59	jason is going up

Watch Summary: many tubeworms, mussels, and carbonate plates

Dive Log for J2-270

Name: Kathy Loftis
Site: AT-340
Date: 6/9/07
Shift: 11:30-4:00
Dive: J2-270

Time Comments

18:17 Jason is still being lowered
18:28 approaching seafloor
18:28 pc-w behind other dvds
18:42 not yet at seafloor
18:45 search for fish trap
18:52 2203 m depth
18:59 in transit to elevator 2 location
19:05 pc-a stopped recording b/w 24 and 40 minutes
19:06 fat cucumber, clump of cucumbers
19:09 pc-a failed insert new disc
19:12 sea cucumber
19:15 starfish
19:22 2 sea cucumbers
19:22 starfish
19:23 sea cucumber
19:29 floppy urchin
19:36 fish
19:41 sea cucumbers
19:43 sea cucumber
19:51 still in transit to elevator
19:55 sea cucumber collection

Summary:

We began with the lowering of JASON. Once having reached the seafloor, we started a short search for a lost fish trap. The trap was not located during the search and JASON started to transit towards the elevator. During this transit, many biological observations were made, however there were no collections. The most common observation made were sea cucumbers.

Date: 6/9/07
Shift: 16:00-20:00 EDT
Dive: J2-270
Site: AT340

Watch Leader: Harry Roberts
Name: Bill Shedd

Time (GMT) Comments

19:58 slurp sample #1, holothurian, green bucket
20:06 elevator launched
20:13 slurp sample #2, holothurian, green bucket
20:22 start DVD tapes #11 20:27
20:27 slurp sample #3, holothurian, green bucket
20:30 stop DVD tapes #10
20:33 slurp sample #4, sea star, red bucket
20:42 slurp sample #5, holothurian, red bucket
20:52 slurp sample #6, holothurian, red bucket
20:54 slurp sample #7, holothurian, red bucket
21:03 observe octopus, attempt slurp sample
21:05 octopus escapes
21:08 slurp sample #8, holothurian, red bucket
21:11 tripod fish observed
21:13 slurp sampling finished; two empty chambers remain – black and white, black, with green dash
21:15 transiting to elevator
21:21 left carbonate area into mud-prone area where the elevator should be
21:23 found elevator in good shape
21:24 Ian's "Louie" camera working
21:29 weight removed from elevator
21:33 another weight removed from elevator
21:37 move elevator to new site
22:13 deploy elevator at new site
22:21 start DVD tapes #12
22:23 stop DVD tapes #11
22:44 PCA #12 DVD stopped, couldn't finalize, replaced
22:53 deploy "Louie" camera, Target #25
23:08 prep for photo mosaic
23:18 reset nav LBL BC 23m offset, bearing 247 from AC baseline
23:25 begin photo mosaic

Watch Summary:

8 slurp samples were taken, moved elevator, deployed Ian's Louie camera, and started photo mosaic, observed octopus and tripod fish

Date: 6/9/07
Shift: 2000-0000 EDT
Dive: J2-270
Site: AT 340

Watch Leader: Stephanie Lessard-Pilon

Name: irmi

Time (GMT) Comments

1:02 doing a smaller area at 3m (dense mussels)
1:13 tubeworms, mussels:nice video
1:21 still photomosaic (Stephanie)
1:45 end of photomosaic
1:47 Ian's camera
1:51 start mussel transplant experiment, move to the area
1:55 mussels close up, really nice, depth: 2190
2:01 sensoring starts
2:02 touching the mussels
2:04 anemones on the mussels: nice close up
2:14 opening of the first cage
2:21 filling the mussels inside the cage
2:29 methane measuring
2:39 second cage: start
2:55 opening of the biobox
2:59 start of filling the third cage with mussels
3:07 4. cage out of the biobox
3:11 white, long fish and start with filling the cage with mussels
3:19 methane measuring
3:28 end of measuring
3:32 moving the green cage
3:40 grab a rock for Harry, from milk-crate in the back
3:45 making pictures of cages from Stephanie

Watch Summary:

Date: 6/10/2007
Shift: 0000-0400 EDT
Dive: J2-270
Site: AT340

Watch Leader: Stephanie Lessard-Pilon, Stephane Hourdez, Chuck Fisher
Name: Nicole Morris

Time (GMT) Comments

03:56:33 Finished down-looking pictures
03:58:42 Going to elevator to get mussel nets
04:07:46 Photographing tubeworms
04:09:20 Elevator in sight
04:15:00 Fix for elevator position
04:17:37 Grabbing mussel scoop nets

04:19:10 White net/black zip ties mussel scoop net removed from elevator
 04:23:56 White/black mussel net in bushmaster bucket
 04:26:48 Blue/black net removed from elevator
 04:28:17 Blue/black net placed in bushmaster bucket
 04:29:55 Going to "the" mussel bed (Marker #2)
 04:37:23 At mussel bed, can see Marker #2
 04:42:00 Grabbed blue/black net from bushmaster bucket
 04:48:20 Attempted mussel collection with blue/black net (inverted net)
 04:53:11 Attempted mussel collection with blue/black net (inverted net)
 04:54:51 Attempted mussel collection with blue/black net (inverted net)
 04:55:25 Attempted mussel collection with blue/black net (inverted net)
 04:56:01 Mussel collection with blue/black net- collected a few mussels
 05:06:01 Attempted mussel collection with blue/black net (inverted net)
 05:08:53 Continuing attempt at mussel collection with blue/black net
 05:14:44 Changed grip position, continuing attempt
 05:17:09 Mussel collection with blue/black net- collected a few mussels
 05:18:34 Mussel collection attempt with blue/black net- brown mussels on hill
 05:21:03 Attempting to grab mussels with manipulator arm
 05:22:56 Observed gas bubbles
 05:23:42 Collected mussels with manipulator, placed in blue/black net
 05:29:53 Placed blue/black net in starboard bio box
 05:34:08 Grabbed white/black net from bushmaster bucket
 05:35:44 Attempting mussel collection with white/black net in same slope area
 05:38:00 Grabbing mussels with manipulator arm instead of scooping- have not collected anything yet
 05:41:23 Attempted to collect mussels with white/black net
 05:42:20 Collected one mussel by scooping mussel net
 05:42:59 Collected some mussels by scooping white/black net
 05:44:52 Collecting mussels with manipulator arm and placing in white/black netÆ
 successful
 05:48:12 Attempting to collect mussels by scooping mussel netÆ successful
 05:54:26 Taking nets back to the elevator, end of mussel net sampling
 05:58:28 Fishing line sighted on mussel bed
 06:01:47 Elevator in sight
 06:07:25 Placed white/black net in biobox #2
 06:10:38 Placed blue/black net in biobox #1
 06:12 PCA-16 stopped recording after 18:06; changed disk to PCA-16-2; we think PCA-16 finalized
 06:18 Started PCA-16-2
 06:21:02 Moving elevator to Urchin 1 area
 06:54:58 Push cores almost fell off *Jason*; elevator hit push cores
 06:57:05 Using starboard manipulator to hold push cores until elevator is lowered
 06:58:49 Placed elevator at Urchin 1 area
 06:59:25 Resetting push cores on *Jason*
 07:05:32 Removing artificial urchin from elevator
 07:08:24 Placed artificial urchin in quiver with meth sensor

07:12:20 Searching for 'good' area to take urchin push cores
07:19:05 Bio observation- small gorgonian in science camera
07:24 Reset DVL- navigation
07:42:00 Getting ready to take urchin cores
07:49 BCW-17 stopped recording at 0749 after approximately 4 minutes
07:52:01 Taking core in urchin trail (green #8)
07:54 Restarted BCW-17-2
07:57 Push core green #5 still has a plug in it
08:01 Taking core in urchin trail (green #3)

Watch Summary:

At the beginning of watch, we started mussel net collections. Mussel net sampling lasted for approximately 1 hour and 45 minutes. There were initial problems with collecting mussels in the two nets; therefore, in order to collect some mussels, *Jason's* manipulator arm was used. Towards the end of mussel net sampling, there were a couple of successful net scooping collections. The last hour of this watch was spent searching for an appropriate area (urchin trails) to take urchin push cores. Two urchin cores were collected before the end of watch.

Date: 06/10/2007
Shift: 0400-0800 EDT
Dive: J2-270
Site: AT340

Watch Leader: Ian MacDonald
Name: Oscar Garcia

Time (GMT) Comments

8:07 Still workin on core in urchins green 3
8:10 Biology takes a sample of sear urchin in starboard biobox
8:10 Starting work with another core.
8:12 Sample core in green 7
8:17 Sampler core in urchins green 4
8:22 Sample core in urchings green 6
8:34 Sea urchin starboard biobox a sample from manipulator arme.
8:40 DVD SCA 17 fails and it is replaced by a new one
8:44 Sample core with Green 1.
8:51 Core in urchins green 2
8:56 Stop coring Biology observation pelagic PC and BC camera
9:06 Fish on pilot camera
9:10 Sample core with Blue 6
9:14 Control core blue 4
9:15 Control core blue 1
9:18 Control core blue 7
9:19 Control core blue 5

9:21 Control core blue 2
9:23 Control core blue 3
9:26 Control core blue 8
9:30 Start Recording DVD 18 series
9:31 Elevator spotted on camera pilot
9:35 'HUEY' Camera is not working
9:48 Relocate push cores to the elevator
9:55 Empty cores dropped on bottom
10:01 DVD PCA 18 stops recording and it is replaced
10:10 Elevator weights released
11:40 New set of DVD is recording DVD 19 series
11:41 EVT nav reset DVL

Watch Summary:

Finish working with green push cores, all blue cores done, 'HUEY' camera not working.

Date: 6/10/07
Shift: 8000-1200 EDT
Dive: J2-270
Site: AT 340

Watch Leader: Ian
Name: irmi

Time (GMT) Comments

12:08 photo transect
12:30 still floating
12:41 on the bottom, preparing for photo transect
12:51 start
12:54 end of transect
12:56 preparation of next transit
13:00 start transit, T4 to T5
13:21 end of transit
13:24 start of photo transect T5
13:26 end of transect
13:29 start of transect T5 to T8
13:22 stop of transect
13:35 start of transect T8
13:41 start transit T8 to T3
13:43 end of line, finish of T3
13:48 start of T6
13:51 end of transect T6
14:11 start of T7
14:14 stop of T7

14:17 start of line
14:20 stop of T9
14:27 start of T2
14:30 stop of T2
14:39 start of T10
14:42 end of line
14:47 reset
14:49 start of line T1
14:52 end of line T1
14:52 heading to CRP looking for urchins
15:01 reset
15:14 start transit to central depression

Watch Summary:

Date: 6/10/2007
Shift: 11.30 – 16.00 EDT (GTM 15.30 – 20.00)
Dive: J2-270
Site: AT340

Watch Leader:
Name: Julia Zekely

Time (GMT) Comments

15.50 Many urchins and trails
16.04 Sea urchins, starfish in between
16.06 looking for site for Stephanies “artificial sea urchin trails”
16.09 complete straight trail in between other trails, Bob takes still
16.35 artificial sea urchin trail set, “Klobuerste” #1; ☺, good one
16.40 Klobuerste Mark , #1 set (2002m depth)
16.42 Doppler reset (2x)
16.57 Klobuerste marker #2 set
17.00 artificial urchin trail #2 set; ☺ good one
17.03 Doppler reset
17.17 Klobuerste marker #3 set
17.18 artificial urching trail #3 set; ☺; 2201m depth
[trails 1-3 on DVD set 21]
17.47 artificial urching trail set, but marked with marker #5; ☺
17.49 Doppler reset
17.55 Photo Mosaic
18.15 Marker deployed (mosaic marker); photo mosaic appr. 3m above bottom
18.59 Marker deployed (mosaic marker)
19.15 Marker with small float as corner markers
19.49 Niskin fired above sea urchin field

Watch Summary:

Good view, most of time used for Stephanie's "artificial sea urchin trails" experiment with Klobuerste, which was very successful. 4 artificial trails were done and marked. Afterwards the photo mosaics were started, many stills taken during mosaic

Date: 6/10/07
Shift: 16:00-20:00 EDT
Dive: J2-270
Site: AT340

Watch Leader: Harry Roberts
Name: Bill Shedd

Time (GMT) Comments

20:30 End of photo survey
20:59 slurp sample of 6 legged sea star, white bucket
21:03 observed crab
21:05 sample of crab
21:11 holothurian observed
21:14 attempt, failed to collect anemone
21:24 star fish observed
21:29 star fish collected, port biobox
21:45 mudflow (v. light colored) surrounds pre-existing highs (dark brown); flow is highly disturbed by numerous urchins, dark colored mounds undisturbed
21:50 PCA-24 DVD stopped, would not finalize, replaced
21:59 core in bacterial mat, red #1
22:02 core in mat, red #2 (might have a blue ring)
22:18 core in mat, red #3
22:24 core in in undisturbed dark sediment, red #4
22:28 core in very disturbed, very light sediment, red #5
22:44 core in mat, red #6
22:59 core in mat, red #7
23:14 core in mat, red #8
23:18 start DVD's #25
23:18 core in mat, yellow #8
23:21 core in mat, yellow #5

Watch Summary:

10 cores were taken, 8 in bacterial mats and 2 in geological flow and non-flow features. One holothurian, two sea stars, and one crab were collected. The flow was made up of very light colored sediment on the surface, almost black below, and was full of trails of numerous live sea urchins; the topographically higher, older sediments was dark brown on the surface and below and show little sign of disturbance by urchins.

Date: 6/10/07
Shift: 2000-0000 EDT
Dive: J2-270
Site: AT340

Watch Leader:
Name: Kathy Loftis

Time (GMT) Comments

0:12:18 In transit to bushmaster site
0:33:12 Mussel shell observed
0:35:11 Large mussel bed
0:36:13 Blue bag observed
0:37:14 Ian's camera seen; LED blinking
0:40:31 Start looking for tube-worms Æ marker 8 and 15
0:43:50 Bucket (white) seen with tubeworms surrounding
0:48:23 Long-line fishing line observed in tubeworm bed, at 10 m from mussel bed
0:53:29 In mussel bed Æ benchmarker #2
1:02:22 Found benchmarker #15 observed only; looking benchmarker 6
1:12:15 SCA (red) completely shut off at some time; turned on and pressed record
1:13:37 Bushmaster
1:16:31 Began DVD set 026
1:18:44 DVD set 025 ended
1:27:36 Begin tubeworm collection with bushmaster Æ stained tubeworms
1:30:44 Begin closing in on tubeworms
1:41:09 Tubeworms are collected
1:49 Tubeworms on shelf
1:52:49 Collecting small batch of stained tube worms
2:11 Collecting tubeworms into port bio box with rock
2:14 Collecting rock into port bio box
2:17 Collecting tubeworms into port bio box with large rock
2:22 Moving NW to look for fish trap
2:56 Jason going up!
2:51 End recording

Watch Summary:

Dive Log for J2-271

Date: 6/11/07
Shift: 16:00-20:00
Dive: J2-271
Site: MC462

Watch Leader: Harry Roberts
Name: Bill Shedd

Time (GMT) Comments

22:38 on bottom, start DVD #27, mottled, very burrowed bottom, small *Beggiatoa* mats
22:43 reset Doppler, not moving
22:48 forward heading 190, 10 m
22:49 common, small *Beg* mats common
22:52 white holothurian, stopped looking for hill with sonar
22:57 fish, vesicomid clams, forward, course 127
22:59 carbonates, gorgonian corals, large red crab
23:02 carbonates, numerous brittle stars, anoemone
23:05 carbonates, strong current - ~1 knot
23:12 looking for top of mound, course 310, 949.4 m
23:18 looking for top of mound, course 35, 949.8 m
23:25 *Beg* mats, course 3, 950 m
23:30 prep to deploy marker
23:34 set marker
23:36 trash(?), sign on pole with arrow pointing up and "surface dweller" written on it
23:37 eel
23:40 *Beg* mats, stopped, waiting for *Medea*
23:45 forward, course 45
23:58 crossing 960 m contour, depth 959 m

Watch Summary: found top of mound to have common *Beggiatoa*, large carbonate outcrops with gorgonian corals, some vesicomid clams, fish and crabs. Geophysical maps found to off by 1 meter in depth

Date: 6/11/07
Shift: 2000-0000 EDT
Dive: J2-271
Site: MC462

Watch Leader: Harry
Name: Irmi

Time (GMT) Comments

0:03 end of first transit
0:12 holothurian
0:14 crabs
0:16 holothurian
0:19 marker CRP
0:20 bacterial mat
0:21 holothurian
0:22 bacterial mat
0:35 soft corals, gorgonians
0:37 rocks
0:40 crab on the rock
1:04 holothurian
1:06 crab
1:29 coral
1:29 gorgonians, rocks, ophiuroids
1:34 rocks, gorgonians
1:35 holothurian
1:35 corals, rock
1:38 bacterial mat
1:43 holothurian, crab
1:45 crab
1:46 rocks, coral
1:47 many rocks, dead corals
1:53 trash, crab on top, anemons
1:56 trash
2:02 rock, holothurian
2:04 rat-tail fish, many of them
2:06 crabs
2:07 bacterial mat
2:09 trash, bomb
2:18 bacterial mat, black
2:25 holothurian
2:58 many fish, chimera, close up
3:35 rock, close up, on Birne flow site back
3:51 start of taking a core for Marshal
3:55 taking the core

Date: 6/12/2007
Shift: 0000-0400 EDT
Dive: J2-271
Site: MC462

Watch Leader: Harry Roberts, Bernie Bernard, Ian MacDonald
Name: Nicole Morris

Time (GMT) Comments

03:58:53 Taking push core (green #8) in bacterial mat
04:05:42 Taking push core (green #3) in bacterial mat
04:05:45 Harry/Bernie think oil may possibly be seeping out
04:06:59 Geo Obs: Oil bubbles?
04:18:59 Taking push core (#4) in bacterial mat
04:20:01 Geo Obs: Oil bubbles
04:20:01 Geo Obs: Hydrates
04:27:00 Taking push core (#9) in bacterial mat
04:27:58 Geo Obs: Hydrate
04:30:00 Core 9 failed; returned to basket empty
04:36:21 Geo obs: hydrate mound
04:42:00 Taking push core (blue #5) in bacterial mat
04:41 PCA 30 stopped recording
04:46 PCA 30-2 started recording
04:50:30 Crab picture taken on Scorpio
04:53:56 Moved white core #9 into milk crate
04:58:01 Taking push core (green #1) in bacterial mat
05:02:31 Going to collect mussel/clam shell
05:06:48 Collecting mussel/clam with manipulator
05:07:21 Mussel collected was placed in starboard bio box
05:08:43 Collecting second shell
05:09:38 Placing 2nd shell in starboard bio box
05:10:44 Mass spec has been on while on the ROV; going to test the mass spec
05:12:36 Picked up mass spec probe from ROV; starting test
05:13:30 Placed probe next to sediment (on top of sediment)
05:16:01 Mass spec test continues
05:17:23 Holding probe above sediment
05:27:04 Some indication of propaneÆ reading from mass spec
05:29:25 Moving probe back to ROV
05:30:05 Moving back to bacterial mat
05:33:33 Placing probe above bacterial matÆ same area as cores were taken
05:45:11 Methane appears to be increasing
05:55:23 Stop testing mass spec
05:55:49 Moving to coral area
06:16:49 Corals sighted (gorgonian)Æ new area (dropped a target)
06:32:58 At coral site to collect Lophelia, gorgonian, and other animals; also to take pictures with handheld camera
06:36:00 Grabbed handheld camera
06:37:15 Power to camera
06:45:10 Trying to work camera; having some problems; no pictures yet
06:49:59 Appears to be a connection problem with ROV and handheld camera
06:54:36 Seeing shells embedded in carbonate
07:04:59 Bio obs: coral
07:04:36 Dropped another marker at coral site

07:06:30 Taking pictures with ScorpioÆ attempting
07:08:33 Taking pictures of coral-gorgonian with Scorpio
07:10:39 Took picture of gorgonian
07:11:04 Took picture of gorgonian
07:11:22 Took picture of gorgonian
07:11:44 Continuing to take pictures of gorgonian
07:25:02 Searching for Lophelia to sample
07:26:34 Ogocephalid observed in brow cam
07:28:51 Continuing to take pictures with Scorpio
07:30:38 Lophelia sighted
07:31:12 Still continuing to reconcile connection problems with Ian’s handheld
07:37:36 Ian’s handheld appears to not be working
07:33:38 Best of video- Lophelia
07:36:13 DV cam recorded of Lophelia
07:39 End of DV cam recording
07:40:40 Still attempting to “fix” connection problem
07:41:35 Taking down looking images of corals with ScorpioÆ Lophelia corals
07:42:51 Ian’s camera (handheld) is not going to work; power circuit is not working only receiving 5 volts
07:44:32 Starting to take Lophelia Scorpio images
07:46:48 Ian’s camera may possibly have power; checking connection, power, volts
07:48:46 Camera is not working
07:50:31 Continuing Scorpio images of Lophelia

Watch Summary:

At the beginning of watch, we were taking push cores in a bacterial mat. While taking push cores, watch leaders sighted oil bubbles seeping from areas where cores had been taken. We then tested the mass spectrometer in different areas for approximately 40 minutes. *Jason* then moved to the coral sight to begin coral collections. The last hour and a half of this watch was spent taking images of coral site with the Scorpio camera and reconciling connection problems with the handheld camera.

Date: 06/12/2007
Shift: 0400-0800 EDT
Dive: J2-271
Site: MC462

Watch Leader: Ian MacDonald
Name: Oscar Garcia

Time (GMT) Comments

7:59 Start Oscar Watching
8:02 Soft Coral in the top of the rock
8:03 Lophelia detected on Scorpio Camera

8:07 DVD Series 032 starts recording
8:09 Ian Macrocamera operation starts
8:13 Manipulator operates camera to a lophelia area
8:15 Stops Recording DVD series 31
8:26 Crab photographed with macrocamera
8:33 PCA DVD 32 stops recording
8:42 Sea urchin observed
8:55 Moving away from the same rock.
8:55 Two different corals observed plain and soft.
8:58 Biol. Observation madrepora coral
9:06 Fail to attempt to sample coral in biobox
9:08 Successful sample collection of madrepora coral
9:22 Soft coral collection with Biobox
9:28 Carbonate Sample
9:35 Stop sampling corals and carbonates
9:47 Start transiting to photo transect series
9:53 Start Transect 1
9:58 End of line 1
10:05 Start recording DVD series 33
10:06 Start transect 2
10:08 Stop recording DVD series 32
10:11 End of line 2
10:22 Start transect 4
10:27 End of transect 4
10:30 Start transect 8
10:35 End of transect 8
10:52 Start transect 5
10:57 End of transect 5
11:06 Start transect t3
11:11 end transect t3
11:16 Start transect t10
11:20 end transect t10
11:26 Start transect t9
11:31 End transect t9
11:39 Start transect t7
11:43 End transect t7
12:02 Start transect t6
12:04 end transect t6 stop phottransect
12:06 end DVD 33
12:31 DVD series 34 were stopped after 28 minutes because Jason dive finished.

Watch Summary:

Multiple Biol. Observations at the beginning of the watch. Macrocamera was used with the manipulator and the Photo Random Transect were conducted

Dive Log for J2-272

Date: 6/12/07
Shift: 2000-0000 EDT
Dive: J2-272
Site: GC415

Watch Leader: Harry
Name: Irmi

Time (GMT) Comments

1:11 Jason reached the bottom
1:29 stop, shrimp
1:35 we are going to geo1,
1:43 shrimp
2:01 bacterial matt
2:09 going to geo target 2
2:10 fish
2:14 Eel
2:32 at target geo2
2:35 going to geo target3
2:48 at geo target 3
2:50 going back to CRP
3:04 marker2 in sight
3:07 taking marker 2
3:15 going to geo target 4
3:32 at target 4

Date: 6/13/2007
Shift: 0000-0400 EDT
Dive: J2-272
Site: GC415

Watch Leader: Harry Roberts, Erik Cordes, Stephane Hourdez
Name: Nicole Morris

Time (GMT) Comments

03:52:08 Continuing the transit to the upper area
04:41:52 Arrived at northern site
04:44:19 Setting marker #2
04:44:29 Reset DVL nav
04:46:36 Going to Geo target5
04:57:30 Bio obs: holothuroid
04:56:46 Bio obs: bacterial mats
04:58:30 Bio obs: fish

05:01:01 Bio obs: bacterial mat; crab
 05:01:40 Bio obs: bacterial mat; clams
 05:02:20 Dropping target "mat/clams"
 05:07:52 Dropped target "bacterial mat"; possibly brine
 05:07:58 Going to take some push cores
 05:09:53 Bio obs: 2 white holothuroids
 05:10:38 Geo obs: edge of flow
 05:15:41 Bio obs: fish
 05:17:50 Getting ready to take push cores
 05:20:35 Taking push core (yellow #7) in bacterial mat/brine
 05:22:56 Taking push core (yellow #4) in bacterial mat/brine
 05:27:22 Taking push core (yellow #1) in bacterial mat/brine
 05:29:21 Finished coring this area
 05:35:01 Bio obs: bacterial mats, holothuroid
 05:35:36 Bio obs: 2 fish
 05:36:41 Shrimp
 05:40:38 Shark; Dalatiidae
 05:42:12 Eel
 05:44:55 Bacterial mat
 05:47:27 Bacterial mat
 05:47:57 Dropped target "brine area 2"
 05:52:28 Bacterial mats
 05:54:10 Pockmark observed on sonar
 05:56:52 Getting ready to take 3 push cores at another bacterial mat
 06:01:49 Taking push core (yellow #9) in another bacterial mat
 06:03:44 Taking push core (yellow #6) in bacterial mat
 06:05:15 Taking push core (yellow #3) in bacterial mat
 06:07:30 Continuing on to Geo target #6
 06:21:39 Geo obs mounds and holes
 06:22:21 Field of mounds/holes
 06:23:26 Getting close to Geo target 6
 06:25:36 Pits/fields
 06:32:35 Heading to Geo target 7
 06:44:52 Moving to Geo target 8
 06:52:17 Geo obs pockmark with bacterial mats
 07:03:14 Bacterial mat
 07:10 PCA failed
 07:15 PCA-2 started
 07:21:29 Bio obs: big shrimp
 07:24:30 Nautilus
 07:36:10 Small bacterial mats
 07:39:49 Small bacterial mats
 07:42:09 Small bacterial mats
 07:44:58 Small bacterial mats
 07:47:08 Small bacterial mats
 07:53:30 Nice bacterial mat

Watch Summary:

At the beginning of watch, we were transiting to the northern site. Three push cores were taken in a bacterial mat/brine site (marker "bacterial mat"). Three push cores were taken in a second bacterial mat/brine area (marker "brine area 2"). After the second set of three push cores, Jason continued moving along to different Geo targets; this continued through the end of this watch.

Date: 06/12/2007
Shift: 0400-0800 EDT
Dive: J2-271
Site: MC462

Watch Leader: Ian MacDonald
Name: Oscar Garcia

Time (GMT) Comments

8:01:29 Taking push core (yellow 8 in bacterial mat over hydrate
8:09:52 Taking push core (yellow 5) in bacterial mat over hydrate
8:15:00 Taking push core (yellow 2) in bacterial mats over hydrate
8:22:55 Mass spec start sampling hydrate
8:35:09 M spec probe calibrated and start over the same hole of pushing core
8:42:09 Biology observation. Other ciliate with sulfid symbionts
8:43 Starts recording DVD series 39
8:46 Stop recording DVD series 38
8:55 Macrocamera set up taking ciliate images
9:10 Macro camera taking images of colonia cilia
9:45 macro camera start core hole
9:51 macro camera turned off
9:56 Core 5 yellow, shake out to try ciliate colony
10:00 Sample in core 5 fell out twice.
10:03 Attempt to sample again with core 5
10:06 Put core 5 away with out any sample.
10:13 Scoop net collection mud around ciliate
10:14 Gas below crust is observed
10:17 Hydrate coming out from the bottom
10:21 Use core 5 to break up crust
10:30 Gas bubbles coming out
10:36 Start recording DVD series 040
10:50 Mark 5 deployed
10:50 Moving towards geotarget #10
10:56 Pock marks series observed
11:00 Fish, carbonates, hydrates
11:05 DVD pca 40 fails after 18 min
11:23 Preparing Jason Ascending

Watch Summary:

Pushing Cores 8,5,2 sampling bacterial mats. Mass spec used sampling hydrates. Bubbles observed in several times of the watch.

Dive Log for J2-273

Date: 6/13/07
Shift: 2000-0000 EDT
Dive: J2-273
Site: GC 852

Watch Leader: Harry
Name: Irmir

Time (GMT) Comments

0:56 floating over the bottom
0:59 fish
1:06 on topo high
1:14 Octopus!!!
1:17 still octopus
1:23 going to drop a marker (3)
1:34 going to geo 1
1:36 gorgonia and anemones (many)
1:39 shrimp
1:52 bamboo coral, funny fish
1:54 going to target 2
2:07 soft coral, anemones (close up)
2:10 anemones, soft coral, (pilot cam +science cam)
2:14 suction sample, close up of anemone with science cam
2:20 start: catching crab
2:32 taking anemone + rock
2:34 taking anemone into milk can with markers (science cam)
2:38 gorgonians!
2:39 troping target `bamboo corals 2`
2:41 large crab(maya)
2:44 catching the crab (science cam)
2:47 taking two legs, into biobox
2:49 coral
2:51 coral, rocks
2:52 taking sample from coral, into biobox
2:07 taking picture with the cool pix
3:10 science cam: close up of coral
3:35 going to geo target 4

Watch Summary:

Date: 6/14/2007
Shift: 0000-0400 EDT
Dive: J2-273

Site: GC852

Watch Leader: Harry Roberts
Name: Nicole Morris

Time (GMT) Comments

04:00:46 Moving to Geo target 3
04:04:48 Skate
04:13:13 Fish
04:15:14 Skate
04:32:47 Bacterial mat
04:39:40 Moving to “Harry’s mystery” target, due west
04:47:57 Ctenophore
05:18:12 Reset DVL-nav
05:35:35 Harry’s target, carbonate mound
05:36:01 Corals: soft coral, black coral
05:37:41 Solitary tubeworm
05:38:04 More tubeworms
05:41:47 Coral
05:43:23 Dropping target “slope outcrop”
05:45:25 Sitting ROV down to collect carbonate
05:45:46 Collecting carbonate rock with manipulatorÆ attempt
05:46:36 Collecting carbonate rock with manipulatorÆ attempt
05:47:29 Collecting carbonate rock with manipulatorÆ attempt
05:47:42 Collecting carbonate rock with manipulatorÆ successful
05:49:06 Placed carbonate sample into empty milk crate on basket
05:50:10 Sponge
05:50:30 Continuing to search for Harry’s mystery target
05:53:38 Moving to southern site
05:56:40 Shrimp
06:00:39 Tubeworms and carbonate
06:00:34 Small gorgonians
06:34:11 Eel
06:45:01 Isopod
07:11:20 At carbonate mound
07:11:33 Coral observed
07:11:49 Coral observed
07:13:48 Searching for animals to slurp
07:14:36 Solitary tubeworm
07:15:21 Brachyurid crabs
07:17:41 Grabbing suction sampler
07:21:43 Trying to adjust suction sampler
07:31:00 Start slurp sampling
07:35:50 Galatheid crab collection in blue chamber
07:38 Galatheid crab collection in blue chamber
07:45:57 Attempted galatheid crab collection

07:46:25 Galatheid crab collected in blue chamber
07:51:40 Galatheid crab collected in blue chamber
07:55:18 Attempting shrimp collection Æ successful in blue chamber
07:56:47 Set suction sampler back on basket; searching for more animals to slurp

Watch Summary:

At the beginning of watch, we were transiting Geo target 3. Following this transit, we started transiting to “Harry’s Mystery” target. We logged biological and geological features while in transit. A target “slope outcrop” was dropped at a carbonate mound area. While at the carbonate mound area, carbonate was collected. We began slurp sampling toward the end of this watch.

Date: 06/14/2007
Shift: 0400-0800 EDT
Dive: J2-273
Site: GC852

Watch Leader:
Name: Oscar Garcia

Time (GMT) Comments

8:03 Tubeworms observed
8:05 Crab over carbonate rock
8:09 Slurp Collection attempted to use for crab
8:13 Strong crab run away
8:15 Biol observation mobile fauna
8:17 Slurp Collection little crab
8:20 Multiple soft coral observed around carbonate
8:22 DVD starts recording
8:32 Slurp Collection continues around big carbonate
8:42 Anemona recorded with DV camera
8:44 Biol. Observation mobile fauna anemone like
8:53 Golden Coral observed over carbonate
9:01 Multiple coral observed
9:06 Reset DVL now
9:17 Unusual Crab attempted to collect-run away
9:20 Moving towards elevator
9:42 Fish observed during transit
9:49 Snail Fish observed
9:50 eel mobile fish
9:53 Ship elevator communication not working
9:58 Elevator mode navigation is not working. Other navigation is still working
10:11 Elevator observed
10:16 DVD starts recording
10:32 Elevator stuck into the mud

10:35 Elevator freed it.
11:18 Elevator landed in new site
11:45 Still waiting for dust to settle

Date: 6/14/2007
Shift: 7.30 – 11.30 EDT (GTM 11.30-15.30)
Dive: J2-273
Site: GC 852

Watch Leader:
Name: Julia Zekely

Time (GMT) Comments

11.53 looking for Ian's camera
11.56 Elevator in sight
12.07 Marker #2 in sight (1405m depth)
12.11 carbonates rocks and mussels
12.14 many mussels
12.19 preparing to scoop mussels
12.28 mussel scoop: **WHITE NET**
12.34 still scooping; good site; gas bubbles observed while scooping (near carbonated rocks; 1407m depth)
12.36 scoops right next/underneath rock (with tubeworms on), more gas bubbles
12.40 net ½ full, lots of mussels collected, other manipulator grabs net
12.46 more scooping, gas bubbles
12.57 scooping finished, white net in biobox
13.01 new fix on marker #8 (from loast year)
13.15 ball marker (**BLUE TAPE**) deployed here (on carbonated rock with tubeworms)
13.17 stained tubeworms (close up, Best of)
13.22 grabbing stained tubeworms (port biobox)
13.30 gas bubbles again(where tubeworms were grabbed), still grabbing tubeworms
13.36 wooden port biobox with grabbed tubeworms closed
13.40 Doppler reset
13.45 Marker occupy, fixed new one on #8
13.47 nice overlook over site around #8 (check **BCam!**)
13.53 looking for mussels to collect; difficult because many dead mussels
13.58 Marker #5 fixed
14.00 Carbonated rocks
14.03 Bacterial mats
14.11 Core RED #6 into bacterial mat, just ½ of core full when back out ✓
14.15 bubbles observed (outside core) during core
14.17 core red #1 ☹
14.21 core red #7 ☹
14.31 crabs on bact. Mats observed, core taken above crab

- 14.32 core red #5 ☺
- 14.46 core red #2
- 14.47 core red #4
- 14.51 all cores taken
- 14.55 weight dropped (at marker #5) so that Jason can back up
- 14.56 Jason 3.5m above bottom looking again for good mussel patch to scoop
- 15.04 1m above bottom; “where to scoop”
- 15.05 close up of mussels; **BEST OF**
- 15.10 **cool pix (macro cam)** of mussels (Bathymodiolus brooksi + B. cildressi together)
- 15.23 **BLUE net** for scooping ready
- 15.26 starting to scoop, 2nd manipulator supports scooping
- 15.34 still scooping, waiting in between to settlement of sediment

Watch Summary:

Date: 6/14/07
 Shift: 1130-1600 EDT
 Dive: J2-273
 Site: GC852

Watch Leader:
 Name: Kathy Loftis

Time (GMT) Comments

- 15:38 Mussel collection beginning
- 15:42 Scooped several mussels
- 15:47 Left ball marker right of where mussel samples were collected
- 15:55 In transit to Ian’s Camera
- 16:00 Clear bubbles observed
- 16:02 Spotted Ian’s camera
- 16:10 Retrieve Ian’s camera
- 16:16 Start DVD 049 set
- 16:14 End DVD 048 no overlap
- 16:18 Site of elevator reached
- 16:52 Ian’s other camera on elevator not blinking
- 17:01 Transferring carbonate to elevator
- 17:14 Transferring red cores onto elevator
- 17:28 Transferring coral
- 17:58 Elevator released
- 17:59 Wait for elevator to surface
- 19:23 See seafloor; start dvd’s again
- 19:36 X380 Y960Æ coral site
- 19:40 Corals

Watch Summary:

Date: 6/14/07
Shift: 16:00-20:00
Dive: J2-273
Site: GC852

Watch Leader: Harry Roberts
Name: Bill Shedd

Time (GMT) Comments

20:00 Waiting to begin photomosaic, surveying area; PCA-#50 stopped
20:28 All decks stopped, DVD-#50, started #51 20:32
21:06 Getting ready to start photomosaic
21:17 Started photomosaic, 5 m altitude

Watch Summary: Surveyed area, began photomosaic

Date: 6/14/07
Shift: 2000-0000 EDT
Dive: J2-273
Site: GC 852

Watch Leader: Stephanie/Harry
Name: Irm

Time (GMT) Comments

23:48 start line 10
0:18 start line 12 from end of line 1
0:49 reset
1:46 new target for golden coral
1:53 back to mosaiking
1:58 corals on a rock
2:22 end of photo mosaik
2:26 start making pictures with cool pix
2:27 madrepora getting ready for close up, science cam: close up with crab
2:33 anemone+coral: video!!!
2:36 start Ians camera: anemone
2:42 video of science cam still going on
2:51 close up anemone (science cam)
2:55 bamboo coral
2:59 getting ready for Ians camera for taking pictures of the bamboo coral
3:07 shrimp on the coral, Ians camera

3:18 crab
3:24 moving to Lophelia (with target)
3:26 reset dve
3:32 fly-trap anemone (science cam)!!!!!!
3:38 reset dve
3:45 Cirripedia (Pedunkeles?) on the coral
3:47 going to Lophelia target
3:54 Lophelia

Watch Summary: wonderful close ups with the science cam!!!

Date: 6/15/2007
Shift: 0000-0400 EDT
Dive: J2-273
Site: GC852

Watch Leader: Ian MacDonald
Name: Nicole Morris

Time (GMT) Comments

03:57:35 Madropora
03:58:31 Collecting macro handheld pictures
03:59:38 Recording DV cam
04:04 Stopped recording DV camÆ end of DV cam tape 001
04:10:23 Start of DV cam 002
04:14 Stopped DV cam 002
04:25 Having problems with DV cam recorder
04:40 Continuing macro handheld pictures
04:45 Fixed DV cam monitor problemÆ ready to record
04:47:20 Handheld camera is off, placing back in ROV
04:52:38 Getting ready to start photo transects
04:56:32 Transiting to photo transect start (T5); have been recording Scorpio images
05:18:47 Start of photo transect (T5) line
05:24:09 End of photo transect (T5)
05:44:32 Reset DVL
05:45:55 Moving to start of transect T1
05:54:51 Start of line T1
05:53:29 Mud flow
05:59:13 End of line T1
06:08:40 Start of line T6
06:11:09 End of line T6
06:16:54 Start of line T2
06:23:20 End of line T2
06:39:38 Start of line T7
06:45:09 End of line T7

06:41:26	Shell hash, carbonate rubble
06:49:21	Start of line T9
06:54:30	End of line T9
07:04:47	Start of line T8
07:10:07	End of line T8
07:28:43	Start of line T3
07:32:56	End of line T3
07:38:10	Start of line T10
07:42:16	End of line T10
07:49:40	Start of line T4; last photo transect line
07:53:54	End of line T4; end photo transects
07:55:06	Heading over to near transect T7

Watch Summary:

At the beginning of watch, we were continuing to take close-up images using the handheld macrocamera. Following the close-up images, we started a set of 10 photo transect lines. This was continued toward the end of this watch.

Date:	06/15/2007
Shift:	0400-0800 EDT
Dive:	J2-273
Site:	GC852

Watch Leader:	
Name:	Oscar Garcia

Time (GMT)	Comments
8:18	Arriving to target brine pool
8:35	Moving to another area looking for brine pools
8:50	Brine pool observed
8:53	Preparing for taking a sample core
8:57	Firing risking
9:07	Found core marks from alving 2006
9:10	Push core yellow 3 used
9:11	Bubbles observed
9:13	Push core Yellow 4
9:18	Push core Yellow 6
9:22	Push core Yellow 2
9:23	Bubbles observed
9:26	Core in brine Yellow 5
9:40	Core in brine yellow 7
9:42	DVD series 57 start recording
9:45	Core in brine yellow 1

9:51 Core in brine yellow 8
10:13 arrived mark 5
10:23 Macro camera start
10:31 Macro camera stops
10:32 Tubeworm collection in biobox
10:58 Finished tubeworm collection
11:05 Begin transit to south
11:19 Bacterial mats
11:22 Attempt to collect a crab.

Date: 06/15/2007
Shift: 0800-1200 EDT
Dive: J2-273
Site: GC852

Watch Leader:
Name: Julia Zekely

Date: 6/15/2007
Shift: 7.30 – 11.30 EDT (GTM 11.30-15.30)
Dive: J2-273
Site: GC 852

Watch Leader:
Name: Julia Zekely

Time (GMT)	Comments
11.31	looking for good tubeworm site and patch to sample with Bushmaster
11.43	?core hole? From last year on bottom<ht
12.03	trying to slurp mobile fauna (rat-tail)
12.05	Marker #1 to be seen
12.08	carbonated rocks; after fish with slurp
12.11	slurp back on basket; Marker #1
12.13	close up at mussels on Marker #1; preparing to take a mussel pot
12.14	BEST OF mussels
12.17	moving marker #1 out of mussel bed
12.25	Mussel Pot (B) taken; pushing down into mussels, did not work, “free” mussel pot again
12.33	released mussel patch sampled
12.34	looking for another patch to sample
12.40	Jason 2.2m above bottom
12.43	good overview of site (mussels, carbonated rocks)

12.46 back to mussel patch #1 we tried to sample
 12.53 mussel pot into mussel patch, trying to sample
 12.58 Mussel Pot collection not successful, troubles with closing mechanism
 (shear between T-handle and sprocket)
 13.05 Marker #6 in sight; 1409m depth
 13.13 nice overview / close up of tubeworms to be collected (Pilots Cam)
 13.26 Slurp collection of shrimps, crabs (into GREEN slurp chamber)
 13.32 fighting to slurp red crab
 13.36 end of slurp
 13.41 stained tubeworm (red crab still in slurp hose)
 13.52 slurp on to get red crab in slurp chamber
 13.55 preparing to take a Bushmaster
 14.02 attention still on Mr. Crabs too (still trying to escape)
 14.04 Bushmaster over tubeworms
 14.10 Bushmaster successful ☺
 14.13 Bushmaster on basket into bucket
 14.26 moving; trying to find LBL transponder, which is not responding (?dead?)
 14.35 waiting for Medea to move W
 14.41 8m above bottom, moving W (20m /min)
 14.43 hose vacuum finally off
 14.51 LBL transponder is 300m off seabed
 15.51 Doppler reset, still looking for transponder

Summary: very good and successful Bushmaster taken

Date: 06/15/2007
 Shift: 1200-1600 EDT
 Dive: J2-273
 Site: GC852

Watch Leader:
 Name: Kathy Loftis

Time (GMT)	Comments
16:10	Stopped recordingÆ still looking for transponder
16:50	Started set 061- nearing bottom
17:58	Stopped recording

Dive Log for J2274

Date: 6/16/07
Shift: 0000-4000 EDT
Dive: J2-274
Site: GB 697

Watch Leader: Harry Roberts, Bob Carney
Name: Nicole Morris

Time (GMT) Comments

6:08:34 *Jason* on bottom
6:06:47 Reset DVL
6:11:02 Bacterial mat
6:11:06 Mud vents
6:20:20 Rock outcrops; bacterial mats
6:20:43 Tubeworms; small and at base of rock outcrops
6:21:53 Bacterial mats
6:31:06 Gorgonian
6:32:03 Holothuroid
6:32:43 Spiny urchins; regular
6:33:07 Getting ready to deploy Marker #2
6:36:05 Deploying Marker #2
6:37:44 Tubeworm
6:40:09 Holothuroid white
6:42:41 Anemones
6:43:07 Gorgonian
6:44:18 Soft corals
6:46:14 Venus fly trap anemone
6:48:50 Bacterial mat
6:54:51 Video grab
6:55:42 Furow
7:00:48 Moving to geo target 2
7:08:03 Holothuroid purple
7:12:15 Furow
7:13:50 Bacterial mats along furrow
7:16:09 Bacterial mats
7:20:52 No signal from mass spec
7:26:44 Fish
7:28:35 Heading to geo target 3
7:36:30 Heading to geo target 4
7:41:16 Purple holothuroid
7:42:45 Small bacterial mats
7:44:05 Getting ready to take 3 push cores in bacterial mat
7:54:09 Red (bottom right corner) push core; no number; mat or barite
7:58:16 Red (middle right) push core; no number; mat or barite

Watch Summary:

At the beginning of watch, *Jason* was deployed and reached the bottom at 0608. We started transiting to Geological targets of interest (Geo 2, 3, 4). We logged biological and geological features while in transit. We began taking push cores in a large bacterial mat toward the end of this watch.

Date: 6/16/07
Shift: 4000-8000 EDT
Dive: J2-274
Site: GB 697

Watch Leader:

Name: Oscar Garcia

Time (GMT) Comments

8:05 Red (upper right corner) push core
8:09 Geological mineral rock sample
8:14 Geological observation brine flow
8:23 Red (upper center) in brine flow
8:25 Red (center) in brine flow
8:29 Red (bottom center) in brine flow
8:33 Red (upper left) in brine flow
8:35 Nice video of brine flow
8:49 Heading to geo target 4
8:54 Tubeworm observed at brine seep
9:05 Macrocamera operation over tubeworm creek Æ Pilot cam
9:24 Bacterial mat
9:28 Macro camera stops
9:34 Setting up to sample tubeworms
9:39 Starts recording DVD series 65
9:57 Tubeworms sampled
10:07 Moving to target 5
10:16 Mound observed
10:21 Biological observation after mound
10:23 Benchmark observed
10:29 Heading to geo target 5

Watch Summary:

Date: 6/16/2007
Shift: 7.30 – 11.30 EDT (GTM 11.30-15.30)
Dive: J2-274
Site: GB 697

Watch Leader:

Name: Julia Zekely

Time (GMT)

- 11.31 transit to target 5 (appr. 700m depth)
- 12.57 on bottom at area N, 1025m depth
- 13.03 looking for site; checking of instruments on Jason
- 13.22 mud but some “craters” to be seen (biological activity, burrows)
- 13.24 Jason approx. 10m off
- 13.25 depth 1010m, mussel shells (not dense)
- 13.28 Bacterial mats; scattered mussel shells
- 13.31 Medea settle for re-navigation
- 13.36 Marker #3 set here [CRP North]
- 13.37 looking around, direction EAST, depth 1008m
- 13.45 proceedings to go east (~50m)
- 13.50 passing marker again
- 13.53 scattered marker again
- 14.05 **MUSSEL BED**; heading to “hot area”; (315deg)
- 14.08 good mussel patch; carbonated rock in between tubeworm (single), corals, frog fish (DV CAM, BEST OF until 14.37 best of); fish about 60cm body length!!**
- 14.19 Macro Cam on fish (cool pix)**
- 14.38 back to tubeworm (single tubi)
- 14.39 **BEST of** single tubeworm (depth 1003m)(sp: Escarpia seepiophila) more individuals scattered around; crab in the background
- 14.45 **Best of [tubeworm, macro on tubeworm (cool pix)]** (until 14.52)
- 14.53 **Best of crab, cool pix (Macro)**
- 14.56 Octocoral; into starboard biobox, very neat one
- 15.01 Pilots Cam on corals (shortly) with brittle stars
- 15.04 preparing to sample single tubeworm
- 15.10 grab collection successful (tubeworm into port biobox)
- 15.17 Octocoral grabbed (piece of, not entire one); into starboard bio box (to tubeworm grab)
- 15.19 transit over side; frog fish (**down look pix of frog fish**) other cams all “black screens”
- 15.26 transit to sonor hot spot with craterhole in center
- 15.28 mussel + clam shells
- 15.29 moving to crater by shells, maybe blowout hole
- 15.30 mussel and clam shell harsh inside crater

Watch Summary:

North site very cool, tubeworm and mussel communities as well as corals; very cool frog fish; a lot of good best ofs

Name: Kathy Loftis

Site: GB697

Date: 6/16/07
Shift: 11:30-4:00 EDT
Dive: J2-274

Time Comments

15:36 At exploratory site. Gulper fish observed
15:51 Survey area visually
15:55 crab
15:58 mussel bed
15:59 Carbonates
16:03 clams
16:05 mussels
16:20 at crater
17:03 start T1 at 37 m
17:06 clam trails
17:07 end T1
17:18 start line T7 alt 3.2
17:26 holothuroid white
17:32 end T5
17:39 start T2 alt 3.1
17:40 holothuroid
17:42 end T2
17:47 start t9 alt 3.7
17:50 end T9
17:58 start T3 alt 4.0
18:02 end T3
18:05 start T4 alt 2.4
18:08 end T4
18:10 t6 start alt 5 m
18:15 end T6
18:20 start t8 alt 4.8
18:23 end t8
19:28 spider crab & swimming sea cucumber
19:50 bacterial mat
19:53 eel
19:56 at N pt of North site
19:56 approach edge

Summary:

We began to visually survey exploratory site GB697. During this survey, we first observed a large gulper fish sitting on a rock. Just beyond the spot where we observed the gulper fish, there was an area containing carbonates with a large mussel bed nearby. A crater was observed and was the site of the start of a photo-survey. After the photo-survey, we continued with a visual survey of the area, making our way to the northern part of the north site.

Date: 6/16/07
Shift: 16:00-20:00 EDT
Dive: J2-274
Site: GB 697

Watch Leader: Harry Roberts
Name: Bill Shedd

Time (GMT) Comments

20:00 Transiting up seismic valley toward geo target #9, course 55 deg
20:13 Hummocky topo, broad highs, narrow lows, mud
20:31 Small ledge, thinly bedded w/ white layer between beds, bottom stirred up
20:36 Stopped, waiting for water to clear
20:40 Continue up valley
20:46 eel in fog
20:51 still in fog, bottom barely visible
21:29 out of fog
21:36 starfish
21:54 bacterial mats, shells, dormant mud volcano w/well defined crater on top, carbonates, tubeworms
22:03 small soft coral, dead clams and mussels
22:09 everything has fine layer of mud (from mud volcano erupting)
22:12 stop to observe and collect tubeworms
22:20 sample tubeworms
22:57 mud volcano, heading 195 deg, across anomaly, mud
23:15 heading 297 deg (past anomaly) for 30 m, pockmarks v. common
23:27 heading 48 deg across anomaly mud
23:36 dark red shrimp
23:39 dormant mud volcano w/ one side of crater wall collapsed, large bacterial mat, carbonates
00:06 stopped, adjusting sonar, mounds 80m ahead on sonar

Watch Summary:

Date: 6/17/07
Shift: 2000-0000 EDT
Dive: J2-274
Site: GB 697

Watch Leader: Eric, Harry
Name: Irmi

Time (GMT) Comments

0:13 going to north
0:18 tubeworms
0:28 trails, clams

0:32 opening of the biobox
 0:34 grabbing the clams (*Calypptogena ponderosa*), into the biobox
 0:40 making ready for getting the cores for Julia
 0:42 first core nr.9 red
 0:44 second core nr.8 red
 0:46 dropping a target "clams"
 0:53 crab, shells (close up pilot cam)
 0:58 dropped a target "mussel bed"
 1:11 taking *B.childressi* with the mussel pot
 1:20 picking up the mussel pot, back into its bucket
 1:23 taking the scoop
 1:25 filling the blue scoop with mussels, into the bushmaster
 1:33 reset dvl
 1:41 carbonate, shells
 1:58 reset dvl
 2:06 back at the rock with the tubeworms
 2:39 mud clouds
 3:09 dropping a target "mud plume"
 3:11 crack in the bottom
 3:17 source of the mud vulcano
 3:21 science cam!

Watch Summary:

Date: 6/17/07
 Shift: 0000-0400 EDT
 Dive: J2-274
 Site: GB 697

Watch Leader: Harry Roberts
 Name: Nicole Morris

Time (GMT)	Comments
3:30:17	Gas bubbles in brow cam
3:37:54	More gas bubbles
3:40:17	Best of video
3:44:46	Getting ready to take push cores
3:48:42	Tried to shake out push core 8Æ unsuccessful
3:51:21	Shaking push core 2Æ core is moving up instead of downÆ successful, core is out
3:54:18	Taking push core 2 in mud volcano
3:56:58	Bubbles in science cam
4:01:03	Firing both nskins
4:03:35	Great video of mud flow in brow cam
4:04:50	Gas bubbles
4:05:25	Great bubbling
4:06:20	Following mud flow channelÆ brow cam

4:12:10 Flowing mud in brow cam
 4:14:20 Cloud of mud
 4:15:28 Moving to geo target 8
 4:18:04 Clouds of mud
 4:31:33 Pits and mounds
 4:38:29 At geo targetÆ heading 149 to undisclosed target
 4:56:28 Bacterial mats
 4:58:49 Holothuroid
 4:59:36 Bacterial mats
 5:01:13 Holothuroid and shrimp
 5:04:04 Bacterial mats and holothuroid
 5:07:33 Bacterial mats and carbonates
 5:10:59 Carbonates and bacterial mats
 5:35:08 Bacterial mat
 5:41:28 Carbonate
 5:42:28 Solitary tubeworm
 5:43:42 Tubeworms
 5:44:45 Anemone
 5:57:10 Bamboo coral
 6:25:12 Lots of silt in the water
 6:26:35 Carbonate and crab
 6:26:55 Out of silt
 6:27:07 Turning back into silt
 6:27:17 Back into cloudy water
 6:32:23 Turning south to go to “red spot”
 6:44:45 Water still appears cloudy
 6:50:35 No longer in silt cloud
 6:51:40 Scattered mussel shells and bacterial mat
 6:52:59 Mussels and clam shells
 6:53:04 Mussel bed
 6:53:41 Dropped target “mussel bed”
 6:53:52 Video grab
 6:55:43 Bacterial mat
 7:08:38 Bacterial mat
 7:15:45 Clam shell
 7:21:29 Moving to next “red spot”
 7:30:40 Fish

Watch Summary:

At the beginning of watch, we filming and taking push cores at a mud volcano. We also fired 2 Niskins over the mud flow source. *Jason* then started transiting to Geological targets of interest. We logged biological and geological features while in transit. We continued transiting to targets of interest through the end of this watch.

Date: 6/17/07
 Shift: 4000-8000 EDT
 Dive: J2-274

Site: GB 697

Watch Leader:

Name: Oscar Garcia

Time (GMT)	Comments
8:06	Biological observations while in transit
8:09	Biological observation mobile fauna fish
8:11	Biological observation bacterial mat
8:25	DVD series 76 start recording
8:29	Mussel shell
8:33	Jelly fish
8:43	Biological observation mobile fauna
8:51	Biological observation mobile fauna
9:19	Biological observation mussels dead
9:21	Clams live
9:22	Continuing south
9:26	Eel pout
9:37	Biological observation
9:42	Mussel dead
9:45	Crab
9:47	Biological observation
10:11	Mound
10:12	Mobile fauna
10:39	Still heading to CRP at north
10:49	Mobile fauna
10:25	DVD series 76 stop recording
11:03	Mark observed
11:04	Marker occupy and fix
11:14	Massive mussel bed
11:20	Preparing mussel pot
11:29	Mussel extraction

Date: 6/17/2007

Shift: 07.30 – 11.30 EDT (GTM 11.30 – 15.30)

Dive: J2 274

Site: GB697

Watch Leader: Chuck Fisher

Name: Julia Zekely

Time (GMT)	Comments
11.29	Trying to take Mussel Pot
11.34	Mussel Pot into Musselbed, closing Pot
11.35	Mussel collection with Mussel Pot successful ☺ sample (mussels taken down to sediment)

- 11.44 leaving site, off bottom, over Frog Fish (still on his rock)
- 11.51 Jason OFF BOTTOM
- 11.52 Jason ascending
- 11.57 drop off weight
- 12.41 Bubbles out of Harrys core taken at the mud volcano
- 12.42 Jason on surface

Dive Log for J2-275

Date: 6/17/2007-6/18/2007
Shift: 2000-0400 EDT
Dive: J2-275
Site: WR 269

Watch Leader: Erin
Name: Irmi

Time (GMT)	Comments
1:12	Jason on the bottom, loosing the milk box with the cores
1:19	again on bottom
1:29	milk box found
1:52	all cores on Jason back again
1:59	going to the Pogonophoran field
2:37	dropping a target "fuzzy worms"
2:41	skeleton
2:43	dropping a target "bones"
2:53	fish (pilot cam)
3:00	pogonophorans, dropping a marker
3:08	found the marker 1
3:19	reset
3:26	preparing for taking a long core
3:30	11 long core from white pogos
3:34	large core 3
	large core 1
3:41	sucker
3:41	holoturoid in the pogos
4:05	moving, looking for non white pogos
4:18	long core 12
4:25	normal sized core white 6
4:29	large core 4
4:35	try it again
4:43	large core 4
4:47	large core 2
4:56	suction
5:22	core white 5, rare pogo
5:28	moving back to white pogos
5:39	green niskin over the white pogos
5:43	back at maker
5:52	start of fotomosaik of white pogos
7:02	end of fotomosaik
7:08	taking control cores: white 4
7:13	yellow1
7:19	white 1

7:28 suction
7:34 yellow 8
7:43 yellow 9, fell down
7:46 grabbed again
8:00 yellow 6

Watch Summary: sampling Sclerolinum with long and large cores at two sites: with white and nonwhite Pogonophorans

Date: 06/18/2007
Shift: 0400 – 0800 EDT
Dive: J2-275
Site: WR269

Watch Leader: Erin Becker/Robert Carney
Name: Christina Kellogg

Time (GMT) Comments

08:44 Preparing to take core White 2. Note per Jeremy that there is not an option for 'white' in the core section of the event logger. Pogonophorans present.
08:47 Making sure a straight pogonophoran is in core White 2.
08:48 Core White 2 begun.
08:49 Core White 2 completed.
08:53 Preparing to take core White 3, more pogonophorans.
09:01 Tried to core a long pogo but it broke; will try another one.
09:03 Collected core White 3, pogonophorans, including a long straight one.
09:09 Reset Doppler.
09:17 Preparing for a photomosaic because Erin saw an area of both white and non-white (new?) pogonophorans.
09:28 Watch leader change from Erin Becker to Robert Carney; Photomosaic plans abandoned.
09:30 Moving slowly to a new location, looking for echinoderms to slurp.
09:46 Observed something that might be a skeleton of something (fish?) since it appeared to be bones in a straight line; however there were no ribs, vertebrae, or skull.
09:48 Small purple octopus, brow camera and then downlooking camera as it passed under the ROV.
09:49 Rattail fish on downlooking camera.
09:51 Thin silver tripod fish, brow camera.
09:55 Black bacterial mat, downlooking camera.
09:59 Brine flow observed.
10:07 Snail, pilot camera; will attempt to collect it.
10:11 Slurping snail into green bucket.
10:13 Large purple/black sea cucumber observed.
10:20 Red shrimp; attempted to collect it; failed.
10:24 Squid (bob-tail?) observed; attempted to collect it by suction but it did not fit into the tube.
10:25 Slurped first sea cucumber into the green bucket.

10:30 Successfully slurped squid from 10:24 into green bucket.
 10:34 Another purple/black sea cucumber observed.
 10:36 Slurped second sea cucumber (individual sighted at 10:34) into the red bucket.
 10:39 Biological observation: Unsure if it is a bivalve shell, ostracod, or other. Will try to collect it.
 10:40 Unknown entity turned out to be a ctenophore; it was slurped into the red bucket.
 10:42 Another sea cucumber sighted; preparing to sample.
 10:43 Slurped third sea cucumber (individual sighted at 10:42) into the red bucket.
 10:45 Slurped fourth sea cucumber into the red bucket.
 10:51 Slurped fifth (mistakenly listed as fourth in handwritten log) sea cucumber into the red bucket.
 11:07 Attempted to slurp a deeply 'rooted' organism but couldn't get it loose. Bob suggested it might have been a coral remnant attached to rock.
 11:12 Tube worms and a crab sighted.
 11:15 Sighted a different crab; attempted to slurp him but unsuccessful.
 11:18 Marker (took a fix) on the location of the sparse tube worm site.
 11:20 Possible echioroid worm; slurping (unclear if this was successful).
 11:25 Sighted dead tube worm with two small galatheid crabs on it.
 11:28 Slurped the two galatheid crabs into the yellow bucket.
 11:31 Sighted fat purple/black sea cucumber, ~15 cm across; did not attempt to collect.
 11:32 Sighted another purple/black sea cucumber; since it is very large, attempting to put it into the biobox.
 11:35 Sixth (mistakenly listed as fifth in handwritten log) sea cucumber (same individual as 11:32) somehow sucked into hose so deposited in yellow bucket instead of biobox.
 11:38 Another large sea cucumber; plan to try to put this one in the biobox.
 11:41 A net was removed from the port biobox to clear it for the sea cucumber.
 11:43 The sea cucumber jets off the bottom to escape the suction; the suction hose is clogged at this point (probably due to cuke number six) so it will not be used beyond this point.

Watch Summary:

The 06/18/07 0400-0800 watch was split between coring pogonophoran areas and collecting invertebrates. The cores collected were White 2 and White 3, both specifically containing long straight pogonophorans. No photomosaics were done. A bacterial mat and nearby brine flow were observed. A different area that had a few tube worms was marked. The only fishes observed were one rattail and one tripod fish, neither were collected. Successful biological collections were: one snail (green bucket), six sea cucumbers (1 in green, 4 in red, 1 in yellow bucket), one squid (green bucket), one ctenophore (red bucket), and two galatheid crabs (yellow bucket).

Date: 6/18/2007
 Shift: 0800-1130 EDT
 Dive: J2-275
 Site: WR 269

Watch Leader: Chuck, Erik
 Name: Julia Zekely

Time (GMT) Comments

11.50 grab swimming pinky sea cucumber
 11.53 grab of sea cucumber #2, trying to get it into biobox
 12.05 sea cucumber tries to escape, swimming
 12.08 wooden biobox closed again
 12.12 scoping net fell off basket, back into biobox
 12.15 Doppler reset
 12.18 climbing on seamount top, tubeworms observed
 12.22 more tubeworm
 12.23 Mussel bed, beer can within mussel bed
 12.26 preparing to scoop mussels, **BLUE** scooping net
 12.33 net on basket, because first mussel Pot will be taken
 12.38 mussel pot **F** taken, ☺ collection
 12.46 Mussel Pot F closed, safe back into bucket on basket
 12.49 preparing to scoop now, “where to scoop”
 12.51 scooping into mussel bed (starting at an edge), 1st scoop taken, waiting for sediment to settle
 12.57 2nd scoop, large mussels collected
 13.06 3rd scoop, net full, large collection
 13.11 scoop net **BLUE** into starboard wooden biobox
 13.18 marker #7 set in mussel bed, 1909m depth
 13.19 Doppler reset; marker #7 occupy and fix; transit to Geotarget 2
 13.22 Mussel bed #2 observed
 13.23 Tubeworms, many patches / small bushes
 13.26 Mussel bed #3 observed
 13.28 Trashbag abserved
 13.26 preparing to take mussel pot B
 13.50 Mussel Pot **B** collection ☺, Pot B losses the outside ring, stuck in mussels, **BrowCam** overlooks ring (nice); too much sediment in water column to work further, waiting to settling
 14.02 still waiting for clearing of view
 14.14 left over ring removed from mussel bed and Back on basket to mussel pot B
 14.30 Erik looks for good patch of tubeworms to grab into scooping net
 14.35 **WHITE** scooping net out of port biobox
 14.41 grabbed rock + tubeworms into the white scooping net
 14.53 tubeworm collection into port biobox

Watch Summary: much fauna to be seen, and a lot of ☺ biological collections: 2 Mussel Pots, sc oop of mussels, grab of tubeworms (attached to rock)

Date: 6/18/07
 Shift: 1200-1600 EDT
 Dive: J2-275
 Site: WR 269

Name: Kate Segara

Time (GMT)	Comments
16:11	Saw benthic-pelagic sea cucumber
16:20	Small bunch of tube worms
16:24	began recording photos enroute to beginning of transecting
16:24	Tubeworms
16:32	Carbonates
16:32	begin T8
16:37	mussels, oyster shells, carbonates
16:37	tubeworms
16:38	end of line
16:44	T1 begin
16:49	T1 End
16:57	T2 Start
17:01	T2 end
17:10	T4 Start
17:15	T4 End
17:26	T3 start
17:31	T3 End
17:43	T6 start
17:47	T6 End
17:48	T9 start
17:51	carbonates
17:53	End T9
18:01	start T5
18:03	Spy bacterial mat and brine
18:14	1 solitary tubeworm
18:21	tubeworms
18:25	Start T10
18:29	bacterial mat
18:29	End T10
18:44	start T7
18:49	End T7
18:51	Dropping weights, JASON ascending

Watch Summary:

This was my first and perhaps last watch in the JASON van. It was a rather short shift as JASON ascended about 2.5 hours into it. A few biological observations were made including sea cucumbers, tubeworms, and mussels. The bulk of the watch consisted of a riveting series of photo-transects with Ian.

Dive Log for J2-276

Date: 06/19/2007
Shift: 7.30 – 11.30 EDT
Dive: J2-276
Site: AT 340

Watch Leader: Stephanie, Chuck
Name: Julia

Time (GMT)	Comments
13.40	Jason descending, at 1179m depth
14.15	Doppler reset
14.16	Jason on bottom (2200m depth), starfish observed
14.24	looking for central marker to find Stephanie's sea urchin field + artificial sea urchin trails
14.29	checking of Jason's instruments
14.30	many sea urchin + trails in sight (not Stephs ones)
14.36	marker #5, Jason sets mark on sea urchin field
14.42	very cool and interesting sea urchin trails
14.45	SciCam: marker shortly to be seen< zoom in: shell with red anemone on it
14.50	Sea cucumber + seastar
14.56	Ball marker detected (2201m depth)
14.59	Doppler reset
15.05	all ball markers detected
15.12	Doppler reset
15.15	Photo mosaic starts line #1
15.20	seastar

Watch Summary: Jason descending, reaching bottom (14.16), sea urchins, looking for Stephanie's sea urchin field

Date: 6/19/2007
Shift: 11:31-16:00 EDT
Dive: J2-276
Site: AT 340

Watch Leader: Bob Carney
Name: Kim Hunter

Time (GMT) Comments

15:30 Jason on bottom - D=2199m; A=2.9m
15:39 Photo-mosaic in progress – Stephanie over spatangid urchin bed.
16:01 Aperture 4.7, shutter 1/60 – changed to assure flash

16:02 Biol. Observation – mobile fauna – seastar
 16:25 Biol. Observation – mobile fauna – hermit crab in anemone in field of photo-mosaic.
 16:33 Digital target at marker and alvin track.
 17:12 Biol. Observation – mobile fauna – fish & ophiuroid in mosaic area.
 18:03 Experimenting with mosaic.
 18:19 Photo-mosaic end.
 18:24 Push cores in experimental trails – start.
 18:31 Push core – red #4 – in trails
 18:32 Push core – red #5 – in trails
 18:35 Push core – red #2 – near trails
 18:37 Push core – red #3 – near trails
 18:39 Dropped core rack
 19:04 Problems stowing core rack – working on it.
 19:09 Fluid leak from bushmaster fitting on Jason.
 19:31 Dropped core rack again.

Watch Summary:

Stephanie completed photo-mosaic and 4 push cores were collected before technical difficulties halted dive progress.

Date: June 19, 2007
 Shift: 1600 – 2000 EDT
 Dive: J2-276
 Site: AT 340

Watch Leader:
 Name: Matt Frye

Time (GMT)	Comments
21:23:00	Sea Urchins
21:34:00	Located Stephanie's marker
21:38:00	core in urchin trail
21:41:00	core in urchin trail
21:45:00	core outside urchin trail
21:51:00	core inside urchin trail
21:53:00	core inside urchin trail
21:56:00	core outside urchin trail
21:59:00	core near ball
22:06:00	core
22:13:00	core in trail
22:45:00	transfer cores to elevator
23:01:00	transfer complete
23:04:00	core basket fell off again

Watch Summary: nine cores retrieved successfully from in and near urchin trails; lost core box several times over the side of the vehicle, resulting in long delays.

Date: 6/19/07
Shift: 2000-0000 EDT
Dive: J2-276
Site: AT340

Watch Leader: Stephane
Name: Irmi

Time (GMT)	Comments
0:12	still transporting elevator
0:24	reset
0:51	lowering of elevator
0:55	mussels
0:57	dropping elevator
1:01	tubeworms
1:05	lowering the elevator, elevator on the bottom
1:06	reset
1:09	fish (science cam)
1:12	still the big fish around the elevator
1:13	start moving
1:20	tubworms and mussels
1:24	found marker 2 in the mussel bed, looking for the mussel cages
1:26	reset
1:29	starting for down-looking pictures of the cages
1:45	close up of mussels (science cam)
1:46	taking the first cage
1:48	taking the second cage
1:51	third cage
1:54	fourth cage
1:57	going to the elevator
2:05	reach the elevator
2:12	at the elevator
2:14	placing the cages on the elevator into the bioboxes
2:33	still arranging the cages in the bioboxes
2:54	checking the instruments
2:57	release of the elevator
3:24	checking the instruments

Watch Summary: collecting the 4 mussel cages and loading them on the elevator

Date: 6/20/2007
Shift: 0000-04000 EDT

Dive: J2-276
Site: AT340

Watch Leader: Bob Carney
Name: Nicole Morris

Time (GMT)	Comments
04:00:28	Elevator still ascending to the surface
04:44:30	Moving to Northwest site to search for fish trap
04:54:05	Search for fish trap homer probe
05:46:07	Still searching for fish trap
06:25:13	Dropped target "mussel bed"
06:26:03	Holothuroid and urchins
06:52:45	Mussel bed
07:12:20	Sea whip on Scorpio
07:41:56	Search for fish trap endÆ unsuccessful
07:44:23	Getting ready to start photo transects

Watch Summary:

At the beginning of watch, the elevator was still approaching the surface. At 0444, Jason started transiting to the Northwest site to search for the fish trap using Homer sonar. At 0741, the fish trap search ended unsuccessfully. At the end of watch, we started getting ready for photo transects.

Date: 06/20/2007
Shift: 0400-0800 EDT
Dive: J2-276
Site: AT340

Watch Leader: Erin Becker/Ian McDonald
Name: Christina Kellogg

Time (GMT)	Comments
08:17:28	Watch shift from Erin Becker to Ian McDonald
08:21:53	Moving into position for the photo transects
08:39:19	Seeing a lot of sea cucumbers on the silty bottom
08:53:59	Photo flash; sea cucumber in brow camera upper right corner
08:56:28	Photo flash; at beginning of Transect T9
08:58:57	Photo flashes; white bacterial mats; waiting for Medea to move
09:13:09	Began photo Transect T9, altitude 4.3 m, heading 198°, 2.5 m/s
09:14:05	Solitary tubeworm and sea cucumber on brow camera
09:14:20	Another solitary tubeworm, brow camera
09:14:44	Two sea cucumbers, brow camera
09:16:40	Urchin trails and urchins
09:17:20	Medea does not want to keep pace with the transect

09:20:42 Sea cucumber, downlooking camera (close up)
 09:21:13 End Transect T9
 09:23:20 Photos taken of tube worms and carbonate bottom
 09:23:51 Mussels on downlooking camera
 09:30:32 Momentum problem with Medea, waiting to start next transect
 09:34:30 White sea cucumber on brow camera (all others have been dark color)
 09:38:45 Began photo Transect T10, altitude 4.4 m, heading 198°, 0.3 knots
 09:50:09 Sea cucumber on downlooking camera
 09:50:20 End Transect T10
 09:52:20 Heading 90° to get into position for Transect T4
 09:55:46 Sea cucumber and white starfish on brow camera
 09:57:40 ROV dragging on the bottom, need to increase altitude to 3.8 m
 10:07:20 Bottom is carbonate, visible rocks, mussels, and tubeworms
 10:08:12 Climbing a steep hill
 10:09:21 Zooming 3-chip camera into tubeworms
 10:09:50 Transect T4 will have altitude 3.9 m, heading 18°
 10:12:28 Began Transect T4, speed approximately half that of earlier line (1.5 knots?)
 10:13:00 Tubeworms and mussels
 10:18:50 Some kind of fish (rattail?) on pilot camera, moving towards us
 10:22:30 Lots of tubeworms in between rocks
 10:30:35 Ended Transect T4
 10:31:59 Dark rattail-like fish, upper left of brow camera
 10:38:35 Began Transect T5, altitude 3.5 m, heading 198°, back to original speed (3 knots?)
 10:40:26 Moved off carbonate to mud bottom
 10:47:00 Ended Transect T5
 11:15:30 Began Transect T6, altitude 3.6 m, heading 18°
 11:18:40 Field of urchins
 11:20:00 Slowing down so Medea can catch up
 11:21:08 Slowing down even more since Medea is falling behind
 11:27:55 Tube worms
 11:28:12 Ended Transect T6.
 11:29:54 Transiting to blue bag marker (estimated time, 1 hour)

Watch Summary:

Photo transects T9, T10, T4, T5, and T6 were completed. Transects T9 and T10 were dominated by mud bottom and sea cucumbers. T4 had lots of carbonate topography, tubeworms, mussels, and other fauna. T5 was mainly mud bottom. T6 was a large urchin field. There were problems all the way through with Medea lagging—having to wait for her or having to slow down during the transect so that she would catch up.

Date: 6/20/2007
 Shift: 0800-1130 EDT
 Dive: J2-276
 Site: AT 340

Watch Leader: Chuck

Name: Julia Zekely

Time (GMT)	Comments
12.25	still transit to "blue bag" marker
12.39	Doppler reset
12.42	Mussel bed (edge) observed
12.43	Mussel bed
12.47	BEST OF mussels; 2198m depth
12.50	Ball marker within mussels; preparing to take mussel pot
12.53	tubeworms within mussels
12.56	looking for large mussels to collect
13.03	Mussel Pot B ready to sample
13.10	Mussel Pot into mussel bed next to ball marker
13.15	difficulties with closing mechanism and to getting mussel pot into mussel bed for collection
13.19	MP B over shells with sediment underneath to test mussel pot; mussel pot does not work (closing mechanism, rotate freely); MP B back on basket
13.23	Mussel Pot F , looking for another spot to sample, away from marker #2
13.24	BEST OF mussels
13.28	good mussel patch observed, Mussel Pot F over it
13.34	Mussel Pot into mussel bed
13.38	Mussel Pot F closed, collection successful ☺
13.41	MPot F back on basket, ring again lost in mussel bed
13.42	checking leftover inside ring, many ophiroids, small tubeworms
13.48	slurping of "left over" inside ring
13.51	ball marker set where mussel pot was taken
13.51	ring picked up and on basket
13.56	pictures with down looking camera taken
14.00	Doppler reset
14.06	checking bushmaster, bubbles of hydraulic fluid leak out
14.15	BEST OF tubeworms (esp. 14.19 good shot)
14.25	preparing of Bushmaster sampling
14.30	Bushmaster above tubeworms
14.35	sampling of tubeworms
14.40	almost entire tubeworms aggregation taken
14.45	Bushmaster closed, ☺ collection, back on basket and secured
14.57	ballmarker set at little, stained tubeworm aggregation
15.00	trying to sample (grab) carbonated rock
15.07	near marker #3 more rocks sampled
15.11	nice rock sampled, on basket
15.18	Photomosaic (where bushmaster was taken)
15.20	end of photomosaic

Watch Summary: good biological collection (Mussel Pot F), 1 bushmaster (although leaking), 1 Mussel pot B not taken, due to closing problems, no push cores

Date: 6/20/2007
Shift: 11:30 – 16:00 EDT
Dive: J2-276
Site: AT 340

Watch Leader: Bob Carney
Name: Kim Hunter

Time (GMT) Comments

15:25 Discussing Ian's camera – how to bring it up and photograph its departure from the bottom.
15:29 Waiting for the weight to drop off Ian's camera.
15:32 Weight released from Ian's camera – camera on way to surface.
15:33 Jason on bottom at start of shift – D=2185m A=3.5m
15:40 Backed off from Bushmaster collection, heading 220 degrees, shot photoline, both collections and ballmarker.
15:45 Jason off bottom.
16:14 Finished labels of DVD 100 series. Jason at ~1235m depth and rising.

Watch Summary:

Started shift just before Ian's camera was released from bottom and Jason started up. No science – just technical maneuvers. Left DVD racks loaded w/ 101 & 102 series in red and blue decks, respectively.

Dive Log for J2-277

Date: 6/21/2007
Shift: 0000-400 EDT
Dive: J2-277
Site: AT 340

Watch Leader: Stephanie Lessard-Pilon
Name: Nicole Morris

Time (GMT)	Comments
5:24:43	Jason on bottom
5:29:30	Methane sensor (0.765) starting to read data
5:33:14	Reset DVL- nav
5:37:48	Mussel brick road
5:38:09	Searching for Marker 5
5:44:13	Found ball marker 5
5:45:48	Getting ready for photo mosaics
5:47:04	Reset DVL- nav
5:54:38	Start of photo mosaic line 1 (due north); 0.08 m/s
5:55:48	Increasing speed to 0.11 m/s
5:57:02	Increasing speed to 0.13 m/s
5:58:08	Decreasing speed to 0.12 m/s
6:03:23	End of photo mosaic line 1
6:04:39	Moved 0.125 meters right
6:05:01	Moving back to original mosaic line (line 1)
6:05:37	Moving 0.175 meters right
6:06:36	Start of photo mosaic line 2
6:14:57	End of photo mosaic line 2
6:14:58	Redoing mosaic line 1 b/c Fstop was too high
6:15:40	Start of photo mosaic line 1
6:24:20	End of photo mosaic line 1
6:25:17	Start of photo mosaic line 3
6:33:54	End of photo mosaic line 3
6:35:19	Start of photo mosaic line 4
6:43:44	End of photo mosaic line 4
6:45:51	Start of photo mosaic line 5
6:48:36	End of photo mosaic line 5 Æ reached bacterial mat
6:46:35	Moving to mosaic mussels within bacterial mat
6:49:20	Moving right 1.75 m
6:49:45	Start of photo mosaic line 6 of bacterial mat
6:50:51	End of photo mosaic line 6
6:51:28	Start of photo mosaic line 7 of bacterial mat
6:52:51	End of photo mosaic line 7
6:53:20	Start of photo mosaic line 8
6:54:40	End of photo mosaic line 8
6:56:11	Setting Jason down

7:01:46 Methane sensor test start in bacterial mat Æ sensor is taken out of ROV
 7:02:49 Exact start time of methane sensor over mussels
 7:04:10 Directly above mussels
 7:06:56 Methane sensor is reacting
 7:18:25 Moved sensor over bacterial mat Æ sensor is still reacting
 7:24:59 Scraping sediment with port manipulator
 7:26:02 Placing methane sensor in this scraped hole
 7:30:27 Methane not changing
 7:30:59 Moving to another area within mussel bed to test sensor
 7:35:49 Placing sensor above brown patch to test
 7:43:03 Moving to another area to test sensor Æ “large mussels”
 7:47:55 Testing sensor in large mussels

Watch Summary: *Jason* reached the bottom at 0524. We started taking a photo mosaic of mussel brick road 0554 and ended at 0654. Following the photo mosaics, we started testing the methane sensor in different areas of mussel brick road. This continued through the end of this watch.

Date: 06/21/2007
 Shift: 0400 – 0730 EDT
 Dive: J2-277
 Site: AT340

Watch Leader: Chuck Fisher
 Name: Christina Kellogg

Time (GMT)	Comments
07:57:00	3-chip camera close-up and pan includes mussels, a hiding fish, and crab
08:00:50	Same scene/area but there are at least two shrimp near fish and crab
08:02:02	Pilot’s camera now close-up on fish and crab in mussels
08:03:52	Pilot’s camera now close-up on fish, crab, and shrimp in mussels
08:04:30	Moving 30 m south to marker 5 to take the cores
08:10:00	White bacterial mat visible at top of pilot’s camera–plan to core near it
08:11:25	Close-up of white bacterial mat in pilot’s camera
08:13:13	Targeting darker gray sediment just outside bacterial mat for brine cores
08:15:00	Seems to be too many mussels in that area, may not be able to core it
08:18:54	Firing both Niskin bottles above mat/brine area to be cored
08:20:00	There doesn’t appear to be a pull-down menu choice for ‘Niskin’ in event logger
08:21:00	Jeremy had to use the new ‘modify’ button in the event log (NO tubeworms present)
08:22:50	Really long sea cucumber on 3-chip camera; moving to close-up
08:23:00	There are two really long sea cucumbers; white polka dotted on gray body
08:24:00	3-chip camera still on sea cucumbers; the end with tentacles is slightly pink
08:26:00	Prepping for first core in brine, will be core yellow #9
08:27:00	Core yellow #9 taken in white/gray bacterial mat
08:28:37	Core yellow #9 complete, back in milk crate

08:29:40 Brow and pilot cameras filming coring, 3-chip camera is still on a close-up of long sea cucumber

08:36:05 3-chip camera pulled back from close-up of sea cucumber to area view

08:38:16 Core yellow #8, in same white/gray bacterial mat as core yellow #9

08:40:00 Core yellow #8 complete, back in milk crate

08:41:27 Getting ready to move a bit north to brine area with fewer mussels for other cores

08:43:38 Following 'mussel brick road' north looking for brine area to core

09:03:00 Still looking for a good spot to take brine cores

09:05:00 Sea plume on 3-chip camera

09:06:40 Sea plume on pilot's camera

09:10:34 Tried to take core yellow #7, but only penetrated a few millimeters; shook the contents out of tube and will try again elsewhere

09:12:24 Tried core yellow #7 a second time; hit carbonate, caught a shrimp in the tube

09:13:17 The core was too short for Marshall

09:13:30 Shaking core yellow #7 loose again, releasing shrimp and shell hash

09:15:27 Returning empty sed core tube yellow #7 to milk crate

09:19:13 Picking up carbonate rock in brine flow in 'mussel brick road'

09:20:19 Carbonate rock for Harry Roberts, placed into starboard biobox

09:23:49 Moving a bit south and west to the right edge of the mussel bed

09:30:00 Back at a previously sampled site; can see Jason footprint in bottom

09:30:36 Black sediments, green mussels around it, fresh mud flow

09:32:38 3-chip camera shows brown mud flow area we're planning to core

09:35:55 3-chip camera close-up on mud, mussels—suggest recent brine/gas flow

09:38:51 Core yellow #7, in dark gray/black brine sediment

09:40:55 Core yellow #7 complete, returned to milk crate

09:43:43 Choosing next core site, to the right of previous hole (core yellow #7)

09:44:32 Core yellow #6, in dark gray/black brine sediment to the right of core yellow #7

09:47:00 Core yellow #6 complete, returned to milk crate

09:48:57 Core yellow #5, in dark gray/black brine sediment above core #7 and to the left of core #6

09:49:55 Core yellow #5 complete, returned to milk crate

09:52:15 Core yellow #4, in dark gray/black brine sediment just above core #5

09:53:11 Core yellow #4 complete, returned to milk crate

09:54:27 Core yellow #1, in dark gray/black brine sediment to the right of core #4

09:55:09 Core yellow #1 complete, returned to milk crate

09:57:00 Moving slightly to be able to core recent brown mud flow in brine area

09:58:00 Mud looks rust colored in the light; iron?

10:00:14 Core yellow #2, in brown mud (or mat?)

10:01:45 Core yellow #2 complete, returned to milk crate

10:03:45 Core yellow #3 in brown mud (or mat?) to the right of core #2

10:04:43 Core yellow #3 complete, returned to milk crate

10:05:35 Moving 200-300 meters to ball #2, since all coring is complete

10:14:08 Still transiting to ball #2, over carbonate rocks and plates

10:17:20 White garbage bag on the bottom, visible in 3-chip camera

10:18:00 Close-up; looks like a sand bag, next to patch of tubeworms

10:19:00 Black/purple sea cucumber in brow camera

10:23:20 Still transiting, passing over tubeworms
 10:24:05 Slowing down, at marker #2
 10:25:05 Chuck wants ROV to sit here and test the methane sensor by marker #2
 10:26:24 Big mussel bed around marker #2
 10:29:52 Reset Doppler (DVL) for marker #2
 10:30:28 Putting methane sensor in position 1, touching mussels, event 25326
 10:31:07 Getting immediate response from methane sensor! Let it run ~ 10 min
 10:38:04 Still sampling with methane sensor
 10:39:33 Picking up methane sensor, moving away from mussels into the water column
 10:40:07 Methane sensor in position 2, water column above mussels, event 25349
 10:49:11 Moving the methane sensor away from live mussels but close to bottom
 10:49:58 Methane sampler in position 3, dead mussels, event 25370
 10:57:40 Methane measurement going down; on down-current side?
 11:00:24 Moving methane sensor again; choosing next position
 11:03:40 Change heading to due west
 11:06:00 Steady stream of bubbles visible rising from the sediment
 11:07:38 Putting methane sensor next to little white spot on bottom
 11:11:30 Methane sensor position 4, white patch, big mussels, event 25417
 11:23:58 Moving methane sensor; position 5, brown mussels, event 25445; also event 25448 (note that text was changed on previous event)

Watch Summary:

During this watch we successfully collected all nine sediment cores from brine seep/microbial mat sites. During transit, a carbonate rock was collected for Harry Roberts. Then the methane sensor was tested and used to sample positions 1.

Date: 06-21-2007
 Shift: 07:30 – 11:30 (EDT)
 Dive: J2-277
 Site: AT-340

Watch Leader: Chuck
 Name: Michael Kullman

Time (GMT)	Comments
11:53	Methane sensor 6 stop EVT 25507.
11:55	Moving back approx 1.5m, 1m right.
11:59	Methane sensor 7 start EVT 25522.
12:04	Mussel flatulence AKA bubbles observed.
12:08	Methane sensor 8 start (same location), pressed 3m closer EVT 25546.
12:14	Methane sensor 8 stop, start 9, bubbles observed EVT 25564.
12:26	Methane sensor 9 stop, start 10 EVT 25585.
12:35	Methane sensor 10 stop, sensor returned to Jason.
12:40	Ready mussel pot F (Jason has not moved since last methane sensor reading).

12:44 Mussel collection in pot F.
 12:49 Return pot F to Jason.
 12:53 'Best Of' video – brittle starts.
 13:00 Methane sensor 11 in mussel pot, cloudy water.
 13:12 Moved Ball marker 2 to edge of mussel bed by accident EVT 25695.
 13:18 Ball marker NAV A in pot ring F, recover pot ring F.
 13:22 Move a few meters, prepare for mussel pot A.
 13:25 Take a series of downward looking photos.
 13:38 Deploy mussel pot A EVT 25757.
 13:49 Begin engineering ops, methane sensor is still running.
 15:19 Squid on vid.

Watch Summary:

Finished methane sensor measurements at mussel bed. Some bubbles / mussel flatulence observed. Two mussel posts (F then A) were deployed. Brittle stars were noted swarming pot ring F after the sample was retrieved. Ball marker A was deployed at pot ring F. Engineering ops / testing begun at 13:49 and continued to end of shift.

Date: 6/21/2007
 Shift: 11:30 – 16:00 EDT
 Dive: J2-277
 Site: AT 340

Watch Leader: Ian MacDonald
 Name: Kim Hunter

Time (GMT)	Comments
15:57	Recovery of engineering marker.
16:29	Start photo transect T8, alt. 4.1m (Ian's transects)
16:40	Photo transect out of rocks and into urchins.
16:41	Back in the rocks.
16:42	Photo transect end.
16:46	Start photo transect T7, alt. 3.3m
17:00	Photo transect end.
17:03	Start photo transect T4, alt. 3.3m
17:18	Photo transect end.
17:42	Start photo transect T6, alt. 4.4m
17:56	Photo transect end.
18:11	Start photo transect T9, alt. 4.9m
18:24	Photo transect end.
18:32	Start photo transect T10, alt. 3.8m
18:40	Crossing Marker 10
18:41	Climbing 3m ledge
18:41	Photo transect end.
18:56	Start photo transect T3, alt. 3.6m

19:05 Photo transect end.
19:18 Start photo transect T2, alt. 3.2m
19:28 Photo transect end; octopus at end of line.
19:35 Start photo transect T5, alt. 3.7m
19:46 Photo transect end.
19:55 Start photo transect T1, alt. 4.6m

Watch Summary: Photo transects 1 – 10 were completed with Ian MacDonald.

Date: June 21, 2007
Shift: 1600 – 2000 EDT
Dive: J2-277
Site: AT 340

Watch Leader:
Name: Matt Frye

Time (GMT)	Comments
20:05:58	still making photo transects
20:12:45	finished line transect T1
20:39:00	transiting to mussel bed; abundant CO3 and worm tubes
21:02:30	methane sensor position #12, near dead open shell “double”; start 26739
21:45:45	start methane sensor #13; 26830
21:53:58	end methane sensor #13; 26847
21:55:19	start reading #14; 26851
22:02:10	end methane reading #14; 26867
22:03:24	start methane sensor #15; 26871
22:09:12	end #15;
22:10:07	start #16 methane sensor; 26886
22:17:36	push sensor down several inches (#17); 26906
22:24:13	end sensor #17; 26922
22:34:00	start #18;
	End methane sensor #18
22:49:40	start methane sensor #19; 26973
23:00:00	start methane sensor #20; 26999
23:13:00	ascend 20 meters
23:37:15	start #22 methane in mussel pot ring; 27080

Watch Summary: methane readings taken over mussel bed; start of shift was end of Ian’s photo transect. That is all.

Date: June 21, 2007
Shift: 2000-0000 EDT
Dive: J2-277

Site: AT 340
Watch Leader: Bob Carney, Stephanie
Name: Irm

Time (GMT)	Comments
23:50	methane sensoring in the mussels (#2711), methane sensoring #23
0:11	end of #23 (27150)
0:14	depositing a ball marker in the mussel bed
0:20	start moving
0:23	grabbing a rock #1 (27179)
0:26	grabbing a rock, it sticks
0:33	still trying to grab the rock
0:34	it did not work
0:36	we are moving to another rock
0:40	grabbing rock #2, into milk crate (#27218)
0:42	looking for rock #4
0:48	grabbing rock #4
0:53	grabbing a little piece of the rock, on top of mussel pot
0:55	again grabbing piece of rock, on top of mussel pot
0:58	another piece of this rock
1:01	still trying to get the rock
1:04	got a piece of this rock, top of mussel pot
1:10	taking away a weight, putting it down on the seafloor
1:13	moving
1:22	taking the sucker
1:25	suction of an holothuride, did not work, too big
1:29	trying to grab the seacucumber, biobox (27335)
1:36	grabbing another cucumber, biobox (27349)
1:40	traces (bottom cam), starfish
1:42	grabbing a star fish, biobox
1:44	turning off the methane sensor
1:49	grabbing a sea cucumber, into the biobox(27377)
1:58	collecting sea cucumber with the sucker
2:01	suction (27402)
2:05	suction of sea cucumber (27412)
2:09	suction of a sea-star (27420)
2:14	suction of a sea cucumber
2:23	another suction of a sea cucumber (27452)
2:27	end of suction
2:40	at a ball marker
2:43	reset
2:56	start of line 1 (27520) of photomosaic
3:07	end of line 1 (27549)
3:15	start of line 3 (27566)
3:22	start of line 4 (27583)

3:44 start of line
3:49 second start of last line
3:55 at the top of line, start

Watch Summary: collecting rocks, sea-cucumbers, starting photomosaik

Date: June 22, 2007
Shift: 0000-4000 EDT
Dive: J2-277
Site: AT 340

Watch Leader: Stephanie Lessard-Pilon, Ian MacDonald, Erik Cordes
Name: Nicole Morris

Time (GMT)	Comments
3:58:58	Still doing line 6 for photo mosaic
3:59:51	End of photo mosaic line 6 in urchin bed
4:00:12	Start of photo mosaic line 7 in urchin bed
4:04:26	End of photo mosaic line 7
4:05:03	Start of photo mosaic line 8
4:09:06	End of photo mosaic line 8
4:09:56	Start of photo mosaic line 9
4:13:46	End of photo mosaic line 9
4:14:27	Start of photo mosaic line 10
4:18:07	End of photo mosaic line 10
4:18:51	Start of photo mosaic line 11
4:23:02	End of photo mosaic line 11
4:23:35	Getting ready to perform photo transects in northwest area
5:03:03	Start of photo transect line T2
5:14:58	End of photo transect line T2
5:24:05	Start of photo transect line T3
5:32:45	End of photo transect line T3
5:47:13	Start of photo transect line T7
5:55:45	End of photo transect line T7
6:01:04	Start of photo transect line T8
6:09:40	End of photo transect line T8
6:21:39	Start of photo transect line T1
6:29:32	End of photo transect line T1
6:29:55	Heading to Marker #8 for tubeworm collection
6:53:25	Mussel bed
6:56:58	Marker 12 sighted
7:01:37	Marker 8 sighted
7:05:35	Getting ready for tubeworm collection at Marker 8
7:12:28	Stained tubeworm collection with manipulator in 1 st patch
7:13:29	Placed into port biobox

7:14:04 Stained tubeworm collection with manipulator in 1st patch
7:19:26 Moving to another tubeworm patch
7:21:40 Collecting stained tubeworms from other (2nd) patch
7:22:10 Placed into port biobox
7:22:42 Collected stained tubeworms from 2nd patch
7:23:26 Placed into port biobox
7:27:14 Collecting stained tubeworms from 3rd patch
7:28:09 Placed in port biobox
7:28:40 Collected stained tubeworms 3rd patch
7:29:46 Placed in port biobox
7:30:56 Closed biobox
7:37:00 Move to marker 12 to look for stained tubeworms to sample with bushmaster
7:40:27 Getting ready to bushmaster stained tubeworm patch next to marker 12

Watch Summary:

At the beginning of watch, we continued to perform photo mosaics in the urchin field. Follow the photo mosaics, Jason moved to the northwest area to perform a set of 5 photo transects. At 0705, stained tubeworms collections started using Jason's manipulator arm. At the end of watch, we were getting ready to sample stained tubeworms using the bushmaster jr.

Shift: 06/22/2007
Dive: J2-277
Site: AT340

Watch Leader: Chuck Fisher
Name: Christina Kellogg

Time (GMT)	Comments
08:00:13	The net on the Bushmaster needs to be recable tied to keep the net spread
08:01:56	Close-up of tubeworm bush at marker 12 on 3-chip camera
08:05:01	Close-up of individual tubeworms, white crab on one, 3-chip camera
08:05:47	'Best-of' video tubeworms and tap worms on 3-chip, event 28202
08:17:49	Bushmaster collection of worm patch at marker 12, event 28226
08:19:07	Good view of tubeworm 'roots' sticking out of Bushmaster bottom, pilot's camera
08:21:28	Looking for bungee handle on Bushmaster, 3-chip camera
08:32:50	Pulling bungee cord over Bushmaster to secure it
08:38:20	Collection of Bushmaster marker 12 complete and successful
08:39:00	Moving 160 meters, heading 140°, 0.2 knots
08:43:30	Using Coolpix to take photos in transit
08:48:50	Increasing speed to 0.4 knots
08:55:27	Purple/black sea cucumber, on brow camera (we've passed over several during the transit over soft mud bottom)
09:00:43	Urchin field

09:03:35 Shell hash and urchin trails
 09:04:24 Tubeworms
 09:04:48 Slowing to 0.2 knots to better look around
 09:06:09 Turning a bit left; more urchin fields and urchin tracks
 09:08:10 Carbonate rock on 3-chip camera; will collect it for Harry Roberts
 09:10:13 Picking up carbonate rock with about 100 tubeworms on it; event 28353
 09:15:13 Stored carbonate rock on platform next to Bushmaster
 09:16:34 Carbonate boulders move into view on brow camera
 09:18:50 Jettisoned one of the weights next to carbonate boulders
 09:24:09 Moving north to look over top of the mound
 09:26:15 More carbonate rocks, small patch of tubeworms
 09:26:55 Purple/black sea cucumber on mud bottom
 09:27:37 Turning to the southeast
 09:28:50 Another purple/black sea cucumber
 09:30:45 Urchin field
 09:31:48 Urchins and urchin trails on downlooking camera
 09:34:58 Urchins and white bacterial mats on brow camera
 09:35:30 Also a mound of gray sediment with what look like burrows in it, near the urchins
 and bacterial mats—what is the associated animal?
 09:37:37 White sea star on carbonate rock
 09:37:40 Carbonate rocks and sparse tubeworms
 09:41:00 More carbonate rocks; rotating ROV to the left
 09:42:56 White spots visible in brow camera—what are they? Moving to look
 09:46:40 White spots are bacterial mats, on brow camera and pilot’s camera
 09:47:09 Longline debris wrapped around a tubeworm bush visible on 3-chip camera
 09:48:22 Moving further south to keep exploring area
 09:50:42 Turning to the east
 09:55:40 Purple/black sea cucumber on 3-chip camera; subsequent close-up
 09:56:50 Two sets of holes in a circle near the sea cucumber
 09:57: 38 Moving east 100 meters
 09:58:21 Looks like carbonates to the left on sonar; heading that way
 09:59:22 Lush tubeworm community on 3-chip camera
 10:00:30 Mussels in pilot’s camera and 3-chip camera
 10:01:40 Both types of tubeworms, Lamb. and Escarp.
 10:02:10 ‘Best of’ video of tubeworms and mussels, event 28478
 10:10:00 Small white crab crawling through mussels on pilot’s camera
 10:11:30 Two white galatheid crabs in pilot’s camera
 10:21:09 Clump of black mussels on 3-chip camera
 10:22:45 Budweiser can in clump of tubeworms on 3-chip camera; event 28523
 10:24:07 Clump of black mussels now on downlooking camera
 10:27:19 3-chip camera close-up on Budweiser clump of worms
 10:43:56 Jason off the bottom

Watch Summary:

Successful Bushmaster collection of tubeworm bush at marker 12. Transited over urchin fields. Collected a large carbonate rock with tubeworms on it for Harry Roberts. Explored new mound that is south of previous mound. Southern part was not too exciting—lots of carbonate rocks, some urchins, sparse tubeworms. However, turned to the east and found lush tubeworm community with both kinds of worms, fast growth, mussels, and crabs. Photogenic clump of tubeworms with a Budweiser can.

Dive Log for J2-278

Date: 6/23/2007
Shift: 0400-0800
Dive: J2-278
Site: GC852

Watch Leader: Ian McDonald
Name: Christina Kellogg

Time (GMT)	Comments
07:23:00	Jason had been on the bottom since ~07:05; DVDs started now; they had just reached the elevator at 07:20
07:26:00	Taking elevator to coral site to deploy cameras
07:32:42	Continuing to transit to the coral site with elevator
07:40:50	Corals visible in downlooking camera, so we're near site
07:43:13	Jason sets down on bottom; adjusts camera views
07:50:30	Ian McDonald's camera "Louie" looks like it is working
07:52:00	Jason moving around elevator; kicking up a sediment cloud
07:59:20	Large pale isopod on pilot's camera, event 28835
08:20:01	Isopod on 3-chip camera
08:07:09	Checking that elevator position had been marked (it had)
08:08:30	Moving "Louie" camera away from elevator
08:09:09	Giant isopod circles elevator on brow camera
08:09:54	Gorgonians visible on pilot's camera
08:10:39	Gorgonians now visible on both brow camera and pilot's camera
08:19:19	Lots of marine snow
08:25:04	Lophelia patch in pilot's camera; then brow and pilot's camera
08:26:40	Clearer picture of Lophelia on 3-chip camera
08:28:20	Looking for a safe place for Louie camera near Lophelia patch
08:31:00	Large red/orange gorgonian (across from Lophelia patch) in pilot's camera
08:32:40	Better shot of red/orange gorgonian in pilot's camera (centered)
08:45:19	Setting down Louie camera in sediment between Lophelia and red/orange gorgonian; event 28933; it will stay here for two months, taking photos every 72 minutes
08:49:01	Flying Jason over Louie camera to photograph camera in situ
08:52:18	Ian does not want to sample Lophelia patch near the camera
09:02:48	Moving north to other Lophelia site to make collections
09:15:20	Small Madrepora sighted to collect for Cheryl { <i>actually a gorgonian</i> }
09:19:24	Clear shot of Madrepora about to be sampled; event 29002 { <i>gorgonian</i> }
09:23:00	Putting picnic basket under coral
09:24:10	Sampled coral but it is larger than basket opening
09:25:00	Need to get close-up photo before breaking the coral up to fit in picnic basket
09:29:50	Broke up coral to fit in basket, event 29017
09:34:28	Red shrimp perched on broken holdfast of Madrepora coral, on pilot's camera { <i>gorgonian</i> }
09:44:20	Sampling broken piece of same Madrepora coral as first sample { <i>gorgonian</i> }

09:46:07 Grabbing Madrepora holdfast out from under red shrimp {*gorgonian*}
 09:48:33 Adding holdfast to picnic basket, event 29063 {*gorgonian*}
 09:55:00 Lophelia bush to be sampled visible on 3-chip camera
 09:52:43 Lophelia close-up on 3-chip camera (just before event 29082)
 10:01:50 Grabbed a piece of Lophelia
 10:02:36 Dropped Lophelia in picnic basket opposite side from Madrepora {*gorgonian*}
 10:03:34 Using 3-chip camera to see if that piece is dead or alive—looks dead, event 29093
 {*was not dead; confirmed at surface*}
 10:05:00 Taking another Lophelia sample from the same thicket; dropped it
 10:06:07 Swimming red galatheid crab flees the scene, on pilot's camera
 10:09:29 Swimming red galatheid crab in pilot's camera again
 10:11:14 More swimming red galatheid; he keeps popping up
 10:14:39 Large piece of Lophelia is broken off and falls behind rock
 10:15:01 Grabbed smaller piece of Lophelia from a different clump than previous (possibly
 dead) collection; event 29120 {*not Lophelia; really Madrepora*}
 10:15:50 This smaller piece went into the basket, so there are two different pieces of
 Lophelia on one side and one colony of Madrepora on the other {*Lophelia and Madrepora on
 one side, gorgonian on the other*}
 10:22:22 Close-up of sponge on pilot's camera
 10:24:00 Looking for piece of Lophelia that dropped; unsuccessful
 10:30:00 Moving back to the elevator's location to take sediment cores
 10:35:07 Preparing to collect sediment cores from soft, brown, undisturbed sediments
 10:39:58 First core, yellow #2, event 29177
 10:42:40 Second core, yellow #4, event 29186, center of milk crate
 10:45:30 Third core, yellow #8, event 29188
 10:47:28 Fourth core, yellow #3, event 29193
 10:49:20 Fifth core, yellow #5, event 29197
 10:51:02 Sixth core, yellow #9, event 29202
 10:54:05 Coring finished; two cores could not be used because they were stuck in the milk
 crate
 10:59:40 Gray eel, (didn't look like Conger)
 11:00:29 Eel visible in 3-chip camera, event 29222
 11:02:16 Picnic basket placed in starboard biobox (#2) on elevator
 11:10:38 Eel visible in brow camera, event 29242
 11:11:49 Doppler reset, event 29245
 11:14:10 Put sediment cores in wood box on elevator, event 29251-29252
 11:17:22 Ready to release elevator for 8am recover
 11:23:00 Looking for a crab to grab while waiting for elevator ok
 11:26:15 Crab on pilot's camera

Watch Summary:

Placed Ian McDonald's rotary camera (Louie) on the bottom near a patch of Lophelia. Collected a colony of Madrepora and pieces of two different Lophelia clumps (but first collection may be dead piece). There seemed to be one large thicket of Lophelia but also some smaller clumps along top and sides of rock. Moved back to the elevator location to collect sediment cores. Six

of eight cores collected (two got stuck in the milk crate). Transferred coral picnic basket and core milk crate to elevator.

{Note: After corals were brought to the surface, it turned out the “Madrepora” was a gorgonian, and the second small piece of “Lophelia” was actually Madrepora}

Date: 06-23-07
Shift: 07:30 – 11:30 EDT
Dive: J2-278
Site: GC852

Watch Leader:
Name: Michael Kullman

Time (GMT) Comments

11:36 Elevator released.
11:40 Run crab, run!! Vid of crab collection. May not be suitable for children under the age of 12.
13:18 Jason approaching area of markers 2, 5 & 8.
13:20 Nav reset.
13:33 Update target location for marker 2 in DVLNAV.
13:40 Mass spec scan 1 EVT 29293.
13:45 Scan 1 end (end of background scan) EVT 29405.
13:47 Mass spec scan 2 EVT 29411.
13:52 Scan 2 end EVT 29421.
13:54 Scan 3 start EVT 29429.
14:01 Scan 3 end EVT 29444.
14:03 Heading for position approximately 25m east of marker 8.
14:04 Reset nav, marker 8 in sight.
14:08 Ball marker near tubeworms from previous dive sighted.
14:09 Reset nav at marker 8. Apparent offset to east of approximately 20m from marker fix 12247 on dive 273.
14:12 Mass spec scan 4 start (near ball marker / marker 8) EVT 29469.
14:18 Mass spec scan 4 end EVT 29470.
14:19 Mass spec scan 5 start EVT 29471.
14:30 Mass spec scan 5 end EVT 29472.
14:32 Mass spec scan 6 start EVT 29473.
14:41 Mass spec scan 6 end EVT 29478, reset nav.
14:42 Mass spec scan 7 start EVT 29481. NOTE: Virtual Van auto events have not been logging every 30 seconds for mass spec readings 4 – 6.
14:54 Mass spec scan 7 end EVT 29491.
15:01 Mass spec scan 8 start EVT 29506.
15:10 Mass spec scan 8 end EVT 29526.
15:19 Mass spec scan 9 start EVT 29545.

Summary:

At the beginning of this watch the elevator was released, Jason was stationary for a short period, Jason then maneuvered north towards the area of markers 2, 5 and 8. A crab was collected en route 11:40.

After reaching Marker 2 an updated position for the marker was entered into DVLNAV. Mass spec readings 1 - 3 were taken in this area. Jason then maneuvered to a position near marker 8. After a nav reset at marker 8 it was noticed that there appeared to be a roughly 20m offset between the current position and the position logged during Dive 273 (EVT 12247).

Mass spec readings 4 – 9 were taken in the area of Marker 8. It was noted that during scans 4 – 6 the Virtual Van automatic fixes at 30 second intervals were not being logged (apparently sitting on the bottom had confused the program, logging then began normally).

Date: 6/23/2007
Shift: 11:30 – 16:00 EDT
Dive: J2-278
Site: GC 852

Watch Leader: Peter Girgius
Name: Kim Hunter

Time (GMT)	Comments
15:32	Mass Spec – end position 9
15:34	Mass Spec – start position 10
15:44	Mass Spec – end position 10
15:45	Mass Spec – start position 11
15:57	Mass Spec – end position 11
16:00	Mussel collection – Pot A – aborted because setup not stable
16:17	2 Niskin bottles fired
16:22	Spotted marker 2
16:23	Reset navigation
16:27	Spotted marker 8
16:31	Reset navigation
16:35	Starting at 16:00 – searching for muddy area to collect mussels
17:04	Reset navigation; still searching for good mussel collection site
17:07	Found spot for mussels & chemical scans
17:11	Mass Spec – start position 12
17:18	Mass Spec – end position 12
17:19	Mass Spec – start position 13
17:29	Mass Spec – end position 13
17:37	Mass Spec – start position 14
17:39	Mass Spec – end position 14
17:40	Mass Spec – start position 15
17:50	Mass Spec – end position 15

17:54 Mass Spec – start position 16
 18:06 Mass Spec – end position 16
 18:07 Mass Spec – start position 17
 18:18 Mass Spec – end position 17
 18:34 Mass Spec – end position 18; started position 18 at 18:20
 18:40 Mussel Pot A – collection at Mass Spec location
 19:30 White mussel net collection
 19:50 Mussel collection end
 19:51 Beginning scan beneath mussel collection

Watch Summary: Shift covered Mass Spec scans 9-18 and biological collections in mussel beds.

Date: 6/23/2007
 Shift: 1600-2000 EDT
 Dive: J2-278
 Site: GC 852

Watch Leader: `
 Name: Matt Frye

Time (GMT) Comments

Time (GMT) Comments
 20:03:00 start mass spectrometer #20 (29940)
 20:17:20 end sample #20 (29969)
 20:20:00 start mass spec #21 (29976)
 20:20:20 counter said 30:36 and was reset
 20:31:33 end mass spec #21 (30002)
 20:35:25 #21 did not stop, continue; methane/ethane/sulfide encountered
 20:39:50 meth sensor #21 really stopped (30021)
 20:42:00 put white bag of musells away on port side
 21:07:33 start mass spec reading # 22 (30061)
 21:19:06 stop mass spec reading #22 (30062)
 21:19:22 moving probe and a couple of mussels over
 21:22:03 start mass spec # 23 (30063)
 21:22:40 system is not auto-logging events between manual entries
 21:34:08 stop mass spec reading # 23 (30064)
 21:37:10 start mass spec reading # 24 (30065)
 21:48:29 stop mass spec # 24
 21:54:00 mass spec start # 25 (30067)
 22:23:48 sample mussels from site 25 into port biobox (30072)
 22:44:05 start mass spec # 26 on edge of CO3 ledge in small hole (30109)
 22:45:00 sponges on ledge
 22:56:17 end mass spec # 26 (30134)
 23:04:17 start mass spec reading #27 (30152)

23:22:49 end # 27 (30190)
 23:28:00 start # 28 mass spec (30200)
 23:40:00 stop mass spec # 28 (30227)
 23:48:00 start mass spec # 29 (under CO3 ledge) (30245)

Watch Summary: 10 mass spec readings from mussel bed; one sample of mussels into port biobox; Good readings of mass spectrometer.

Date: 6/23/2007
 Shift: 2000-0000 EDT
 Dive: J2-278
 Site: GC 852

Watch Leader: ` Pete, Erik
 Name: Irmir

Time (GMT)	Comments
0:07	Ian's camera
0:16	reset
0:19	start close up science cam: mussels
0:22	moving Ian's camera towards the rock with the mussels, making pictures (#30312)
0:26	still positioning of Ian's camera: making pictures: shrimp + mussels
0:38	moving Ian's cam, making pictures of an isopode
0:41	end of Ian's cam (#30357)
0:48	grabbing mussels from a rock, into biobox
0:51	another peace of rock + mussels; biobox (#30383)
0:55	moving to look for another mussel bed
0:57	reset
0:59	marker #2
1:03	reset
1:03	marker #2
1:14	start of mass spec #30 (#30431)
01:23	end of mass spec #30 (#30438)
1:29	#31 start of mass spec (#30444)
1:41	end of mass spec #31 (#30453)
1:44	start of mass spec #32 (#30459)
1:58	end of mass spec #32 (#30483)
2:02	start of mass spec #33 (#30485)
2:13	close up of science cam: crab
2:14	end of mass spec #33 (#30486)
2:20	start of mass spec #34 (#30496), close up: science cam: mussels, crab
2:33	end of #34 (#30496)
2:48	corals (science cam)
2:58	reset
2:59	at coral site

3:01 science cam: coral, calcareous gorgonian!!!
 3:02 reset
 3:08 fly-trap-anemone (science cam)
 3:11 reset
 3:14 Ian's cam: making pictures of corals
 3:20 fly trap anemone
 3:26 crab

 3:29 end of Ian's cam
 3:31 taking a piece of coral (#30626), biobox
 3:36 transit to start the SM2000 survey

Watch Summary: taking pictures with Ian's cam (mussels and corals), making mass spec, taking samples from mussels and corals

Date: 6/24/2007
 Shift: 0000-4000 EDT
 Dive: J2-278
 Site: GC 852

Watch Leader:
 Name: Matt Frye

Time (GMT)	Comments
4:00:50	20m 1 st line
4:03:23	calibration start
4:05:22	calibration end
4:08:13	reset doppler
4:09:00	re-run 20 m calibration altimeter
4:10:44	end
4:13:30	15 m calibration start
4:15:04	end of line
4:16:48	10 m calibration start
4:18:50	end of line
4:22:39	5 meter calibration start
4:24:26	end of line; end of calibration
4:27:41	start line 1 (north)
4:27:23	stop line 1
4:51:01	start line 2 south
5:10:36	end line 2
5:15:14	start line 3 north
5:34:29	end line 3
5:38:30	start line 4 south
5:57	end line 4
6:04	start line 5 north
6:22	end line 5

6:31 start line 6 south
 6:50 end line 6
 6:54 start line 7 north
 7:13 end line 7
 7:17 start line 8 south
 7:35 end line 8

Date: 06/24/2007
 Shift: 0400-0800 EDT
 Dive: J2-278
 Site: GC852

Watch Leader: Mike Kullman/Robert Carney
 Name: Christina Kellogg

Time (GMT) Comments

Mike had been up for several hours running SM2000 multibeam surveys. He continued to keep the log until the surveys were finished. To keep the log consistent, I am including his entries, from 08:03 to 10:03

08:03 Start survey line 10 (south), 31207
 08:21 End line 10, 31245
 08:26 Start survey line 11 (north), 31256
 08:46 End line 11, 31296
 08:52 Start survey line 12 (south), 31310
 09:10 End line 12, 31351
 09:28 Start survey line 13 (west), 31388
 10:03 End line 13, 31459

10:06:27 Turning off SM2000 multibeam system
 10:08:39 Transiting to Marker 1, 0.4 knots, ~470 knots
 10:10:37 Started DVDs again when bottom became visible (series #128)
 10:15:09 Dark colored sea cucumber, pilot's camera, event 31484
 10:22:15 Crossed a line in the bottom; previous Jason footprint?
 10:30:31 Bottom has been soft sediment marked by occasional holes
 10:31:42 Getting suction tube in manipulator to prepare for slurping (Bob takes over watch)
 10:34:35 Eel visible in downlooking camera
 11:00:30 Eel-like fish visible on 3-chip camera
 11:04:47 Dark colored fish (rattail?) lying on bottom; 3-chip camera, 31585
 11:05:40 Same fish on brow camera, 31587
 11:07:06 Another fish, silver, lying on bottom, 3-chip camera, 31591-31592
 11:10:59 Large red crab on the bottom, 3-chip camera, 31600-31602
 11:12:00 Trying to sample a couple of crab legs from him, 31603-31604, 31607
 11:15:00 Putting crab into port biobox, 31612
 11:17:30 Crab gets second wind and escapes manipulator instead of entering biobox
 11:19:00 Crab is gone

11:24:00 Moving to marker 6
11:32:26 Doppler reset, 31645

Watch Summary:

Mike Kullman completed the SM2000 multibeam survey, running north/south lines 10-12, and then a cross line to the west for survey13. Bob Carney took over and the suction tube was readied for slurping unsuspecting invertebrates. Observed a couple of eels and a couple of fishes. Entertaining but unsuccessful attempt to collect legs from a crab.

Date: 06/24/2007
Shift: 0800-1200 EDT
Dive: J2-278
Site: GC852

Watch Leader: Chuck Fisher
Name: Erin Becker

Time (GMT)	Comments
11:42	At Marker 1 – Dropped target “Marker 1 J2-278”
11:59	Dropping target “tubeworms/clams”
12:28	“Mass speculating”
12:29	Position 35: background seawater EVT 31763 ; stop scan 35 EVT 31788
12:46	EVT 31799 start recording position 36
12:58	Moving probe to base of tube worms
13:01	Starting position 37 EVT 31831
13:10	Mussels embedded in carbonate, carbonate covered in white crap
13:11	Best-of video growing carbonate for Harry
13:13	End position 37
13:13	Putting mass spec away and preparing to collect stained tubeworms
13:22	Collecting stained tubeworms into starboard biobox
13:23	Claw loose, difficult to hold tubeworms
13:28	Tubeworm trying to jump out of biobox. Balanced precariously on edge
13:30	Retrieved escaping tubeworm
13:31	Shutting lid w/ some worms hanging out
13:34	Slurping shrimp for Stéphane – one chamber
13:40	Suction seems pretty weak
13:44	Accidental clam slurp
13:49	Putting slurp away
13:56	Setting up at Marker 1 for chem scanning and mussel pot
14:07	Mass spec probe nestled into mussels
14:11	Position 38 on mussels EVT 31967
14:18	Not detecting methane; seawater hit
14:20	Done scanning 31968

14:20 Moving two mussels to the left
 14:23 Starting position 39 EVT 31975
 14:27 Still looks like seawater
 14:27 Stopping position 39; 31985
 14:27 Moving 6 in. and placing into mussels. Deeply inserted between little and big mussels
 14:28 Setting up position
 14:29 Hearing some pounding and what sounds like an engine alarm
 14:29 Beginning position 40 EVT 31987 (VV logged at 14:30)
 14:30 Detecting some sulfide (a little)
 14:41 End position 40 EVT 31989
 14:45 Start position 41 EVT 31990
 14:48 Little sulfide hits
 14:56 Stop position 41 EVT 32006
 14:57 Putting away mass spec
 14:59 All bungees released on ring as MPF came out of bucket
 15:00 Pot scar looks pretty empty; putting MPF away
 15:13 Crab eating broken mussel in pilot and science cam. Shrimp came into pot scar. Pot went to sediment. Crab is a “vagrant” species. Shrimp all over dead mussel that crab is eating
 15:19 Reset Doppler
 15:22 Tried to get DV Cam video but crab turned away
 15:23 Going South 100m

Watch Summary: We did some chemical sensing with the mass spec around stained tubeworms and then collected those into the starboard biobox. We then went to Marker 1 and did some more chemistry and collected a mussel pot. There was some interesting video of a crab and a swarm of shrimp eating one of the broken mussels.

Date: 6/24/2007
 Shift: 11:30 – 16:00
 Dive: J2-278
 Site: GC 852

Watch Leader: Ian MacDonald
 Name: Kim Hunter

Time (GMT) Comments

15:35 Biological collection underway – clams picked-up with manipulator arm instead of scoop
 16:16 Searching for Bushmaster collection site – spotted bubble stream coming from sediment surface – was told no time to investigate or deploy Mass Spec probe – must continue search for mussels and tubeworms
 16:23 Returned to bubble stream for Mass Spec measurements
 16:28 Peter is sick so no Mass Spec measurements in bubble stream – going to take measurement in tubeworm clump instead because Eric is not sure what deleterious effect bubbles may have on probe.

16:30 Mass Spec tube is tangled so no measurements taken – probed restowed
16:40 Bushmaster collection of tubeworm clump
16:59 reset navigation
17:03 Starting Ian's photo lines
17:07 T8, alt. 4.1m, H 175 degrees
17:16 end of line
17:23 T1, alt. 3.1m, H 355 degrees
17:32 end of line
17:35 T3, alt. 3.1m, H 355 degrees
17:40 end of line
17:44 T4, alt. 3.5m, H 175 degrees
17:49 end of line
17:53 T10, alt. 4.6m
17:58 end of line
18:06 T5, alt. 3.8m, H 355 degrees
18:11 end of line
18:24 T2, alt. 4.8m, H 175 degrees
18:29 end of line
18:32 T7, alt. 3.6m, H 175 degrees
18:37 end of line
18:45 T6, alt. 4.3m, H 355 degrees
18:50 end of line
18:51 T9, alt. 3.3m, H 355 degrees
18:57 spotted marker 6
18:59 reset navigation
18:59 end of line
19:11 Jason off bottom

Watch Summary: Shift covered end of biological collections for this dive and Ian's photo lines T1-T10. Shift ended early with Jason beginning ascent.

Dive Log for J2-279

Date: June 25, 2007
Shift: 08:00 – 12:00 EDT
Dive: 279
Site: GB 829

Watch Leader:
Name: Matt Frye

Time (GMT)	Comments
13:06	seafloor acquired
13:13	heading 255
13:15	soft bottom mud
13:17	small bacteria mat
13:30	scattered CO3 @ 1223 m
13:51	top of ridge @1224 M
13:56	suspended silt
14:07	deploy marker on top – marker 13
14:14	doppler reset
14:20	head due north 200 meters
14:34	1267 meters
14:40	stop, turn back to south at 1287 meters
14:42	tubeworm, mussel, CO3 @ 1275 m Unknown rock, looks like CO3
14:47	dead mussels 1267 m
14:51	dead mussels 1261 m
14:55	mussel jackpot at 1255 m
15:02	start mass spec into live mussels
15:19	start mass spec reading #42 (32881)

Watch Summary: Mostly exploration; found the top of the hill and moved downslope from there; found live mussels @ 1255 m

Date: 6/25/2007
Shift: 11:30 – 16:00 (EDT)
Dive: J2-279
Site: GB 829

Watch Leader: Group Effort
Name: Kim Hunter

Time (GMT)	Comments
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15:44 Mass Spec in mussel bed. Completed Mass Spec position 42, ran ~5.5 min of “best of video” and started Mass Spec position 43 while I was catching up the DVD logs from the previous shift.

15:54 Stop position 43, evt 32955
15:58 Start position 44, evt 32965
16:10 Stop position 44, evt 32990
16:16 Start position 45, evt 33003
16:25 Stop position 45, evt 33023
16:30 Start position 46, evt 33033
16:40 Stop position 46, evt 33055
16:45 Mussel Pot A collected
16:54 Scoop net to be filled and put into port biobox
17:08 Net stowed in biobox
17:11 Ian starting photo imaging
17:12 Reset Doppler navigation
17:51 Stop photo transect, evt 33189
17:52 moving to next mussel bed
18:26 Macro camera start – tubeworm photos
18:30 mussel photos
18:43 Stop macro camera
18:47 carbonate collection with sponge attached
18:48 tubeworm grab collection into port biobox
18:54 carbonate collection from tubeworm site
19:05 Returning to previous mussel bed for second mussel pot collection
19:31 Mussel Pot F collection

Watch Summary: This dive is on a new site – referred to as the Christmas Tree site. An extensive mussel bed was found on the sediment surface – lots of black mud beneath. Would be a good place to get push cores in the future. There are some tubeworm clumps but not abundant. There are large carbonate outcrops here.

Date: June 25, 2007
Shift: 1600 – 2000 EDT
Dive: 279
Site: GB 829

Watch Leader:
Name: Matt Frye

Time (GMT)	Comments
19:51	leaving central mussel bed; heading 090 for 60 m
20:22	090 approx 140 m, turned 145 into CO3
20:23	tubeworms and CO3 (big chunks)
20:26	dead mussels downslope
20:27	straggler tubeworms

20:36 steep slope
20:42:39 still large vertical CO₃ structures; high relief bottom
20:44:49 white galatheid and tubeworms on 3 chip camera

Watch Summary: 10 mass spec readings from mussel bed; one sample of mussels into port biobox; Good readings of mass spectrometer.

Dive Log for J2-280

Date: 6/26/2007
Shift: 0400-0800
Dive: J2-280
Site: GB647

Watch Leader: Chuck Fisher/Robert Carney
Name: Christina Kellogg

Time (GMT)	Comments
10:00:00	Approximate time of Jason launch; expect to be at bottom around 11:00 GMT (7am local)
10:43:00	Jason reaches bottom; soft brown sediment
10:51:00	Started DVDs
10:52:25	Sighted a piece of asphalt (?) that has a white gorgonian on it; will try to collect
10:56:57	Tried to sample small piece of the rock; it broke apart and was revealed to be definitely asphalt; very shiny; eventually got a small piece into the biobox
10:59:00	Tried to collect the bigger piece with the white gorgonian, but dropped it
11:03:30	Shifting some weights around to make room for collection
11:11:20	Successfully collected asphalt piece with white gorgonian into milk crate
11:12:29	Pushed on the asphalt piece to firmly wedge it into milk crate
11:17:17	Moving away to look around at the site before beginning SM2000 surveys
11:20:00	Bob Carney took over as watch leader
11:21:40	Soft brown sediment pockmarked with holes
11:22:20	Moving down the slope on the north side
11:24:46	Moving at 0.2 knots to beginning of survey

Watch Summary:

Beginning of dive J2-280 at site GB647. Discovered a chunk of asphalt with coral on it and sampled it, marking the site with Marker #2. Moving into position to begin SM2000 survey.

Date: 6/26/07
Shift: 0800-1200 EDT
Dive: J2-280
Site: GB647

Watch Leader: Bob Carney
Name: Lara Miles

Time (GMT)	Comments
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11:46	BIO OBS: fish
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11:55	Heading to GEO 1
12:01	TRANSIT: taking pictures @ a rate of 1 min intervals/ downward camera
12:07	BIO OBS: ray: "Bathy raja" (Bob id)
12:13	BIO OBS: corals and brittle stars
12:15	BIO OBS: crab with coral and sea stars/ broken coral and shells
12:23	Possible chain drag mark in sediment?
12:23	GEO OBS: carbonate rubble- probably asphalt
12:33	GEO GRAB: asphalt
12:43	BIO OBS: spiny urchins in possible brine stream (possibles provided by Bob)
12:45	BIO OBS: white and orange bacteria mats
12:45	BIO OBS: fish and crab
12:48	BIO OBS: mussel shells and sea star in asphalt: rock massive ("size of house" Bob)
12:56	BIO OBS: filter feeding starfish
13:00	BIO OBS: pink coral
13:00	BIO OBS: white bacterial mat
13:02	GEO GRAB: Push core (testing bact. Mat to see how deep it goes: successful/full core
13:07	GEO GRAB: Push Core #2 (above 13:02) and core #5 taken on white bact. mat
13:08	GEO GRAB: Push Core #9
13:15	BIO GRAB: urchin in starboard bio box
13:16	DVCAM: start time on tape 20m 13s: tape sampling site
13:28	GEO GRAB: Push Core #6 was tried but sediment not deep enough FAILED
13:29	BIO OBS: fish in pilot cam and filter feeding star fish
13:39	GEO OBS: previously thought to be a chain drag (12:23) now cause unknown
13:46	BIO OBS: starfish (many)
13:56	GEO GRAB: carbonate placed behind the BM for HARRY
14:10	BIO OBS: clam shells
14:11	BIO OBS: tubeworms
14:23	GEO OBS: asphalt
14:26	TRASH: 3 cans and 2 bottles
14:43	Passed geo 2, heading 208 towards geo 3
15:12	GEO GRAB: core yellow (1) right front starboard

Watch Summary:

Passed over a large asphalt/carbonate substrate with many biology observations including: urchins, fish, a ray, starfish and tubeworms. There were four successful push cores taken and one failed (sediment not deep enough). Of the four push cores, three were taken on white bacterial mats. Two asphalt geology grabs were taken as well as, one biology grab of an urchin.

Date: 6/26/2007
Shift: 11:30 – 16:00 EDT
Dive: J2-280
Site: GB 647

Watch Leader: Group Effort
Name: Kim Hunter

Time (GMT) Comments

15:50 Two mat cores (yellow #'s 4 & 8) taken – white bacterial mat cores taken adjacent to rock outcrop, snails feeding on mat, some orange mats w/in white areas – tried to core but mud was not deep enough – only able to core white mat areas.
16:20 Single tubeworm collected – oil oozed out of hole left when tubeworm extracted.
16:30 Tubeworms & carbonate collected into port biobox.
17:20 Collected yellow core #7 near carbonate outcrop – white bacterial mat.
17:40 Using net to collect snails.
17:55 Collected Bernie's core in blue mud, oil bubbles & snail in core.
18:04 Mussel grab into starboard biobox.
18:23 Brachiopod grab in starboard biobox.
18:25 There is some debate as to whether the ledge where the mussels and brachiopods were collected is asphalt or carbonate.
18:30 Chunk of ledge broken off and put into starboard biobox – Matt Frye thinks it's carbonate.
19:27 "Fat" tubeworm grab into starboard biobox.
19:29 Doppler navigation reset.

Watch Summary: This dive is on a new site – hilly topography with many ledges and rock outcrops. Tubeworms are mainly singles or pairs – didn't see any clumps. Mussels are generally associated with rock outcrops. Many bacterial mats are on thin sediment layer over rock. There seems to be a fair amount of oil in these sediments – pulling tubeworms or taking push cores often releases oil bubbles.

Date: 6/26/07
Shift: 1600 - 2000
Dive: J2-280
Site:

Watch Leader: Matt Frye
Name: Matt Frye

Time (GMT) Comments

20:21 heading for geo-marker 5; mud
20:29 sponges, tubeworms, dead mussels, crab, CO₂
20:36 doppler reset
20:45 lone tubeworm in sandy bottom; stbd biobox
21:03 transiting mud bottom with soup bowl depressions
21:09 fish resting on bottom, 3 chip camera
21:09 track in the mud, 3 chip camera
21:12 another fish, 3 chip
21:15 white bacterial mat, 3 chip
21:17 clump of algae from the surface, 3 chip

21:21 starfish and sponge (stalked), 3 chip
21:21 eel, 3 chip
21:58 site geo #6, nothing; site geo 5, nothing
22:08 west of geo #6, collect tube and coral; stbd side
22:22 west of geo #6, collect tubeworms, stbd side
22:48 marker 2 (CRP) seen again; heading to geo #1
23:22 back @ geo #1; firing niskins

Watch Summary: mostly mud at geomarker #5 and 6; some tubeworm collection west of geo #6; last minute transit to geo #1 to collect some niskin data

Dive Log for J2-281

Date: 6/28/2007
Shift: 0000-4000 CDT
Dive: J2-281
Site: AC645

Watch Leader:
Name: Nicole Morris

Time (GMT) Comments

6:39:59 72 meters from bottom- no dvds recording
6:48:00 Moving to SM2000 survey area
6:50:15 Reset DVL
6:57:14 SM2000 Calibration survey start; 20 m alt 180
6:59:59 SM2000 Calibration survey end 20 m alt 180
7:03:26 SM2000 Calibration survey 15 m alt start
7:05:23 SM2000 Calibration survey 15 m alt end
7:07:27 SM2000 Calibration survey 10 m alt start
7:09:29 SM2000 Calibration survey 10 m alt end
7:11:30 SM2000 Calibration survey 5 m alt start
7:13:29 SM2000 Calibration survey 5 m alt end
7:15:20 Chimera- no video recording
7:17:55 Reset DVL
7:24:44 Start SM2000 line 1
7:53:00 End SM2000 line 1
7:57:15 Start SM2000 line 2
8:25:00 End SM2000 line 2
8:28:17 Start SM2000 line 3

Watch Summary:

Jason was descending to the seafloor at the beginning of my watch. At 0657, we started performing the SM2000 calibration lines. This was completed at 0713. Shortly after, we started performing SM2000 survey lines 1-3. At the end of watch, we were still performing SM2000 survey line 3.

Date: 28 June 2007
Shift: 0400-0730 CDT
Dive: J2-281
Site: AC 645

Watch Leader: Jason staff
Name: Eric Hawkins

Time (GMT) Comments

08:53 End of SM 2000 line 3

08:56 Start of SM 2000 line 4
 09:22 End of SM 2000 line 4
 09:29 Start of SM 2000 line 5
 09:54 End of SM 2000 line 5
 10:00 Start of SM 2000 line 6
 10:26 End of SM 2000 line 6
 10:35 Start of SM 2000 line 7
 11:00 End of SM 2000 line 7
 11:11 Start of SM 2000 line 8
 11:36 End of SM 2000 line 8
 11:42 Start of SM 2000 line 9
 12:07 End of SM 2000 line 9
 12:12 Start of SM 2000 line 10

Watch Summary: SM 2000 lines throughout the entire shift.

Date: 6/28/2007
 Shift: 0800-1200 CDT
 Dive: J2-281
 Site: AC 645

Watch Leader:

Name: Mike Cohen

Time (GMT)	Comments
12:37:32	End SM 2000 line 10
12:43:48	Start SM 2000 line 11
13:10:29	End SM 2000 line 11
13:13:58	Start SM 2000 line 12
13:34:07	End SM 2000 line 12
13:42:12	Start SM 2000 line 13
14:08:03	End SM 2000 line 13
14:10:56	Start SM 2000 line 14
14:36:27	End SM 2000 line 14
14:41:11	Start SM 2000 line 15
15:06:33	End SM 2000 line 15
15:09:43	Start SM 2000 line 16
15:35:18	End SM 2000 line 16
15:51:50	Start SM 2000 line 17 (East-West)
16:21:08	End SM 2000 line 17 (East-West)

Watch Summary:

During this watch, the pilots used Jason II only for surveying. The last survey line was line number 17, which ran in the opposite direction to all of the previous survey lines.

Date: 6/28/2007
Shift: 11:30 – 16:00 CDT
Dive: J2-281
Site: AC 645

Watch Leader: Group Effort
Name: Kim Hunter

Time (GMT) Comments

16:30 Jason crew attending to navigational issues
16:40 On bottom and heading toward elevator to get Ian's camera.
16:50 Stopping to collect Pogo cores.
17:23 Finished Pogo coring. Collected 6 cores in Pogo bed – 4 long cores for Joye lab and 2 short cores for Chris. Collected 2 control cores – 1 adjacent to Pogo bed and 1 outside of disturbed Pogo coring area.
17:24 Heading to elevator.
17:48 Found elevator.
18:01 Stowing core rack in elevator box.
18:09 Retrieving Ian's camera from elevator.
18:22 Camera is on Jason.
18:26 Elevator released from bottom.
19:30 Elevator spotted 100m off starboard bow.
19:49 Elevator on deck.
19:54 Moving to target #8 at marker #'s 42-46 to deploy Ian's camera.
20:35 Marker #12 from 1992 spotted.
20:36 Markers 14 & 15 from 1992 spotted.
20:37 Marker A spotted.

Watch Summary: Most of this watch involved collecting Pogo cores and waiting for the elevator to surface. The banded tubeworm site was located and Ian was still searching for marker 10, where he wants to deploy his camera, when the shift ended.

Date: 06/28
Shift: 16.00 – 20.00 CDT
Dive: J2-281
Site: AT 340

Watch Leader: Erik, Stephanie
Name: Julia

Time (GMT) Comments

20.58 preparing to deploy Ian's camera
20.59 looking for the musselbed

21.01 observing marker #4,5
 21.05 deploying Ian's camera HUEY in musselbed
 21.12 marker E observed (deployed 15 years ago)
 21.13 marker #8
 21.22 HUEY deployed within tubeworm aggregation (2195m depth)
 21.27 Ian takes pix around HUEY with down looking camera
 21.30 test of mass spec
 21.36 stop of mass spec
 21.37 looking for banded tubeworms for cool pix macro shots (around marker E)
 21.41 JASON landed, closer look to find banded tubeworms -> **B23WS black**, banded tubeworm
 21.47 Macro cam on BANDED TUBEWORM
 21.54 Identification of **Green57WT**
 21.55 pictures taken of shrimp on tubeworm (black23)
 21.58 mussel on tubeworm (7 at least, growing on tubes)
 22.02 macro cam on banded tubeworm G57
 22.11 Doppler reset
 22.12 Marker F observed
 22.19 Macro cam on banded tubeworms **R47TS**
 22.36 banded tubeworms close to marker F not detected, heading to marker #10
 22.39 **W2WP** near Ian's camera, macro on it
 22.41 Best of tubeworm (banded tw)
 22.43 tubeworm dead (?) Best of **black 20**
 22.48 Macro back on basket, then on **W2** again
 23.11 macrocam stop (back on basket)
 23.17 moving to marker A
 23.25 at marker A, found other banded tubeworms: **white 4** and **red 8**
 23.27 macro cam start again
 23.31 Best of tubeworm
 23.36 macro of of red8
 23.40 Doppler reset
 23.55 – 0.00 Best of SITE (fine overlook of site, tubeworms etc)

Watch Summary: deployed Ians camera, looking for banded tubeworms (some found), many7 best of and macro pix taken, especially macros of banded tubeworms

Date: 6/28/07
 Shift: 2000-0000 CDT
 Dive: J2-281
 Site: AC 645

Watch Leader: Stephan
 Name: Irmi

Time (GMT)	Comments
1:04	#48 start mass spec (#37665) in a tubeworm bush

1:19 #48 end mass spec (#37698)
 1:24 #49 start mass spec(#37708)
 1:39 #49 end mass spec (#37740)
 1:45 #50 start mass spec (#37752)
 1:49 #50 end mass spec (#37782)
 2:07 #51 start mass spec (#37797)
 2:21 #51 end mass spec (#37827)
 2:26 #52 start mass spec (#37837)
 2:42 #52 end mass spec (#37827)
 2:47 looking for a marked bush of tubeworms
 2:48 R47TS red found
 2:54 science cam: shrimp in tubeworms
 3:01 #53 start mass spec (#37911)
 3:01 still close up science cam, looking for the next marker
 3:15 #53 end mass spec (#37942)
 3:18 great close up of shrimp!!!!
 3:20 #54 start mass spec (#37951)
 3:35 #54 end mass spec (#37984)
 3:38 looking for marker F, grabbing it
 3:40 looking for marker A
 3:56 giving up
 3:58 reset
 4:01 white a banded tubeworm found
 4:02 marker A
 4:11 start mass spec #55 (#38061)
 4:26 end mass spec #55 (#38092)
 4:33 start mass spec #56 (38107)
 4:46 end mass spec #56 (#38134)
 4:50 start mass spec #57 (#38144)

Watch Summary: Mass spec # 48-#57

Date: 6/29/2007
 Shift: 0000-4000 CDT
 Dive: J2-281
 Site: AC645

Watch Leader:
 Name: Nicole Morris

Time (GMT)	Comments
5:05:09	End of mass spec position 57
5:05:15	Putting wand back onto Jason
5:10:01	Getting ready to image banded tubeworms (Red 8)
5:11:12	Found (green 29) banded tubeworm under rock
5:14:30	Imaging Red 8 tubeworm

5:15:10 Trying to fix the camera
 5:23:23 Fixed cameraÆ moving back to image
 5:26:30 Capturing images of red 8 tubeworm
 5:38:20 Finished imaging red 8
 5:39:01 Looking for green 29
 5:41:10 Imaging green 29 tag
 5:44:13 Putting camera back onto Jason
 5:47:55 Moving Marker 5 to another location
 5:48:51 Moving to marker 10
 5:58:53 At vicinity of Marker 10
 5:59:43 Setting up to perform mass spec scans
 6:05:35 Start mass spec position 58 near tip of tubeworm white 2
 6:16:47 End mass spec position 58
 6:16:58 Moved to tagged black worm
 6:20:10 Start mass spec position 59
 6:34:05 End mass spec position 59
 6:37:00 Start mass spec position 60
 6:51:15 End mass spec position 60
 6:51:42 Putting wand back onto Jason
 6:54:33 Getting ready to start photo mosaic
 6:57:30 Marker 25 sighted
 6:58:03 Dropped target at Marker 10
 6:58:35 Reset DVL
 7:03:15 Markers 17 and 18 sighted
 7:03:57 Marker 16 sighted
 7:15:41 Looking at Ian’s cameraÆ working
 7:30:50 Searching for other targets
 7:31:33 Marker 44 sighted
 7:32:40 Marker 45 sighted
 7:32:50 Marker 42 and 43 sighted
 7:33:06 Marker 33 sighted
 7:36:55 Moving to pick up Ian’s camera to move to the “new” marker area- where 43, 43,
 44, 45 were sighted
 7:39:53 Picking up Ian’s camera
 7:45:20 Dropping camera in new area
 7:52:07 Moving around area to see the extent before the photo mosaic
 8:03:59 Setting up for a 5 m alt mosaic
 8:07:32 Changing alt to 4 m
 8:10:54 Start of photo mosaic line 1
 8:14:27 End of photo mosaic line 1
 8:17:59 Start of photo mosaic line 2
 8:20:55 End of photo mosaic line 2
 8:21:32 Start of photo mosaic line 3
 8:25:21 End of photo mosaic line 3
 8:26:15 Start of photo mosaic line 4
 8:29:48 End of photo mosaic line 4

8:30:13 Start of photo mosaic line 5
8:33:55 End of photo mosaic line 5; end of mosaic

Watch Summary:

At the beginning of watch, we continued to image banded tubeworms. After this task, we continued performing mass spectrometer scans. The next task was to perform a photo mosaic over an area where Ian had previously performed a video mosaic. We first started searching for markers 42, 43, 44, and 45. Once these we found, we moved the rotary camera to this area and then performed a photo mosaic (set of 5 lines). At the end of this watch, we were preparing for a photo transect survey.

Date: 29 June 2007
Shift: 0400-0730 CDT
Dive: J2-281
Site: AC 645

Watch Leader: Ian MacDonald
Name: Eric Hawkins

Time (GMT)	Comments
8:58	Start photo Transect #1, alt. 3.5m
9:00	Small clump of tubeworms
9:00	Additional clump of tubeworms
9:01	Carbonate
9:01	Large bed of tubeworms
9:03	Return to soft sediments
9:03	More carbonate outcrops
9:04	Tubeworms
9:07	End of T1 transect
9:08	Line/scar in sediment
9:19	Begin photo transect T6, altitude 4.3m, heading 345 deg.
9:23	Carbonate
9:24	White bacterial mats
9:25	Carbonate
9:26	Small tubeworm clump by carbonate
9:28	White bacterial mat
9:28	Carbonate pavement
9:28	End of T6 transect
9:29	Mussel cluster at the end of T6
9:30	Jason continuing along T6 path post-transect
9:30	Tubeworms
9:31	Tubeworms
9:31	Carbonate
9:33	Bacterial mat
9:41	Begin photo transect T3, altitude 3.4m, heading 165 deg.
9:41	Tubeworms
9:41	Carbonate

9:43 Mussels w/ few tubeworms
 9:43 Pogonophorans
 9:46 Back to soft sediments
 9:49 Carbonate
 9:49 End T3 transect
 9:51 Holothuroid, dk purple/black
 9:52 Start T4 transect, altitude 3.4m, heading 165 deg.
 9:53 Single carbonate
 9:55 Long stretch of soft sediments
 9:56 Track/line in sediments, left of brow cam
 9:57 More tracks
 9:59 Holothuroid, dk purple/black
 10:01 End T4
 10:03 Holothuroid, dk purple/black
 10:06 Fish
 10:16 Start transect T2, altitude 3.0 m, heading 345 deg.
 10:19 Holothuroid, dk purple/black
 10:24 End transect T2
 10:25 Moving to next transect
 10:26 Line/track in sediments, left of brow cam
 10:28 Octopus on downlooking camera out in the middle of the sediments, at least 28 cm (based on laser guides)
 10:33 Begin T7, altitude 4.2 m, heading 165 deg.
 10:33 Mussel beds with tubeworms
 10:39 Holothuroid, dk purple/black
 10:41 End transect T7
 10:42 Heading east to next transect
 10:49 Begin T8, alt. 3.8 m, heading 345 deg.
 10:54 Mussels and tubeworms
 10:55 Carbonate
 10:56 Smaller clumps of tubeworms
 10:57 End T8
 10:58 Transitioning to T5
 11:15 Begin T5, alt. 3.9m, heading 165 deg.
 11:18 Single stalk of soft coral
 11:19 Single stalk of soft coral
 11:19 Single stalk of soft coral
 11:20 Holothuroid, dk purple/black
 11:20 Single stalk of soft coral
 11:21 Holothuroid, dk purple/black
 11:22 Holothuroid, dk purple/black
 11:23 End T5
 11:23 Single stalk of soft coral
 11:24 Holothuroid, dk purple/black
 11:27 Holothuroid, dk purple/black
 11:28 Holothuroid, dk purple/black

11:29 Single stalk of soft coral
11:30 Single stalk of soft coral
11:36 Start T10, altitude 3.4m, heading 345 deg.
11:37 Pale sediment mounds
11:39 Holothuroid, dk purple/black
11:45 End T10
11:52 Large track in sediment, left of brow cam
11:54 Small patch of tubeworms
11:54 Carbonate
11:55 Tubeworms
11:56 Carbonate
11:57 Monofilaments (trash)
11:57 Long line of tubeworm clumps
12:02 Start T9, altitude 3.6 m, heading 165 deg.
12:02 Carbonates
12:03 Isolated tubeworm patch
12:05 Carbonates
12:05 Isolated tubeworms
12:06 Carbonate plates
12:08 White bacterial mat
12:09 Carbonate
12:10 Tubeworms
12:11 End of T9
12:14 On hold – waiting to determine next location as transects have ended
12:16 Heading for photo mosaic – aiming for middle of mussel bed
12:16 Large patches of tubeworms
12:18 Mussels and tubeworms
12:20 Cordes and Shah assuming operations
12:24 Small crab and shrimp on science cam
12:25 Numerous white shrimp atop mussels

Watch Summary: This portion of the AC 645 dive (J2-281) primarily involved Ian's photo transects, which were underway when we went on watch at 0400. As we were finishing our shift, Erik Cordes was just beginning reconnaissance of mussel beds.

Date: 6/29/2007
Shift: 8000-1200 CDT
Dive: J2-281
Site: AC645

Watch Leader: Bob Carney

Name: Michael Cohen

Time (GMT)	Comments
12:58	Bio obs tubeworms
13:05	Bio obs tubeworms and mussels at marker 9
13:10	Mass spec start background, EVT#:39324
13:24	Mass spec end background, EVT#:39355
13:30	position at marker 62 near bed of mussels, Mass spec start background EVT#: 39367
13:44	end scan at maker 62, EVT#: 39399
13:46	fish hiding in mussels
13:50	Mass spec start background at position 63, EVT#: 39413
14:05	Mass spec end background at position 63, EVT#: 39443
14:08	Mass spec start background at position 64, EVT#: 39452
14:14	Mass spec end background at position 64, EVT#: 39464
14:18	Removed probe from tube on sub
14:27	DVR cam used – mussel moving up tubeworm
14:27	Mass spec start background at position 65, EVT#: 39493
14:29	Mass spec end background at position 65, EVT#: 39499
14:30	End DVR cam use. Length = 2:38:27
14:34	Mussel pot B collection
14:37	Lift up mussel pot B
14:40	Dropped mussel pot B back in location on sub
14:47	Dead mussels knocked into ring by ROV
14:50	Reset DVL
15:04	Starboard box opened up
15:07	ROV breaking rocks
15:23	Found calibrated Carney rod
15:34	Looking for mobile fauna at marker 1
15:42	Slurp – sea cucumber, single chamber
15:45	Slurp – sea cucumber
15:47	Looking for more mobile fauna
15:51	Slurp – sea cucumber
15:56	Slurp – anemone
16:05	Returned slurp tube to sub
16:08	ROV grabbed sponge
16:15	Soft coral Sea Whip put in starboard bio box
16:20	Reset DVL

Watch Summary:

Date: 6/29/2007
Shift: 11:30 – 16:00 CDT
Dive: J2-281
Site: AC 645

Watch Leader: Group Effort
Name: Kim Hunter

Time (GMT)	Comments
16:30	Bob is doing mobile fauna slurping and grabs.
16:42	Mass Spec – start scan, evt 39796
16:51	Reset Doppler
16:59	Mass Spec – stop scan, evt 39833
17:47	Mass Spec – started scan in mussel bed, position #66
17:52	Niskins fired at Mass Spec position #66, mussel bed surrounded by tubeworms
17:56	Mussel pot F collected at Mass Spec position #66
17:58	Mass Spec wand was stowed at 17:50 but scan is still going – trying to flush system.
18:05	Mass Spec stopped.
18:12	Stephanie starting photo mosaic line 1
18:17	end line 1
18:19	start line 2
18:23	end line 2
18:24	start line 3
18:29	end line 3
18:30	start line 4
18:34	end line 4
18:35	start line 5
18:39	end line 5
18:40	start line 6
18:44	end line 6
18:48	start line 7
18:52	end line 7
18:53	start line 8
18:57	end line 8
18:58	start line 9
19:02	end line 9
20:10	Bushmaster tubeworm collection attempted
20:17	Bushmaster collection aborted – couldn't close on clump
20:35	Giving up on collecting with Bushmaster – it needs maintenance

Watch Summary: This watch covered a period in which some things went right (e.g., sea cucumber collection and photo mosaic) and some things went wrong (e.g., Mass Spec may be clogged and Bushmaster won't open and close properly). Such is life.

Date: 06/29
Shift: 16.00 – 20.00 CDT
Dive: J2-281
Site: AC 645

Watch Leader: Erik

Name: Julia

Time (GMT)	Comments
21:00	heading to Ian's camera, camera in sight
21.16	Ians camera released
21.17	21.17 JASON OFF bottom, ascending
21.18	Mass spec off

DVD set off: 21.30

Dive Log for J2-282

Date: 6/30/2007
Shift: 8000-1200 CDT
Dive: J2-282
Site: AC818

Watch Leader: Bob Carney
Name: Michael Cohen

Time (GMT) Comments

13:00 Start mass spec scan at position 67 – event #40441
14:04 end mass spec at position 67 – event #4051
14:10 Jason II reached ocean floor desination
14:10 reset DVL
14:15 shrimp visible on all cameras
14:22 well head found on ocean floor
14:40 heading north
14:43 reached marker 4
14:50 mussel bed, tubeworms and sea urchins all found together
14:52 trash discovered – bag and fishing line
14:54 elevator seen in camera
15:10 sea-cucumbers and eels found among mussel bed
15:18 fish seen in camera

Watch Summary:

During this watch, much of the time was spent getting to the desired location thousands of meters below sea level. The time that was spent at this location was used for the mass spec, and seemingly overall exploration of the area.

Date: 6/30/2007
Shift: 11:30 – 16:00 CDT
Dive: J2-282
Site: AC 818

Watch Leader: Group Effort
Name: Kim Hunter

Time (GMT) Comments

17:10 Started collecting push cores in urchin bed at start of shift. Finished collection at this time and now heading to elevator.
17:28 At elevator – will be sending up Pogo and Urchin cores and retrieving Ian's camera.
18:01 Elevator off bottom but Jason's arm is caught on elevator frame.
18:24 Elevator has been released from Jason's death grip and is surfacing.

18:32 Setting Ian's camera out to get photos while waiting for elevator to come to surface – camera was placed next to Marker #1.
 20:04 Elevator is on deck.
 20:05 Moving to SM 2000 survey start point.
 20:31 Leaving shift ~30 early to process push cores. Jason on way to survey site and no DVD's running.

Watch Summary: Urchin push cores were collected at start of shift in muddy area with shell debris. All Pogo and Urchin cores were sent up on elevator. Jason arm was stuck on elevator rail for an unfortunate half hour.

Date: 06/30/2007
 Shift: 16.00 – 20.00 CDT
 Dive: J2-282
 Site: AC818

Watch Leader: Erik, Stephanie
 Name: Julia

Time (GMT)	Comments
21.25	reset Doppler; waiting to MS 2000
21.32	SM-2000 survey line #1 start
22.03	SM-2000 survey line #1 end
22.08	SM-2000 survey line #2 start
22.39	SM-2000 survey line #2 end
22.44	SM-2000 survey line #3 start
23.14	SM-2000 survey line #3 end
23.18	SM-2000 survey line #4 start
23.48	SM-2000 survey line #4 end
23.53	SM-2000 survey line #5 start
00.31	SM-2000 survey line #5 end
00.55	start of 'cross-line'
01.02	end of "cross-line", end of survey
01.06	Ian's camera in sight
01.08	at Ian's camera, bushes of tubeworms, sea urchin trails and mussels around
01.13	Ian's camera taken to another place (at well head)
01.27	at well head, Ian's camera deployed
01:32	Best of well head ☺
01.35	back to marker #1
01.39	getting ready to photo mosaic
01.40	dropping target at southern end
01.58	photo mosaic start
02.03	dropping target "bacterial mat"

02.10 photo mosaic line #1 end
 02.11 moving to the right
 02.12 start of photo mosaic line #2
 02.21 end of photo mosaic line #2
 02.22 start of photo mosaic line #3
 02.31 end of photo mosaic line #3, moving 1.5m to the right
 02.33 start of photo mosaic line #4
 02.43 moving to marker #1, photo mosaic line #4 end -> end of photo mosaic
 02.53 looking for whitish mussels to sample and to do mass spec (at marker #1)
 03.00 start of mass spec
 03.15 end of mass spec

Summary: SM 200 0 surveys (5 lines + cross line); moving Ian's camera to well (out of photo mosaic area), photo mosaic done, start of mass spec measurements

Date: 07/01/07
 Shift: 2000-0000 CDT
 Dive: J2-282
 Site: AC 818

Watch Leader: Stephan
 Name: Irmir

Time (GMT)	Comments
3:40	end of mass spec (#41947)
3:44	start of mas spec #70 (#41948)
3:59	end of mass spec #70 (#41950)
4:02	mussel pot D
4:10	taking out the net from port biobox
4:15	pick up the ring
4:18	filling net with mussels
4:21	grabbing mussels; into the net
4:30	net into biobox port
4:40	start of mass spec #71 (#41964)
4:55	end of mass spec #71 (#41965)

Watch Summary: Mass spec # 70-#71, mussel sampling

Date: 07/01/2007
 Shift: 0000-4000 CDT
 Dive: J2-282
 Site: AC818

Watch Leader: Stephane
 Name: Nicole Morris

Time (GMT)	Comments
5:03:31	Mass spec placed back onto Jason
5:12:47	Removing wand from Jason
5:17:12	Start mass spec position 72 in mussels
5:19:09	Wand in sediment—took out
5:21:49	Stop mass spec position 72
5:22:30	Placing wand back onto Jason
5:24:11	Switched to pump water through green filter
5:24:58	Removed wand from Jason
5:29:38	Start mass spec position 73
5:45:58	End mass spec position 73
5:46:45	Placing wand back onto Jason
5:48:46	Removed mussel pot B
5:50:06	Mussel pot B collection
6:02:10	Mussel pot B back onto Jason
6:12:10	Mussels collected using Jason manipulator arm; placed in port biobox
6:14:03	Mussels collected using Jason manipulator arm; placed in port biobox
6:15:10	Mussels collected using Jason manipulator arm; placed in port biobox
6:16:26	Mussels collected using Jason manipulator arm; placed in port biobox
6:17:20	Mussels collected using Jason manipulator arm; placed in port biobox
6:18:12	Mussels collected using Jason manipulator arm; placed in port biobox
6:20:36	Closed port biobox
6:21:49	Removing wand from Jason
6:25:30	Start mass spec position 74 in mussel pot scar
6:41:11	End mass spec position 74
6:43:30	Start mass spec position 75, background scan
6:58:16	End mass spec position 75
7:00:17	Reset dvlÆ searching for marker 2/3 for stained tubeworms
7:06:13	At marker 3
7:14:59	Tubeworm grab using manipulator at marker 3 Æ starboard biobox
7:16:28	In biobox
7:18:11	Tubeworm grab using manipulator at marker 3 Æ starboard biobox
7:18:28	In biobox
7:19:16	Tubeworm grab using manipulator at marker 3 Æ starboard biobox
7:19:57	In biobox
7:28:50	Closing stbd biobox
7:30:03	Moving to bacterial mat marker
7:32:52	Grabbing mass spec wand from Jason
7:36:19	Start mass spec position 76, background scan
7:51:31	End mass spec position 76
7:53:23	Putting wand back onto Jason
7:56:55	Push core red 8 taken
7:59:36	Push core red 5 taken
8:04:50	Push core red 3 taken
8:06:35	Removing wand from Jason
8:09:00	Start mass spec position 77 in core red 3 hole

8:24:06 End mass spec position 77
 8:26:08 Push core red 7 taken
 8:28:27 Push core red 4 taken
 8:30:35 Removing wand from Jason
 8:33:23 Start mass spec position 78 in core red 4 hole
 8:47:01 End mass spec position 78

Watch Summary:

At the beginning of watch, we were performing mass spec scans in a mussel bed. We had to change to the green filter b/c the blue filter was placed into sediment. We collected mussels using mussel pot B and the Jason manipulator arm. We also performed a couple of stained tubeworm grabs. Toward the end of watch, we started collecting push cores in a bacterial mat. We performed a couple of mass spec scans within push core holes.

Date: 1 July 2007
 Shift: 0400 – 0730 CDT
 Dive: 282-1
 Site: AC 818

Watch Leader: Suni/Stephanie/Bob Carney
 Name: Eric Hawkins

Time (GMT)	Comments
8:54	Core control – red #2
8:56	Core control – red #1
8:58	Core control – red #6
9:00	Moving core crates off of Jason
9:00	Flipped core crates around and returned to Jason
9:05	Blue short core (#1) for Christine
9:05	Blue #7 core
9:08	Blue #8 core
9:11	Mass Spec start in blue #8 core hole (#79)
9:16	Orange sea star on science camera
9:20	Operational note from Jason crew about core organization when small and large core barrels are both used
9:28	End mass spec #79 *****END SUNI/BEGIN STEPHANIE*****
9:29	Navigation change – moving ~100m north to find urchins for coring
9:31	Purple holothuroid
9:31	Nav reset DVL
9:32	Yellow marker #1 in mussel bed
9:34	Purple holothuroid
9:37	White sea stars
9:40	2 purple holothuroids
9:40	moving 20m east, looking for urchins
9:41	2 purple holothuroids

9:43 Deploy doppler target for urchins
 10:01 Core #2, next to first urchin
 10:04 Picking up first urchin – placed in starboard biobox
 10:06 Blue #3 core in position occupied by first urchin
 10:12 Blue #4 core, next to second urchin
 10:15 Picking up second urchin – placed in starboard biobox
 10:17 Blue #7 core in position occupied by second urchin
 10:27 #6 core for Christine, next to urchin
 10:32 White sea star on science camera
 10:32 Purple holothuroid
 10:40 Bob Carney – slurp collection of purple holothuroid
 10:43 Bob Carney – slurp collection of purple holothuroid
 11:00 Seaweed
 11:04 2 purple holothuroids
 11:15 Purple holothuroid
 11:18 Slurped a mobile, large purple holothuroid
 11:22 2 purple holothuroids
 11:24 Purple holothuroid
 11:25 Purple holothuroid
 11:34 Swimming of a swimming pelagic sea cucumber
 11:35 Good visual of the swimming pelagic sea cucumber
 12:09 Fish

Watch Summary: This watch involved three tasks: The end of mass spec analysis for Suni, the collection of urchins and cores for Stephanie and the collection of holothuroids for Bob Carney.

Date: 7/1/2007
 Shift: 8000-1200 CDT
 Dive: J2-282
 Site: AC818

Watch Leader: Bob Carney
 Name: Michael Cohen

Time (GMT)	Comments
12:53	Looking for Sea Stars
12:58	Sea Star placed in bio box, grab
13:11	Opened bio box
13:12	Sea Star placed in bio box, grab
13:13	Sea Cucumber tries to escape bio box
13:16	More Sea Stars put in bio box
13:17	Sea Star escaped, thrown out of bio box by accident
13:19	Removing weight
13:34	Elevator spotted in cameras

13:38 Bio box opened on elevator
13:42 Cores from sub place in bio box on elevator
13:44 Core fell off of sub, had to be placed back on
13:53 Opened boxes 1&2 on elevator
13:54 Mussel pot B placed in box 1 on elevator
13:56 Mussel pot D, placed in box 2 on elevator
13:59 Boxes 1&2 closed with cords
14:05 Removed weight from elevator, fell into sediment
14:08 Jason lifted elevator up from ocean floor, floated up towards surface
14:22 Slurp – Bat Star
14:24 Jason hose punctured, sediment leaking out
14:35 Port bio box opened
14:37 Sea Cucumber put in port bio box, grab
14:45 Sea Star put in port bio box, grab
14:47 Sea Star put in port bio box, grab
15:07 Sea Cucumber put in starboard bio box, grab
15:18 Sea Cucumber put in starboard bio box, grab
15:24 Sea Cucumber put in starboard bio box, grab
16:18 Located well head

Watch Summary:

This watch was primarily focused on fauna collection. Bob Carney guided the pilots for the majority of the watch, as he was interested in collecting a solid amount of sea stars and sea cucumbers for his research. In addition sub cores were added to the elevator and then the elevator's weight was released in order for it to reach the ocean surface to be put back on the ship.

Date: 7/1/2007
Shift: 11:30 – 16:00
Dive: J2-282
Site: AC 818

Watch Leader: Group Effort
Name: Kim Hunter

Time (GMT) Comments

17:00 Checking on Ian's camera at start of watch then clearing fishing net from stained tubeworm bush and using Mass Spec in tubeworm bush before bushmaster collection.
17:25 Bushmaster collection of stained tubeworms at Marker 4.
17:36 Heading north towards target geol.
17:37 Reset Doppler Nav.
18:05 Jason heading to surface, end of dive.

**Watch Summary: Uneventful shift other than the collection of the stained tubeworm bush.
It was a very nice bushmaster collection – textbook technique.**

Dive Log for J2-283

Date: 7/2/07
Shift: 8000-1200 CDT
Dive: AC601
Site: J2-283

Watch Leader: Bob Carney
Name: Mike Cohen

Time (GMT) Comments

13:17 reset doppler
13:28 heading north in search of brine shoreline
13:31 turned on downward looking camera, shooting every 15 seconds
13:40 radioactive barium sulfate discovered
13:45 shore located
13:47 north shore named
13:57 urchin at brine shoreline
14:01 sea cucumber in downward looking camera
14:02 brine on right, water on left
14:09 shoreline becomes complicated, many indentations
14:10 fish seen in cameras
14:14 large indentation in brine pool
14:20 inside brine cove
14:20 urchin at brine shoreline
14:30 old beach shoreline visible
14:34 fish
14:41 strange oscillation in water in downward looking camera
14:56 circumnavigated brine pool one time
14:56 downward camera turned off
15:11 core number 1, Vladimir
15:13 core number 2, Vladimir
15:14 core number 4, Vladimir
15:16 core number 6, Vladimir
15:19 core number 7, Vladimir
15:22 reset dopler
15:49 core number 3
15:50 core number 5
15:52 core number 8
15:55 cores too large for Jason to spin crate
15:57 removed hindering core, rotated crate and returned
16:02 core number 8 (yellow)
16:05 core number 7 (yellow)
16:08 reset dopler

Watch Summary:

The primary purpose of this dive, and specifically this watch, was to explore a brine pool on the ocean floor. The pilots first circumnavigated the pool before doing anything else. This allowed both the pilots and scientists to have a good understanding about the spatial setting of the pool in order to take samples (specifically core samples) at desired locations.

Date: 07/02/2007
Shift: 1200-1600
Dive: J2-283
Site: AC 601

Watch Leader:
Name: Kim Hunter

Time (GMT)	Comments
17:00	Cores in brine pool are finished
17:16	Small Niskin fired in brine pool
17:27	Big Niskin fired in brine pool
17:30	On way to elevator
18:14	Elevator released from the seafloor with core rack from brine pool and niskins
18:20	Cucumber slurping while waiting for elevator
19:59	Prepare to run photo transects
20:09	Start photo transect line 8
20:16	Stop line 8
20:21	Start photo transect line 9
20:29	Stop line 9
20:49	Start photo transect line 10

Date: 07/02/2007
Shift: 16.00 – 20.00
Dive: J2-283
Site: AC 601

Watch Leader: Ian
Name: Julia (+ Stephanie)

Time (GMT)	Comments
20:54	approaching brine pool
21:02	end of photo transect line 10, transit to line 1
21:02	start of photo transect T1
21:16	end of photo transect T1
21:24	start of photo transect T2
21:42	shore line in sight
21:45	sea urchins with trails at shore
21:46	end of photo transect T2

21:51 over brine pool transit to T3
 21:55 start of photo transect T3
 22:01 end of photo transect T3
 22:04 swimming sea cucumber
 22:18 start of photo transect T4
 22:22 sea cucumber
 22:25 end of photo transect T4
 22:30 lots of urchins, on shore of brine pool
 22:35 start photo transect T5
 22:39 background mass spec starts
 22:44 end of photo transect T5
 22:55 stop mass spec background
 23:01 start photo transect T6
 23:07 approaching brine pool
 23:09 start mass spec
 23:10 end of photo transect T6
 23:14 swimming holothuroid hits Jason basket
 23:21 start of photo transect T7
 23:23 stop of mass spec background
 23:28 end of photo transect T7
 23:36 picking up light for macro cam
 23:46 setting up to do macro documentation of features and fauna along photo transect T9
 23:57 taking macro pix of brine flocculent material in center of brine lake
 00:06 macro pix of brine lake shore
 00:16 sediment on macro cam
 00:34 cleaning camera lens
 00:42 macro pix of sea urchins

Summary: taking many photo transects

Date: 7/2/07
 Shift: 2000-0000 CDT
 Dive: J2-283
 Site: AC 601

Watch Leader: Bob
 Name: Irmi

Time (GMT)	Comments
1:19	sucking a holothuroid
1:47	grabbing a sea cucumber, into wooden biobox
1:49	anemone, big, red
1:55	grabbing anemone, into wooden biobox
2:12	grabbing a sea cucumber
2:16	big fish

2:31 grabbing a sea cucumber, wooden biobox
 2:37 grabbing a sea cucumber, wooden biobox
 2:41 at the shore, many sea urchins
 2:42 red core #4 taken at the shore, for Harry
 2:42 red core #1 taken at the shore, for Harry
 2:49 start mass spec #83, background (#45119)
 3:03 end mass spec #83 (#45147)
 3:08 star mass spec #84 above the white shore
 3:09 stop mass spec
 3:11 restart mass spec #84 (#45168)
 3:25 end mass spec #84 (#45197)
 3:31 start mass spec #85 (#45210)
 3:32 sea cucumber floating in the brine pool (science cam)
 3:46 end mass spec #85 (#45242)
 3:53 start mass spec #86 in the brine pool (#45259)
 4:15 end mass spec #86 (#45303)
 4:16 start mass spec #87 (#45306)
 4:16 transit to the center of brine
 4:36 end of mass spec #87
 4:39 start mass spec #88 (#45355), in the middle of brine pool
 4:54 end of mass spec #88 (#45387)
 Start of mass spec #89
 5:16 end mass spec #89 (#4534)

Watch Summary: sampling sea cucumbers, taking red cores #4 and #1 for Harry, mass spec # 83-#89,

Date: 7/3/2007
 Shift: 0000-4000 CDT
 Dive: J2-283
 Site: AC601

Watch Leader: Ian MacDonald
 Name: Nicole Morris

Time (GMT)	Comments
5:35:14	Getting ready to image transect T9 with macrocamera
5:40:30	Imaging T9 with macrocamera
6:09:16	Red octopus on macrocamera
6:26:46	Still imaging T9 with macrocamera
6:31:37	Placing macrocamera back onto Jason
6:35:18	Slurp collection of musselsÆ picking up slurp
6:38:20	Mussels collected using slurpÆ start
6:40:59	Slurp of mussels end
6:41:38	Slurp back on Jason
6:49:52	Collecting urchin using Jason manipulatorÆ starboard biobox
6:52:36	Removing handheld macrocamera from Jason

6:53:10 Continuing to image T9
 7:23:00 Put macrocamera back onto Jason
 7:23:53 Getting ready to start urchin coring
 7:40:50 Push core red 7 taken in urchin area
 8:00:31 Push core red 6 taken in urchin area near brine pool
 8:01:25 Picking up wand from Jason
 8:09:25 Start mass spec position 90 in push core 6 hole
 8:24:08 End mass spec position 90
 8:25:35 Getting ready to taken another push core
 8:34:37 Push core red 5 in urchin area near brine pool; last core in urchins
 8:40:16 Getting ready to transit to digital target 40 to search for pogos

Watch Summary:

At the beginning of watch, we starting imaging transect T9 with the handheld macrocamera. We collected some mussels using the Jason slurp. Three push cores were taken in an urchin area. At the end of watch, we started transiting to digital target 40.

Date: 3 July 2007
 Shift: 0400-0800 CDT
 Dive: J2-283
 Site: AC 601

Watch Leader: Irm
 Name: Eric Hawkins

Time (GMT)	Comments
	Looking for pogos for Irm
8:45	Nav Reset DVL
9:08	Urchins and trails
9:19	Previous Jason footprint
9:58	Small tubeworm clump
10:01	Trash – pallet?
10:30	Trash – pallet? (again)
10:32	Marked a location with tubeworms and the pallet
10:38	Zig zagging back to brine pool
10:53	Fish lying in burrow on downlooking camera
10:55	Carbonate
10:56	Yellow marker lying on its side – can't see number
11:03	Mussels
11:17	Small white crab
11:30	Swimming red shrimp
11:35	Red Core #2, Pogo for Irm
11:37	Another core – Red #3, Pogo for Irm
11:40	Another core – Red #? (didn't get) – Pogo for Irm

11:44 All cores removed and returned to their respective sheaths
 11:51 Turned core crate around so blue cores are ready
 11:59 Three orange crabs
 12:08 Blue Core #26
 12:09 Numerous amphipods visible inside core
 12:15 Blue Core #29 – straight pogo
 12:24 Nav Reset DVL

Watch Summary: This shift focused on Irmi's attempts and success at locating and sampling Pogos at the AC 601 brine pool.

Date: 7/3/07
 Shift: 8000-1200 CDT
 Dive: AC601
 Site: J2-283

Watch Leader: Bob Carney
 Name: Mike Cohen

Time (GMT)	Comments
12:37	anemones seen in cameras
12:45	fat core number 1, Erin
12:54	fat core number 2, Erin (included sea cucumber)
13:16	Ian's camera
13:18	macro camera images of pogo
13:23	end macro camera images of pogo
13:26	reset dopler
13:43	urchin core near brine boundary (number 7)
13:52	diving into brine, made waves on shoreline
13:55	taking pictures of brine
13:55	immersed in brine pool
14:06	deeply immersed in brine, camouflaged entire core basket
14:19	at the elevator
14:25	jumped over elevator
14:33	control core, number 4, event number 46763
14:36	control core, number 2
14:37	control core, number 3
14:39	control core, number 1
14:41	control core, number 6
14:46	put cores in elevator
14:47	removed net from bio box on elevator
15:03	elevator lifted off ocean floor by Jason
15:07	heading back towards brine pool
15:08	grab net off of sub
15:11	squid seen in cameras
15:30	adjusted Madea camera to zoom in on Jason

15:38	altitude jumped suddenly to 4 meters
15:39	dopler not working correctly
15:45	Jason moves further out from Madea
15:49	PC-W DVD recorder from red deck stopped and finalized
15:50	PC-W DVD recorder from blue deck started
15:54	100 meters above floor
16:02	impressive dive into pool
16:04	water tsunami
16:07	located where elevator was, mussels present
16:09	grabbed net to try and get mussels, none were caught
16:13	elevator reached surface

Watch Summary:

The primary purpose of this watch was to further explore the brine pool. The Jason pilots completely immersed Jason into the brine several times in order to further understand the pool's characteristics. The elevator was also released and floated to the surface, followed by the collection of several control cores.

Date:	7-3-2007
Shift:	1200-1600 CDT
Dive:	J2-283
Site:	AC601

Watch Leader: ?

Name: Michael Kullman

Time (GMT)	Comments
17:10:00	Mussel collections.
17:24:00	Mussel collection failed – making another attempt.
17:29:00	Mussel collection blue net.
17:50:00	Heading south towards possible vent.
19:23:00	Approaching possible vent.
19:40:00	Entering north side of vent area.
19:50:00	Vent area appears to be an old brine pool, many urchins and mussels noted along 'shoreline' on north side.
20:01:00	Extremely large mussel bed seen along north / northwest side of 'shoreline'.
20:14:00	After transiting south around the west side of 'shoreline' made a short excursion over the brine lake interior. Presence of barite 'flocks' noted.
20:16:00	Continuing south along west side of 'shoreline'.
20:17:00	Jason ran into the bottom, cleaning mud from working end.
20:32:00	Cleaning finished, continuing transit around 'shoreline'.
20:37:00	Mussel distribution noticeably less dense towards southern end of 'shoreline', urchins and mussel shells noted.
20:55:00	Mussel density now down to solitary mussels.

Watch Summary:

After making a final mussel collection at the primary dive site (northern brine lake) Jason went into tow-mode and made an approximately 2.6km transit to investigate a large high amplitude anomaly in southern AC601. Upon arrival the area appeared to possibly be an old brine lake. Jason began to make a transit around the apparent 'shoreline' of the lake, starting at the north and heading south along the western edge. A very large mussel bed was observed along the northwest 'shoreline' of the lake. Mussel density decreased as Jason continued it's transit south along the 'shoreline'. Some barite 'flocks' were observed when Jason moved out into the lake.

Date: 07/03
 Shift: 16.00 – 20.00 CDT
 Dive: J2-283
 Site: AC 601

Watch Leader: Ian, Erik
 Name: Julia (+ Stephanie)

Time (GMT)	Comments
21:07	brow cam video much better
21:09	urchins trails very long, well defined
21:11	dark stained sediment t, target dropped (dead shells = black fluff)
21:18	rattail fish (sci cam)
21:29	thick black river of brine with urchins
21:39	mussels in brine pool
21:47	attempt to take coolpix of mussels, sediment cloud
21:58	Jason stopped, changing pilot (dinner relief)
22:00	mussel clusters along brine edge, swimming holothuroid
22:02	holothuroids on mussels (macro), many shrimps, pix taken
22:08	numerous pink (with white dots) holothuroids in mussel bed photos taken with coolpix
22:12	moving towards elevator site (where it is supposed to land), Doppler reset
22:16	traveling over large mussel bed
22:39	elevator in water
23:40	elevator in sight
23:41	dropping weights
23:48	picking up elevator, sunk in the mud
00:23	arrived at mussel "manhattan", very large mussel bed
00:31	dropped elevator
00:34	over very dense mussel aggregations
00:40	dropping weight onto the elevator

Summary: very cool huge brine lake, with many many mussels on shore line, taking pictures (cool pix)

Date: 7/3/07

Shift: 2000-0000 CDT
Dive: J2-283
Site: AC 601

Watch Leader: Eric, Kim
Name: Irmi

Time (GMT)	Comments
0:56	picking up a mussel pot, from elevator to jason
0:59	picking up second mussel pot, from elevator to jason
1:02	picking up a weight
1:03	moving away from elevator
1:04	taking mussel pot D
1:11	dropping a marker at the mussels (1)
1:12	picking up the ring, back to elevator
1:27	reset
1:27	moving to smaller mussels, down looking cam: sea urchins trails and mussels
1:33	at the mussels
1:37	taking mussel pot B
1:44	picking up the ring
1:44	dropping marker 2
1:50	at the elevator
1:51	picking up mussel pot B, on elevator
1:54	picking up a weight
2:02	core rack from elevator to jason
2:15	niskin from elevator to Jason
2:36	searching for an area for push cores and niskins
2:59	moving along the shore
3:02	many red mats
3:09	yellow core 7; sampling red mud, mud is falling out of core
3:18	yellow core 4; sampling red mud; core will be retaken
3:21	taking yellow core 4 a second time
3:23	taking yellow core 4 a third time
3:36	niskin, from red mud
3:46	moving along a crack
3:53	tubes of worms sticking out of black field
3:57	yellow core 3; sampling black mud and tubes
3:58	yellow core 6; sampling black mud and tubes
3:59	yellow core 9; sampling black mud and tubes
4:01	yellow core 5; sampling black mud and tubes
4:02	going back to the mussels along the edge
4:06	big snails, shells, pogos, clams
4:12	niskin, from brine pool
4:25	firing the niskin (#48334)

Watch Summary: mussel pot D, B; taking yellow cores 7, 4, 3, 6, 9, 5, firing two niskins

Date: 7/4/2007
Shift: 0000-4000 CDT
Dive: J2-283
Site: AC601

Watch Leader: Kim Hunter, Bob Carney
Name: Nicole Morris

Time (GMT)	Comments
4:39:25	Took push core yellow 8 in brine
4:41:07	Taking push core yellow 2 in brine
4:41:25	Core is too short; shaking out
4:42:23	Taking push core yellow 2 again in brine
4:43:17	There is too much sediment in the core; shaking out
4:46:41	Taking push core yellow 2 again in brine
4:49:10	Taking push core yellow 1 in brine
4:58:47	Clam shells
5:02:26	Mussel net collection of clams
5:12:15	Clam collection using mussel net
5:13:57	Snail collection using mussel net
5:14:56	Moving to mussel bed Æ moving to elevator
5:42:05	At mussels Æ moving to Marker 1
5:45:55	Snail collection with mussel net
5:53:05	Placed core rack/mussel net onto elevator
6:00:24	At marker 1
6:00:59	Removing wand from Jason
6:02:03	Start mass spec position 91, background scan
6:17:35	Placing wand into mussel pot scar
6:17:50	End mass spec position 91
6:20:32	Start mass spec position 92 in mussel pot scar
6:34:52	Moved wand into mussels
6:35:04	End mass spec position 92
6:37:01	Start mass spec position 93 in btwn mussels
6:52:14	End mass spec position 93
6:52:30	Placed wand back onto Jason
6:53:52	Sampling mussels using manipulator
6:57:12	Stopped mussel collection
7:02:57	Searching for brine to perform mass spec scan
7:28:18	Start mass spec position 94 or 95 in brine pool
7:45:24	End mass spec position 94 or 95
7:45:43	Moving to elevator to release
7:50:56	At elevator
7:54:18	Placing Niskin on elevator
8:04:29	Using manipulator to lift elevator from seafloor
8:04:48	Elevator released from seafloor

8:05:50 Releasing Jason weights
8:08:20 Mass spec scanning while ascending
8:08:21 Jason off bottom

Dive Log for J2-284

Date: 07/04
Shift: 16.00 – 20.00 CDT
Dive: J2-284
Site: AC 818

Watch Leader: Bob
Name: Julia (+ Stephanie)

Time (GMT)	Comments
21:40	Jason descending, at 864m depth
22:10	pass 2000m
22:31	doppler reset, still descending
23:11	Ian's camera in sight, no water inside (comment Ian)
23:17	giving Ian's camera a shake, worked -> camera released
23:23	Ian's camera surrounded by white shells and urchins
23:27	picking up sea star #1, put in wooden starboard biobox
23:34	2 holothuroids, anemone and mussels (Best of)
23:36	2 nd starfish into starboard biobox
23:46	picked up 3 rd sea star, also starboard biobox
23:50	sea star #4
23:51	sea star #5
23:57	closing biobox
00:04	rattail
00:10	big purple holothuroid
00:12	pelagic sea cucumber feeding on the ground (Best of) very cool
00:14	grab of sea cucumber
00:16	sea star escapes from starboard biobox
00:19	in sight of marker #3
00:22	Ian's camera on surface, Jason into tow mode

Date: 4 July 2007
Shift: 2000-0000 CDT
Dive: J2-284
Site: AC 818

Watch Leader: Bob, Erik
Name: Irmi

Time (GMT)	Comments
1:14	moving to photo mosaic (Stephanie)
1:17	pogos + clams, dropping a target ("pogos + clams")
1:21	grabbing a sea cucumber; wooden biobox

1:23 bacterial mats
 1:27 grabbing a sea star; wooden biobox
 1:28 pogos, large field
 1:37 fish
 1:41 pogo patches
 1:43 marker #4 in sight
 2:11 start of line #1
 2:12 moving back to beginning of line #1
 2:16 restart of line #1
 2:28 pelagic sea cucumber floating
 2:40 end of line #2
 2:41 start of line #3
 2:51 end of line #3
 2:53 start of line #4
 3:03 end of line #4 and of mosaic
 3:05 at marker #1
 3:08 close up of tubeworms + anemone
 3:09 grabbing stained tubeworms; wooden biobox
 3:13 second grab of tubeworms; wooden biobox
 3:15 third grab of tubeworms; wooden biobox
 3:16 fourth grab of tubeworms; wooden biobox
 3:49 grabbing a sea cucumber; port biobox
 4:00 grabbing a sea cucumber; port biobox
 4:07 large field of pogos and some clams
 4:10 at the urchin field
 4:13 core yellow #3: next to an urchin (#49564)
 4:15 grabbing the urchin; port biobox
 4:17 core yellow #2; where urchin has been before (#49572)
 4:22 core yellow #6; beside an urchin (#49484)
 4:24 grabbing the urchin; port biobox
 4:27 core yellow #8; beside an urchin
 4:32 core yellow #5; really disturbed area (#49612)
 4:34 grabbing the urchin; squashed
 4:36 core yellow #7; place where urchin has been before (#49618)
 4:48 core yellow #1, urchin filed

Summary: making photo mosaic (Stephanie), grabbing sea cucumbers, grabbing tubeworms, taking cores in urchin filed (Stephanie)

Date: 5 July 2007
 Shift: 0000-4000 CDT
 Dive: J2-284
 Site: AC 818

Watch Leader: Bob Carney

Name: Nicole Morris

Time (GMT)	Comments
5:04:08	Core yellow1 taken beside urchin
5:05:58	Urchin collected- port biobox
5:12:02	Core yellow 4 taken under urchin that was collected
5:21:45	At Marker 1
5:25:19	Start mass spec position 96
5:40:12	End mass spec position 96
5:43:20	Start mass spec position 97 in mussels
5:58:16	End mass spec position 97
5:58:17	Moved to another area of mussels within same bed
5:59:39	Start mass spec position 98
6:12:57	Moving wand further btwn mussels in musselbed
6:14:43	End mass spec position 98
6:16:19	Start mass spec position 99
6:31:20	End mass spec position 99
6:34:09	Start mass spec position 100 in tubeworms near base
6:49:17	End mass spec position 100
6:50:20	Start mass spec position 101 in tubeworms
7:03:50	Moving to Marker 4
7:06:11	End mass spec position 101
7:07:48	At Marker 4
7:18:53	Firing Niskins over marker 4 mussel bed
7:29:34	Start mass spec position 102 in white mussels (marker 4)
7:44:06	End mass spec position 102
7:55:01	Mussel pot D collected
8:20:01	Mussel pot B collected

Watch Summary:

At the beginning of watch, we were finishing urchin cores. We then started performing mass spec scans in a mussel bed and tubeworm patch. Both Niskins were fired over Marker 4. Mussel pot B and D were also both taken near Marker 4 mussel bed.

Date: 5 July 2007
Shift: 0400-0800 CDT
Dive: J2-284
Site: AC 818

Watch Leader: Erik Cordes
Name: Eric Hawkins

Time (GMT)	Comments
8:48	Heading north to look for clams

8:49 Nav Reset DVL
9:01 Previous Jason footprint visible
9:07 Located large patch of shells and hash
9:19 Moving forward, scanning for live clams
9:24 Identified better clam target
9:33 Used mesh bag to scoop shells and hash
9:37 Second scoop with mesh bag
9:46 Moving to new location
10:11 Begin using macro camera to ID shrimp on tubeworms
10:26 End macro camera
10:30 Begin slurping – first shrimp and tubeworms
10:47 Continue slurping – moving onto holothuroids
10:49 Nav Reset DVL
11:13 Nav Reset DVL
11:26 Mass Spec started for water column samples as dive ends
11:27 Begin final ascent to surface to end Dive 284

Watch Summary: This shift involved Erik sampling clams with the mesh bag and continued holothuroid (and other mobile fauna) slurping as Dive 284 came to a close.

APPENDIX 7. GORGONIAN SITES

Chemo III Deep Slope Cruise 2007 ROV Jason II

Jun-07

Chief Sci. Chuck Fisher

Cruise ID: rb-07-04

R/V Ron Brown

Jason II ROV

Coral
Samples
(DNA and
voucher)-
Erik
Cordes

Station Data
compiled by
Cheryl
Morrison from
cruise report

virtual van: precise data and
more pictures, use event log #'s
to find collections

(<http://4dgeo.who.edu/jason/>)

Date	Site*	Jason Dive #	Lat.	Long.	Time	Depth (m)	Indiv. ID	Species or Type	Event log #	Cairns ID
12-Jun-07	MC462	JII-271	28 29.502356 N	88 52.725634 W	9:04:00	954	1	Madrepora	8895	Madrepora oculata
12-Jun-07	MC462	JII-271	28 29.502427 N	89 52.725582 W	9:10	954	2	Purple gorgonian	8910	paramuriceid
12-Jun-07	MC462	JII-271	28 29.503172 N	88 52.728304 W	9:23	954	3	Yellow octocoral	8940	Acanthogorgia armata
12-Jun-07	MC462	JII-271	28 29.503042 N	88 52.728323 W	9:25	954	4	Caryophyllia sp.	8945	Caryophyllia
14-Jun-07	GC852	JII-273	27 7.202052N	91 9.867040W	2:56	1422	5	Bamboo coral	11044	Keratoisis sp.
14-Jun-07	GC852	JII-273	27 7.197767N	91 9.875455W	3:24	1422	6	Iridogorgia- 'black coral' on tag	11063	Iridogorgia pourtalesii
14-Jun-07	GC852	JII-273	27 7.202052N	91 9.867856	2:52:00	1422	7	red gorgonian	11038	paramuriceid
17-Jun-07	GB697	JII-274	27 18.752971N	92 6.388914W	15:17	1003	8	winter coral'	16706	Crysogorgia fewkesii
23-Jun-07	GC852	JII-278	27 6.611598N	91 9.966750W	9:24	1397	9	Corallium sp.	29339	Corallium medea
23-Jun-07	GC852	JII-278	27 6.610908N	91 9.964440W	10:04	1396	10	Solenosmilia- 'Lophelia' on tag	29424	Solenosmilia variabilis
23-Jun-07	GC852	JII-278	27 6.610956N	91 9.964356W	10:02	1396	11	Madrepora	29417	Madrepora oculata
24-Jun-07	GC852	JII-278	27 6.611418N	91 9.963684W	10:15	1396	12	Madrepora	29447	Madrepora oculata
26-Jun-07	GB647	JII-280	27 20.030928N	92 25.792140W	10:52	942	13	Pink gorgonian from asphalt	34290	Villogorgia sp.
26-Jun-07	GB647	JII-280	27 19.991550N	92 25.658232W	22:15	959	14	Purple gorgonian from carbonate	35800	Placogorgia sp.

*Site names refer to MMS lease block areas in the Gulf of Mexico

MC=Mississippi Canyon

GC=Green Canyon

GB=Garden Banks

Lat/Long, Time, Depth correspond to Virtual Van numbers.

Dive # 271
MC-462
6/12/2007
954 m
9:04

Madrepora J2-271-01

9:04
Browcam Event 8895



Sci-cam Event 8895



9:10
purple gorgo'
soft coral'

J2-271-02
Event 8910

Browcam



Event 8913

Browcam



Event 8902

Sci-cam



Event 8913

Pilot cam



Event 8903

Pilot-cam



Event 8914

Browcam



Event 8903

Browcam



Event 8916

Sci cam



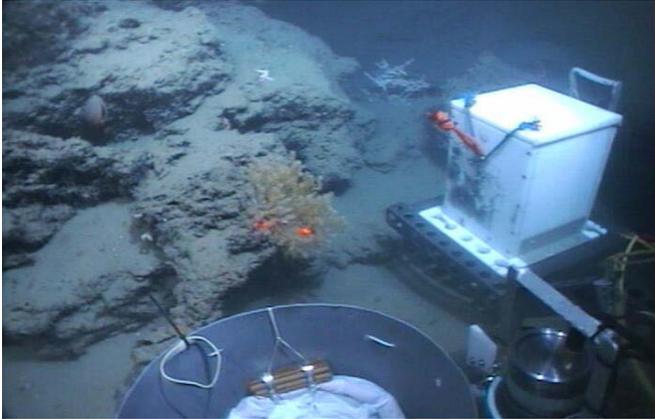
Event 8919

pilot cam



9:22
yellow octo'
Event 8939

J2-271-03
browcam



Event 8939

SciCam



9:25
collected on carbonate, in bushmaster bin
Caryophylla'
Event 8945

J2-271-04
SciCam



Event 8946

SciCam



Event 8940

SciCam



Event 8947

BrowCam



Event 8950

SciCam

Event 8942

BrowCam



Event 8944

PilotCam



Event 8951

BrowCam



J2-273

J2-273, GC852, 14-Jun-07

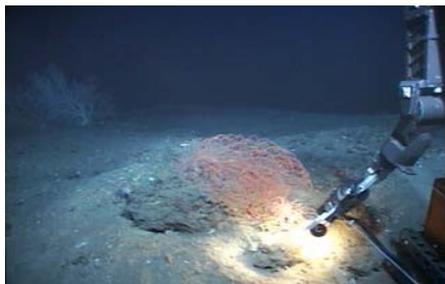
J2-273-05, bamboo coral



CruiseID : rb-07-04 11040
 Image : BrowCam.20070614_025645.jpg
 Time : 2007/06/14 02:56:45
 Latitude : 27.12003579
 Longitude : -91.16445016
 Heading : 90.93
 Depth : 1421.83
 Altitude : 0.76
 SciCam



Iridogorgia J2-273-06



CruiseID : rb-07-04 11063
 Image : PilotCam.20070614_031802.jpg
 Time : 2007/06/14 03:18:02
 Latitude : 27.11998905
 Longitude : -91.16445178
 Heading : 105.62
 Depth : 1422.07
 Altitude : 196.69



SciCam.20070614_032444.jpg

Red gorgo J2-273-07



CruiseID : rb-07-04 11037
 Image : PilotCam.20070614_025045.jpg
 Time : 2007/06/14 02:50:45
 Latitude : 27.12000109
 Longitude : -91.16444353
 Heading : 93.00
 Depth : 1421.72
 Altitude : 0.74



PilotCam.20070614_025213.jpg

11038



SciCam.20070614_025213.jpg

11038



: PilotCam.20070614_030300.jpg



PilotCam.20070614_025545.jpg

11043

J2-274

Dive J2-274

GB697

6/16/2007

15:10

depth 1003 m

winter coral'
Event 16706

J2-274-08
BrowCam



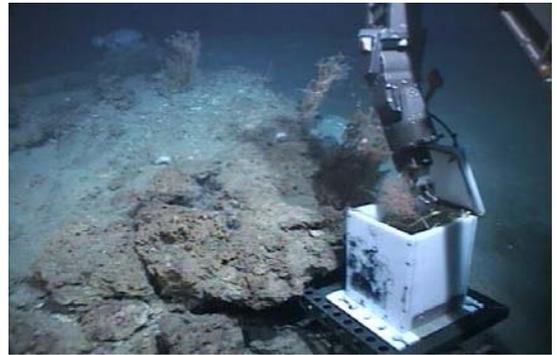
Event 16706

SciCam



Event 16706

PilotCam



Event 16707

Pilotcam



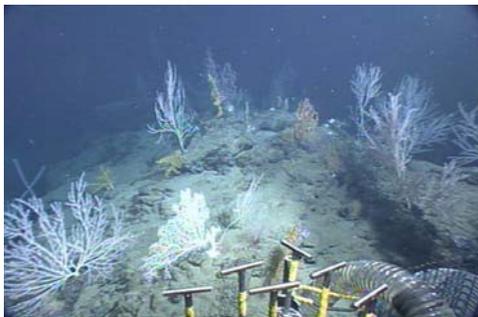
Event 16707

SciCam

J2-278

J2-278 GC-852 ##### approx. 1410 m

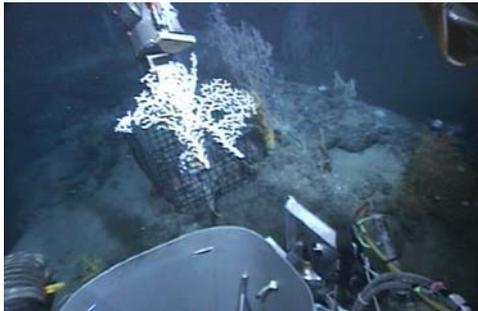
Corallium sp. J2-278-09
Event 29329 SciCam preparing to make hard coral collection
1399 m 9:19



Event 29329 BrowCam



Event 29339 PilotCam 9:24



Event 29340 BrowCam



Solenosmilia (= 'Lophelia') J2-278-10 1398 m

Event 29405 BrowCam 9:56



Location marked 'Lophelia'

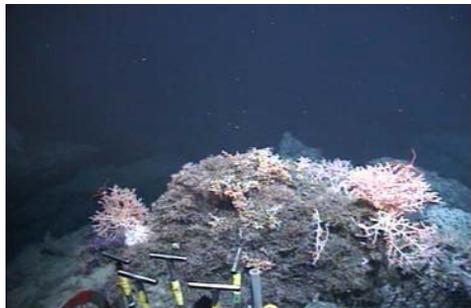
Event 29405 SciCam



Event 29406 SciCam 9:57



Event 29407 PilotCam 9:57



Event 29341 PilotCam 9:25



Event 29407 SciCam



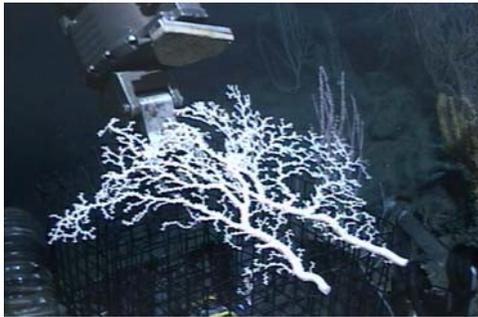
Event 29343 SciCam 9:26



Event 29424 PilotCam 10:04



Event 29344 PilotCam 9:26



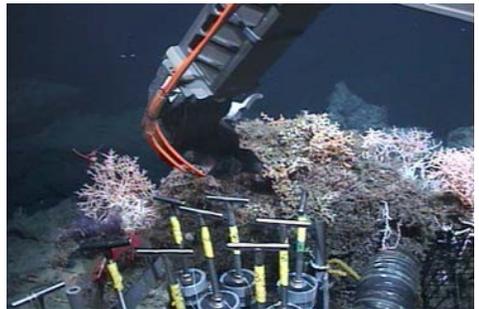
Event 29424



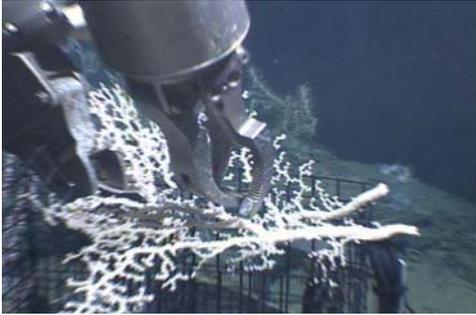
29346 SciCam 9:27



Event 29426 BrowCam 10:05



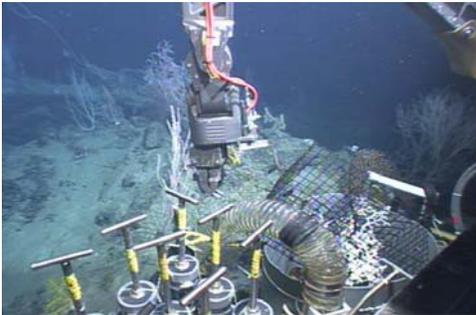
Event 29349 SciCam 9:28



Event 29426 BrowCam 10:05



Event 29357 SciCam 9:32



Scientists note this basket not good size for sample.

Event 29435 PilotCam 10:09



Event 29362 PilotCam 9:34



One more piece of same coral that ROV knocked over.

Event 29376 PilotCam 9:43



Event 29384 PilotCam 9:46

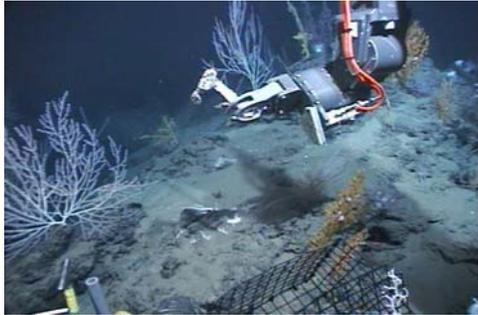


Retrieve base

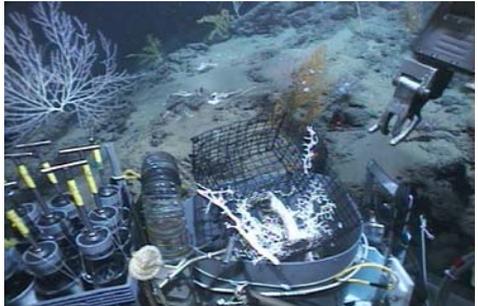
Event 29386 SciCam 9:47



Event 29387 PilotCam 9:48



Event 29389 PilotCam 9:48



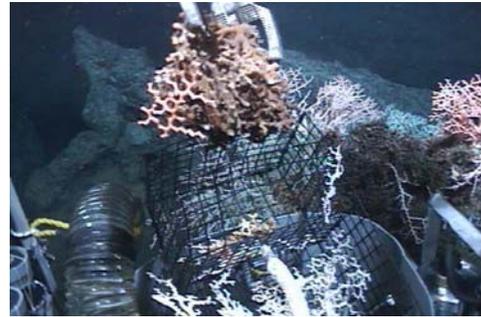
Madrepora J2-278-11 1397 m

Event 29414 PilotCam 10:00

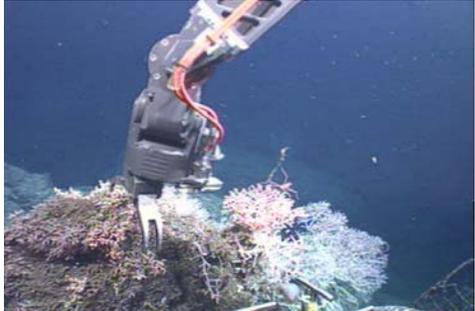


Madrepora J2-278-12 1398 m

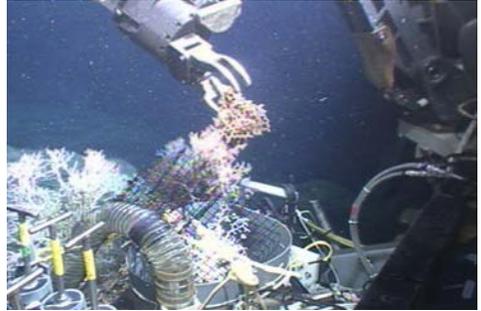
Event 29447 PilotCam 10:15



Event 29415 SciCam 10:01



Event 29447 SciCam



Event 29416 BrowCam 10:01



Event 29448 PilotCam 10:15



Event 29417 SciCam 10:02

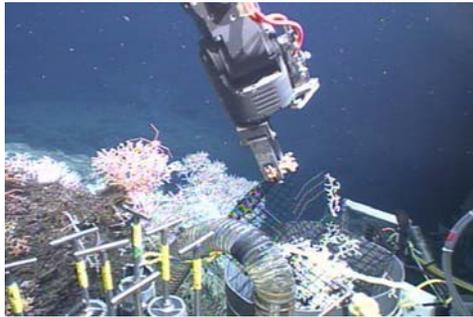


Event 29450 PilotCam 10:16

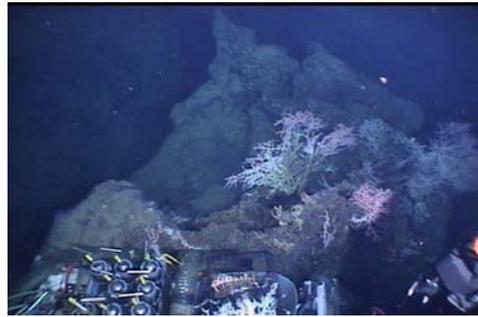


Note- sample appears to be in wire basket on 'picnic basket'

Event 29418 SciCam 10:02



Event 29450 BrowCam



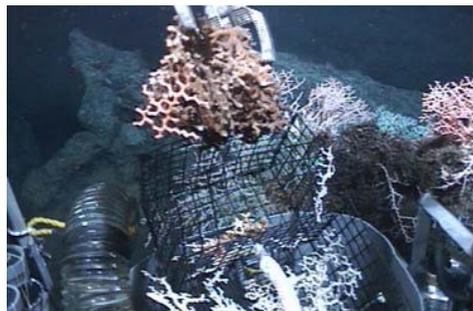
Event 29419 Pilotcam 10:02



Event 29420 PilotCam 10:03



Small piece of Madrepora? In 'picnic basket' with Corallium sp.
They note 'not sure it is alive, will try to get more'



J2-280 GB647 26-Jun-07

Pink gorgonian from asphalt 941 m **J2-280-13**
Event 34290 SciCam 10:52



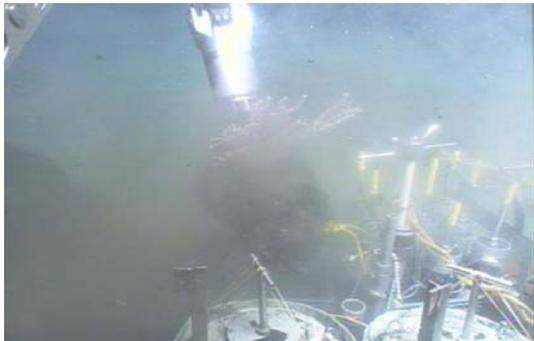
Event 34295 SciCam 10:54



Event 34296 SciCam 10:56



Event 34298 SciCam 11:03



Purple gorgonian from carbonate **J2-280-14**
Event 35789 SciCam 959 m 22:10



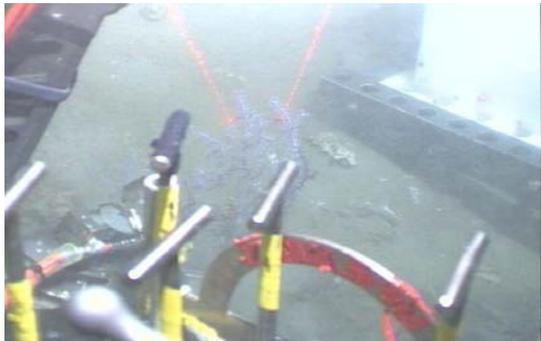
Event 35790 PilotCam 22:10



Event 35792 PilotCam 22:11



Event 35795 SciCam 22:13



Event 35798

SciCam

22:14



Event 35800

PilotCam

22:15



APPENDIX 8. SEEP CARBONATES

APPENDIX 8-A

Hydrocarbon Seep-related Rocks from the Deep Gulf of Mexico

Hydrocarbon Seep-related Rocks from the Deep Gulf of Mexico

AT 340

Photos of rocks before slabbing



AT 15-3 Alvin Dive 4173



4173 Carbonate from mussel grab



4173 R1 Carbonate



4173 R1 Bottom



4173 Carbonate from tubeworm aggregation



4179



4180



4180-1



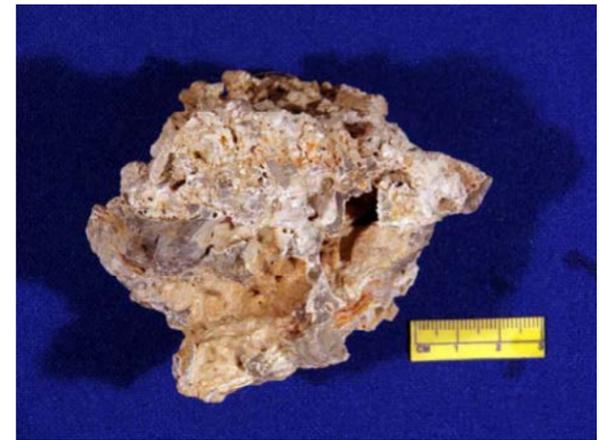
4181 Carbonate from mussel scoop #2



4183 Carbonate from bushmaster



4183 Rock from baby tubeworms



Port Biobox Tubeworm environment (43)



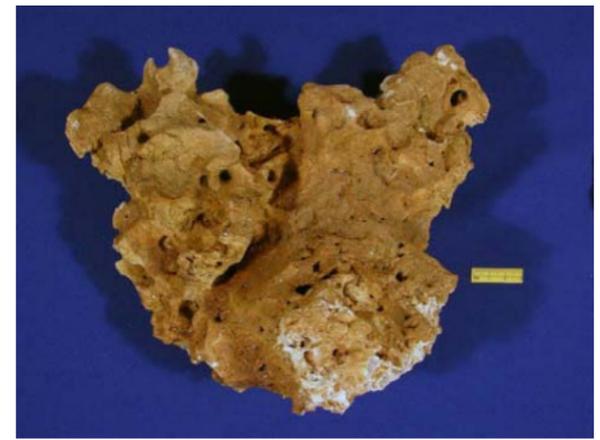
270 Large mussel bed carbonate (44)



270 Carbonate below stained tubeworms (47)



270 Port Biobox Tubeworm environment (52)



270 Grant mussel bed (57)



270 Urchin Bed Calibration Crater (53)



276 Rock #1 (25)



277 #4



277 (12)



277 Brine flow rock (10)

Photos of slabs of rocks



AT 15-3 Alvin Dive 4173



4179



4180



4180-1



Port Biobox Tubeworm environment (43)



270 Port Biobox Tubeworm environment (52)



270 Grant mussel bed (57)



270 Urchin Bed Calibration Crater (53)



276 Rock #1 (25)

GC 415

Photos of rocks before slabbing



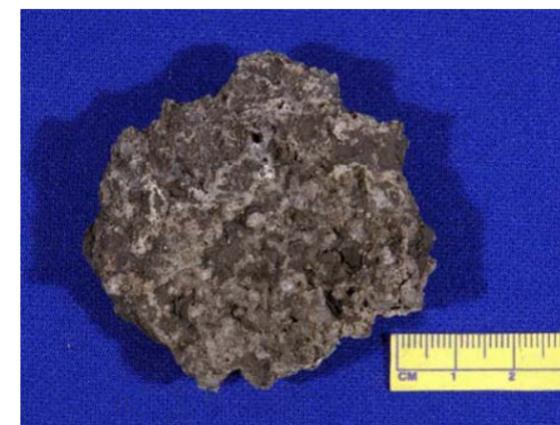
272 Top Mound



272 Crust above hydrate Geo Target 9 (41)



272 Crust brine area, over hydrate (31)



Carbonate crust in cone Y5 (32)

Photos of slabs of rocks



272 Top Mound



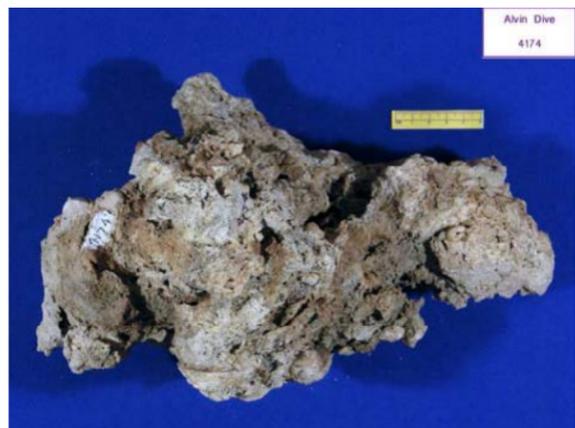
272 Crust brine area, over hydrate (31)



Carbonate crust in cone Y5 (32)

GC 600

Photos of rocks before slabbing



4174



4174-1



4174-2



4184



4184 Clam Site #2



4184 Clam Site #2-1



4184 Rock from clam scoop

Photos of slabs of rocks



4174



4174-1



4174-2



4184



4184 Clam Site #2

GC 852

Photos of rocks before slabbing



4177 Carbonate from mussel scoop



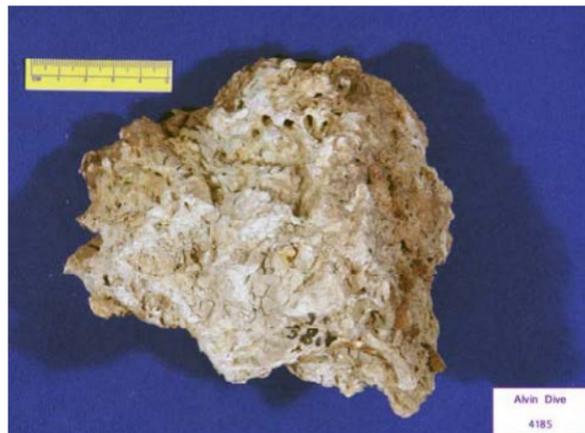
4177



4185 Anemone Site



4185



4185-1



4186 Rocks from Bushmaster



4186 Tubeworm



4187 Carbonate from mussel pot



4187



273 Mussel Scoop Blue (55)



273 Rock sample Geo Target #2 Top Mound (soft coral site) (54)



273 Rock sample western slope anomaly (56)



273 Blue Net Mussel Scoop (45)



273 Stbd Biobox Tubeworm Grab (51)



273 Port biobox Tubeworm/Mussel area (37)



273 Mussel Scoop Blue (48)



273 Carbonate rock from white mussel scoop (46)



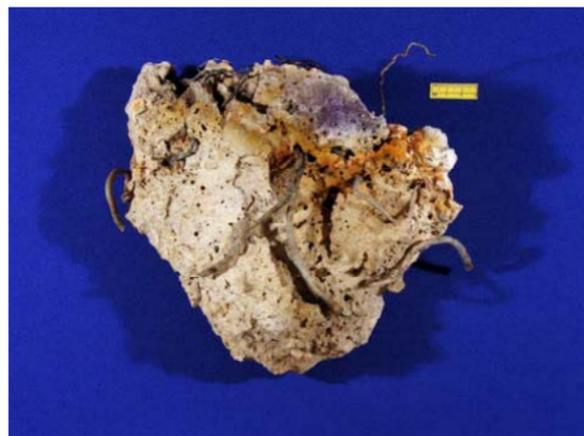
273 Rock with sponge close to mussels (50)



273 Sponge Area (36)



273 Tubeworm area



273 Tubeworm area (2)



278 bm

Photos of slabs of rocks



4177



4185 Anemone Site



4185



4185-1



4186 Tubeworm



4187



273 Mussel Scoop Blue (55)



273 Rock sample Geo Target #2 Top Mound (soft coral site) (54)



273 Rock sample western slope anomaly (56)



273 Stbd Biobox Tubeworm Grab (51)



273 Carbonate rock from white mussel scoop (46)



273 Rock with sponge close to mussels (50)



273 Sponge Area (36)



273 Tubeworm area



273 Tubeworm area (2)



278 bm

MC 462

Photos of rocks before slabbing

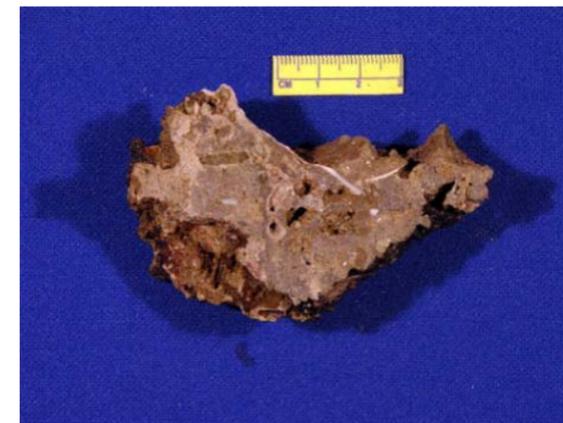


271 Anemone Rock-Grab (49)



271 (Chuck Collected) Rk W/shells Dating (56)

Photos of slabs of rocks



271 Anemone Rock-Grab (49)



271 (Chuck Collected) Rk W/shells Dating (56)

MC 640

Photos of rocks before slabbing



4182



4182 Aft biobox Mussel Scoop



4182

Photos of slabs of rocks



4182 Aft biobox Mussel Scoop

MC 853

Photos of rocks before slabbing



4178



4178-1



4178

Photos of slabs of rocks

KC 243

Photos of rocks before slabbing



4176 Mussel Scoop Sample



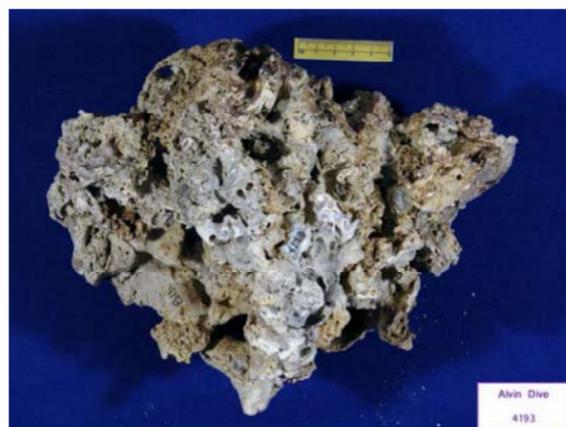
4176 Carbonate



4176 Carbonate/Black powder

AC 601

Photos of rocks before slabbing



4193



4193 Milk Gate



4196



4196-1



4196 Bushmaster



4196 Slurp Sample

Photos of slabs of rocks



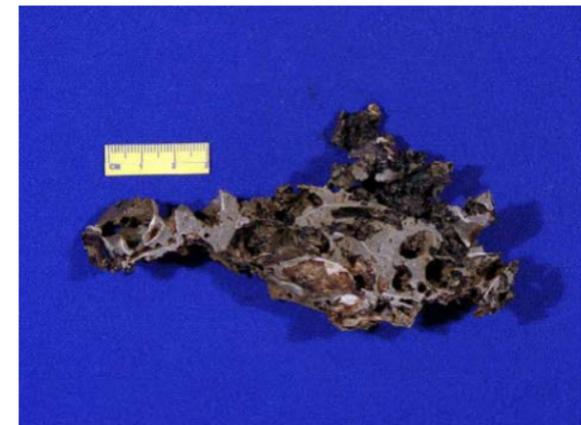
4193



4193 Milk Gate



4196



4196-1



4196 Bushmaster

AC 645

Photos of rocks before slabbing



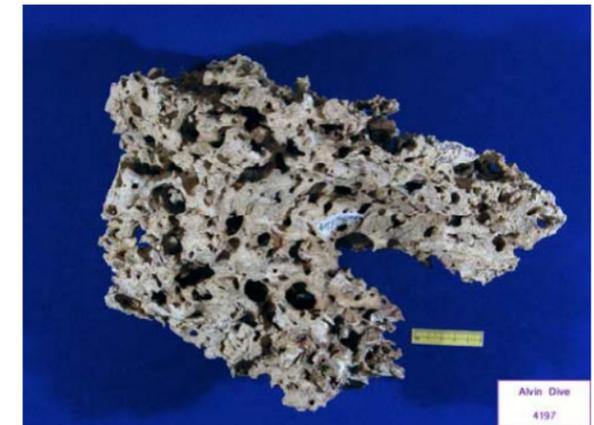
4194 Top



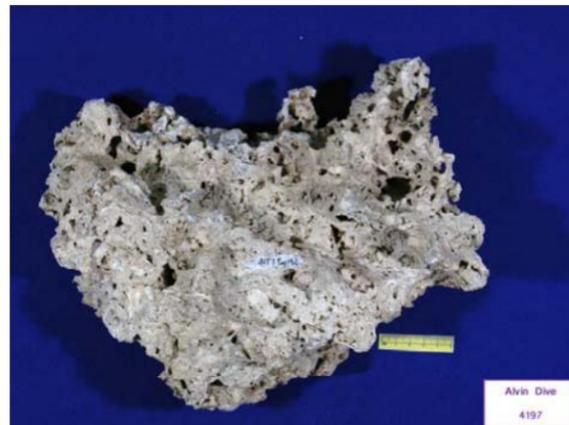
4194 Bottom



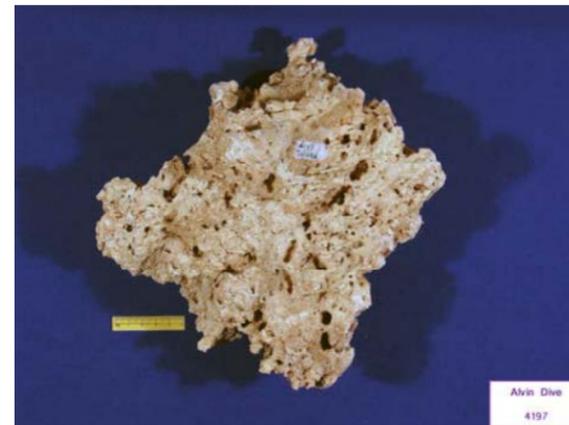
4197 Top Mound



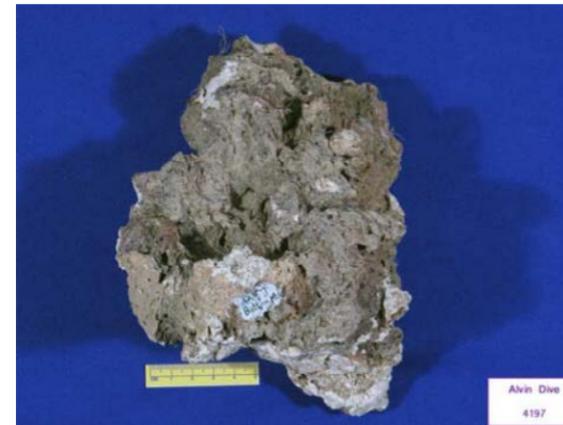
4197 Top Mound-1



4197 Top Mound-2



4197 Top Mound-3



4197 Bottom Mound



281 Ubauance site (23)

Photos of slabs of rocks



4194 Top



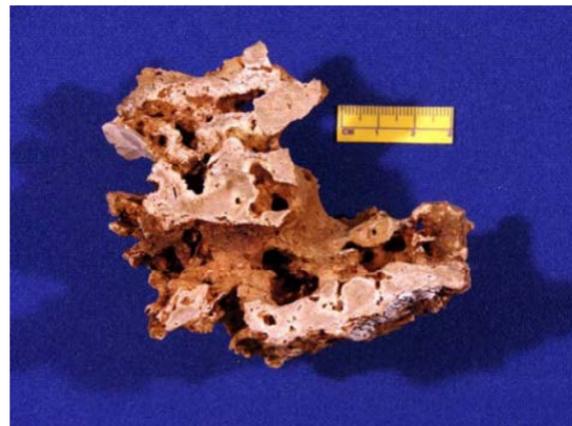
4194 Bottom



4197 Top Mound



4197 Top Mound-1



4197 Top Mound-2



4197 Top Mound-3



4197 Bottom Mound



281 Ubauance site (23)

AC 818

Photos of rocks before slabbing



4192 Carbonate from mussel pot



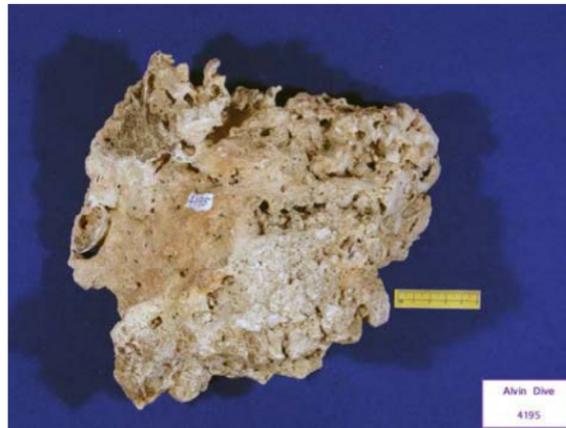
4192 Biobox



4195 Carbonate from Bushmaster



4195 Mussel Scoop



4195



4195-1



282 Mussel Pot B



282 tw grab



282 Mussel Pot D

Photos of slabs of rocks



4192 Biobox



4195



282 tw grab



282 Mussel Pot D

GB 647

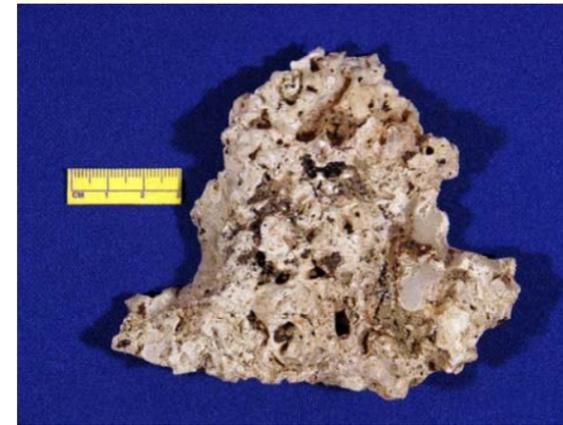
Photos of rocks before slabbing



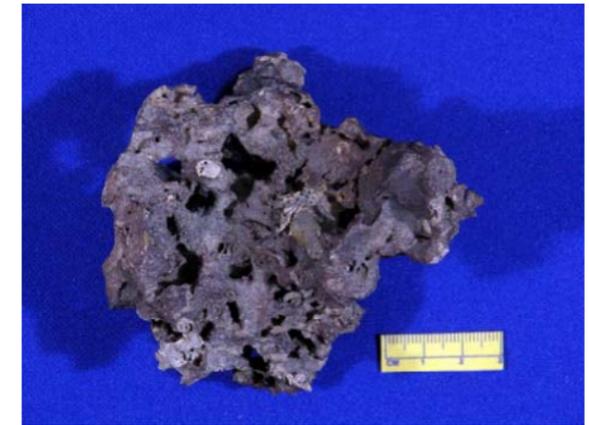
280 Carbonate (19)



280 Carbonate rubble field (17)



280 Port Biobox



280 GB647 STBD Biobox



280 Port Biobox (28)



280 Carbon. of bruhiopod site stbd biobox (18)



280 Port Biobox (29)

Photos of slabs of rocks



280 Carbonate (19)



280 Carbonate rubble field (17)



280 Port Biobox



280 GB647 STBD Biobox



280 Carbon. of brachiopod site stbd biobox (18)



280 Port Biobox (29)

GB 697

Photos of rocks before slabbing



274 Stbd (11)



274-01 Port



274 Between Geo Target 3-4 Barite (3)

Photos of slabs of rocks



274 Stbd (11)



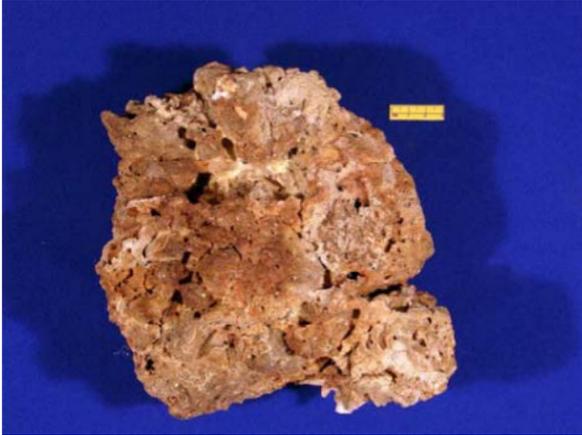
274-01 Port



274 Between Geo Target 3-4 Barite (3)

GB 829

Photos of rocks before slabbing



279 Rock # 2

Photos of slabs of rocks



279 Rock # 2

WR 269

Photos of rocks before slabbing



4191

Photos of slabs of rocks

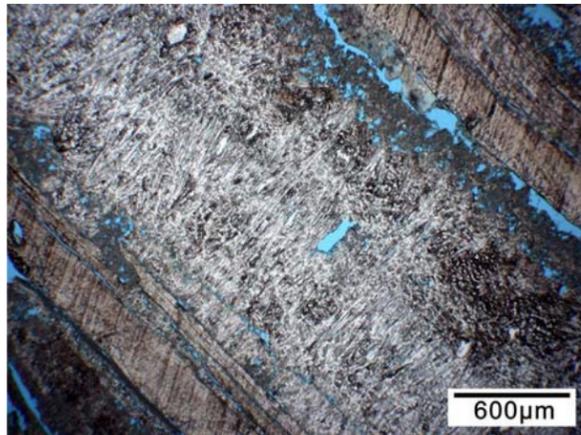


4191

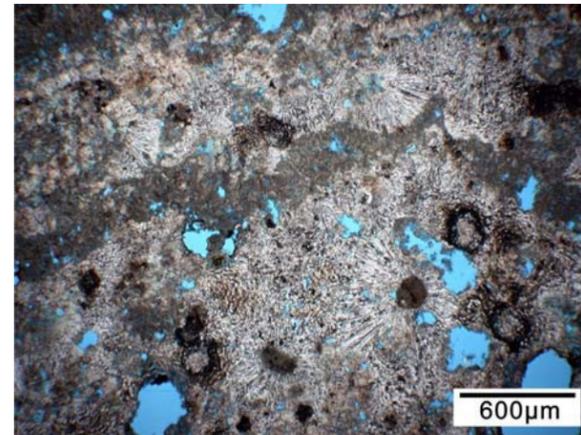
APPENDIX 8-B
Thin Sections

Thin Sections

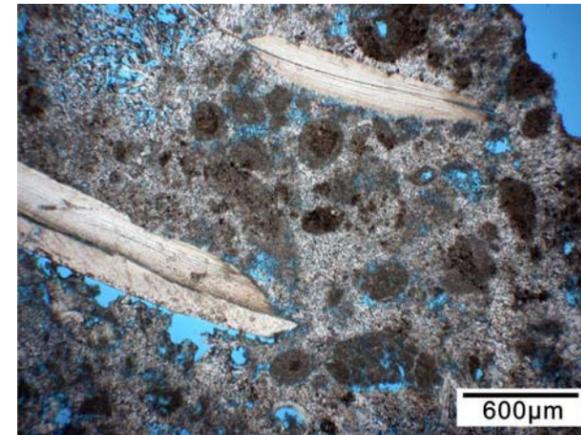
AT 340



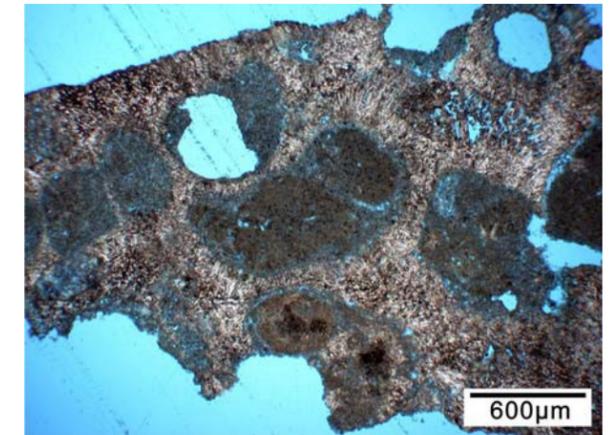
4180



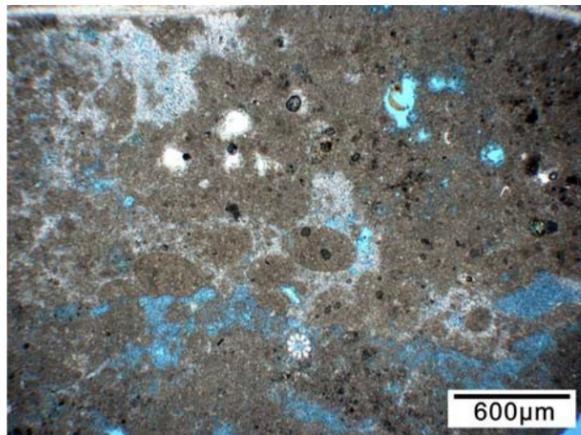
4180



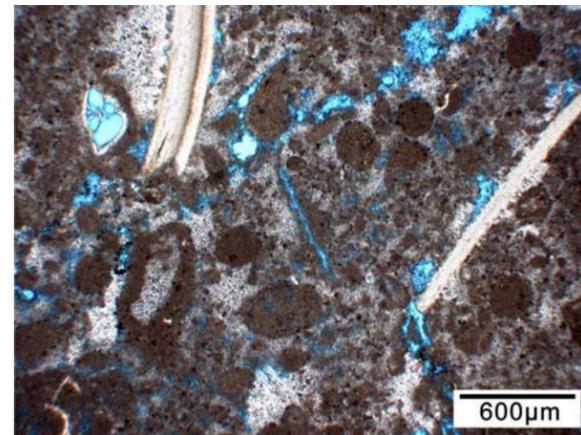
4180



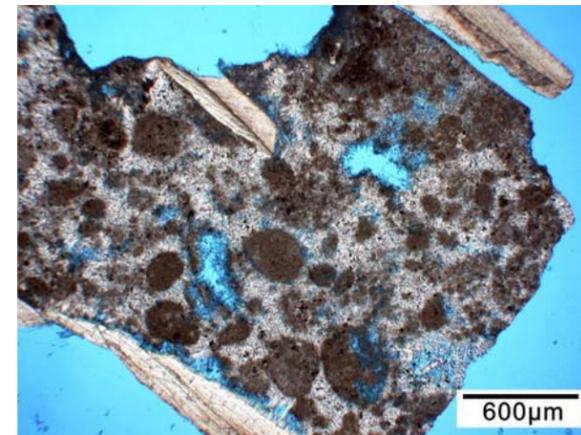
4180



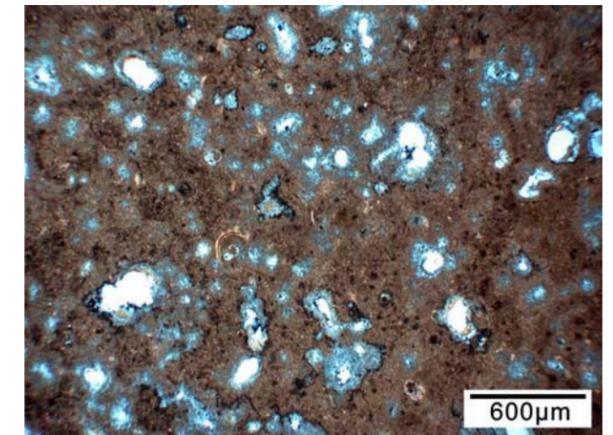
270 Grate Mussel Bed (57)



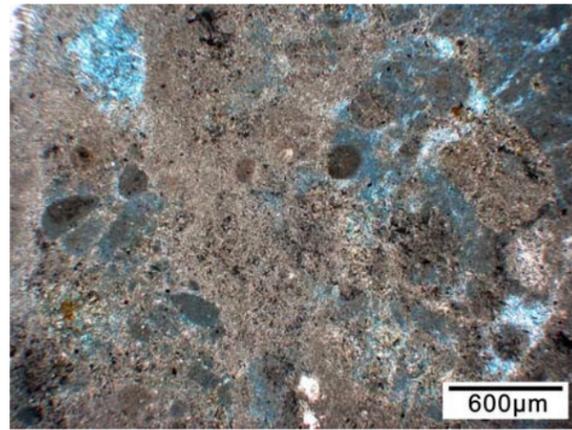
270 Grate Mussel Bed (57)



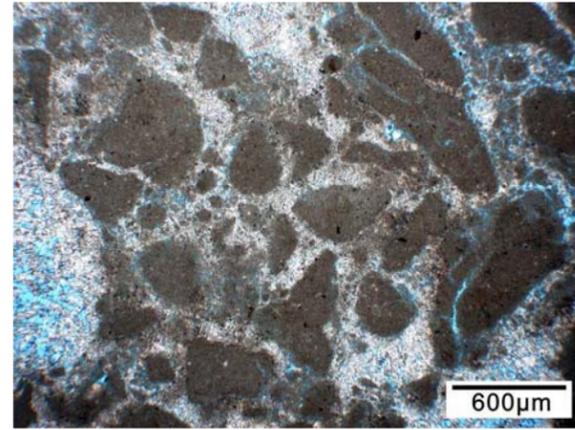
270 Grate Mussel Bed (57)



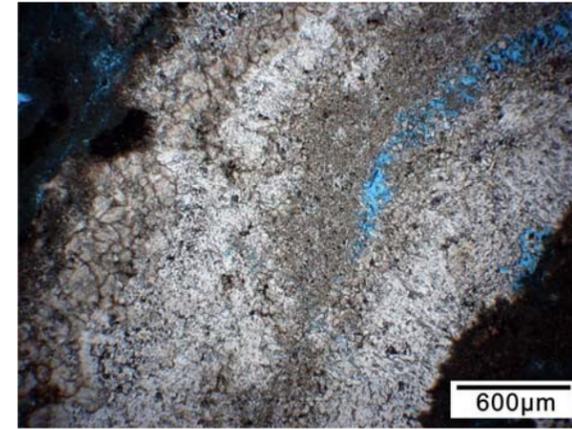
270 Grate Mussel Bed (57)



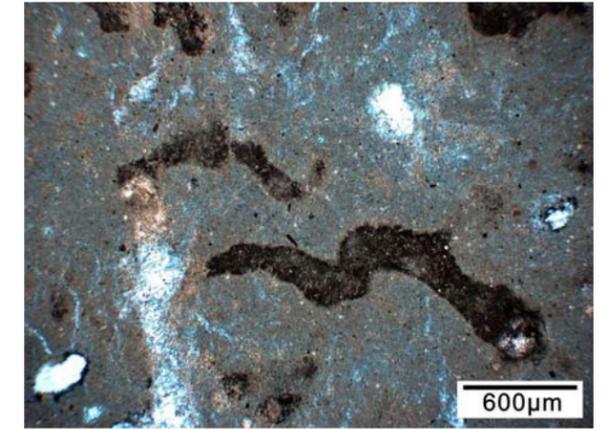
270 Port Biobox Tubeworm Environment (52)



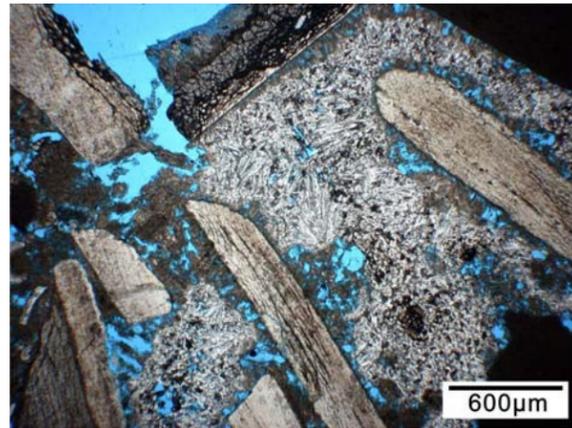
270 Port Biobox Tubeworm Environment (52)



270 Port Biobox Tubeworm Environment (52)



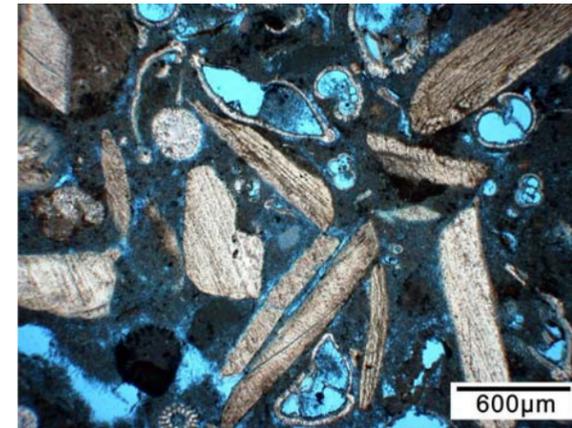
270 Port Biobox Tubeworm Environment (52)



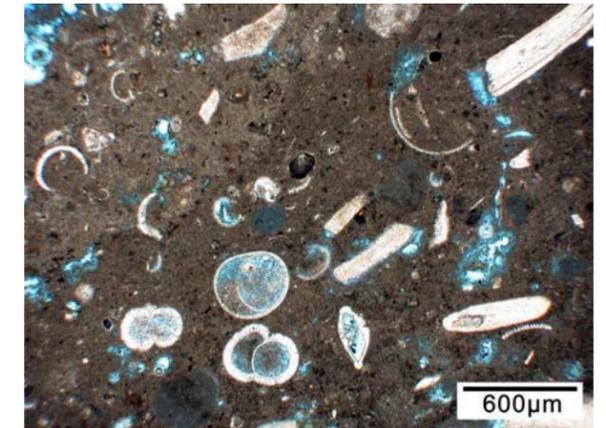
277 (12)



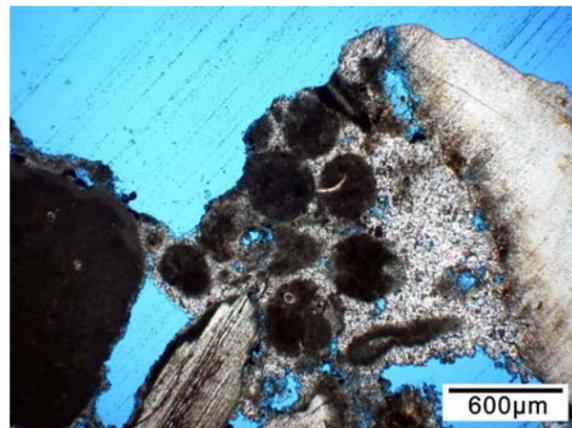
277 (12)



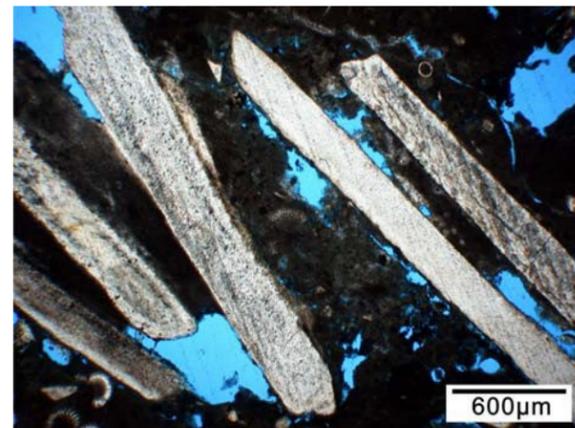
277 (12)



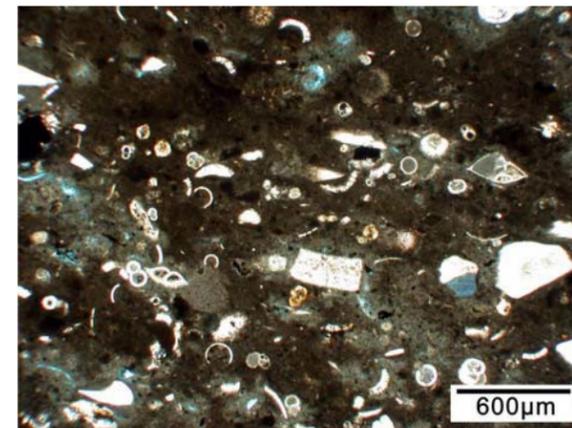
277 (12)



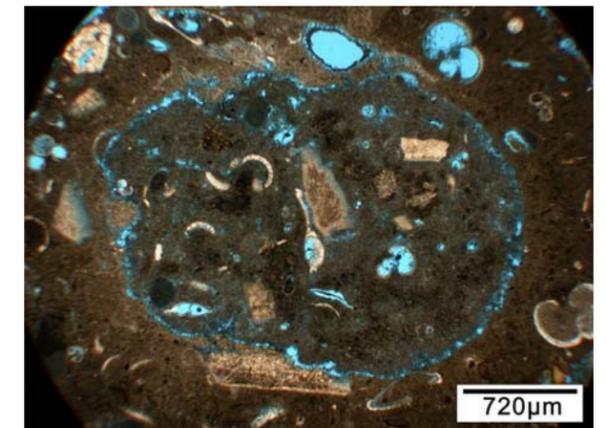
277 (10)



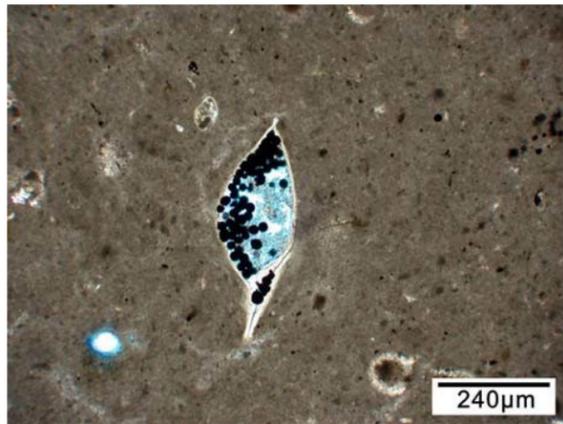
277 (10)



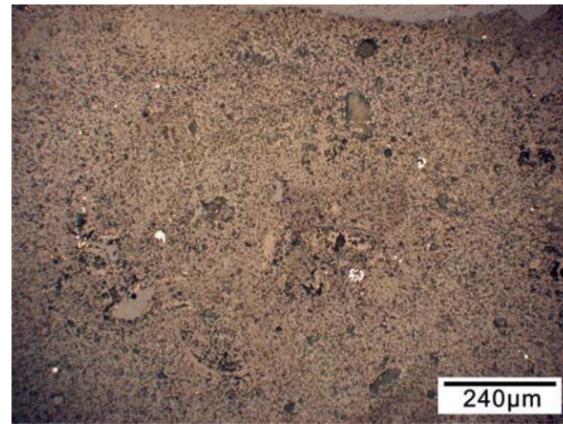
277 (10)



277 (10)

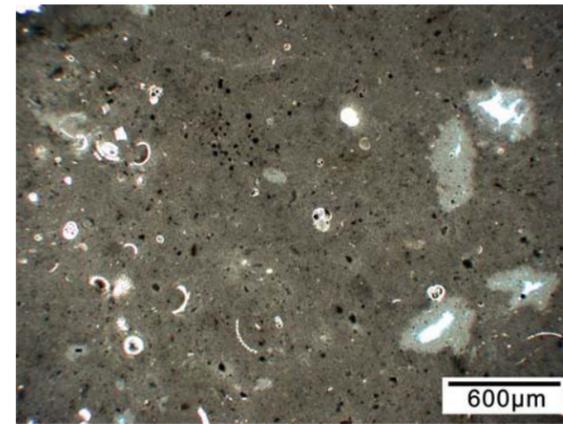


4174 Clam Site #2

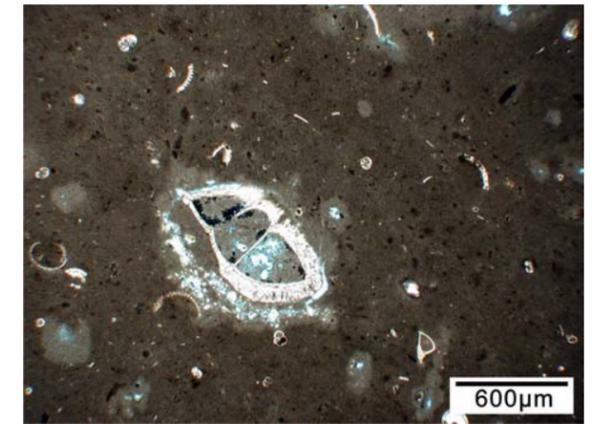


4174 Clam Site #2 **

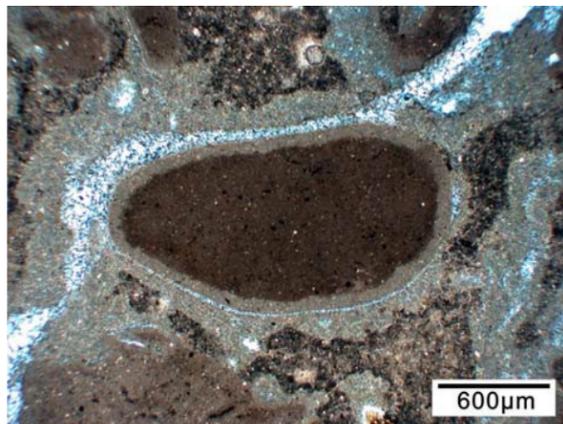
GC 600



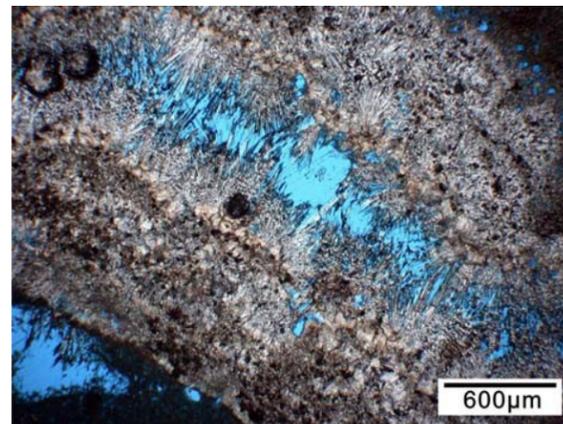
4174 Clam Site #2



4174 Clam Site #2

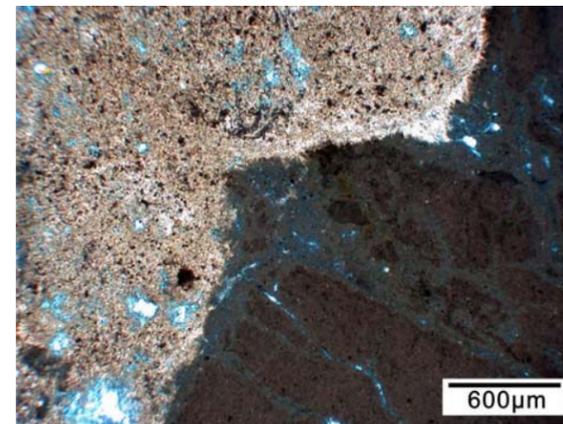


4177

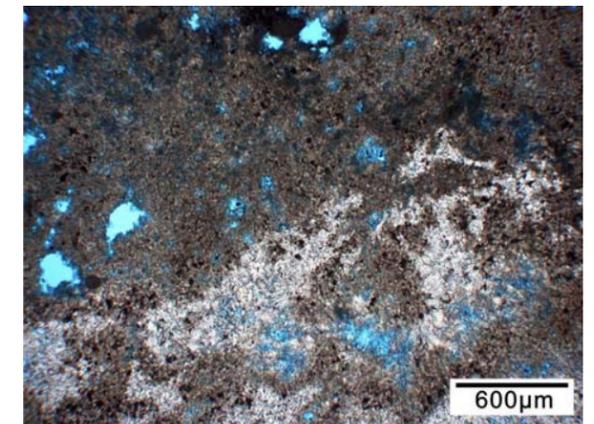


4177

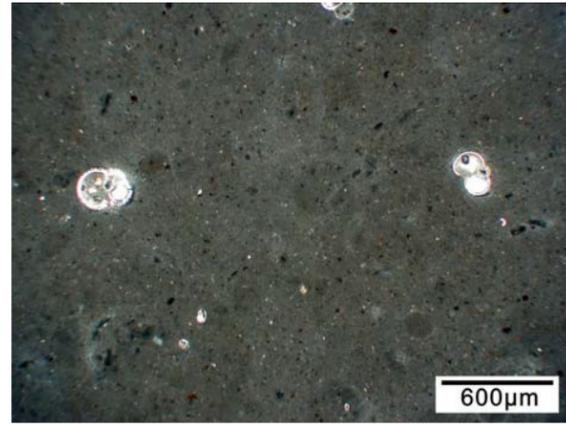
GC 852



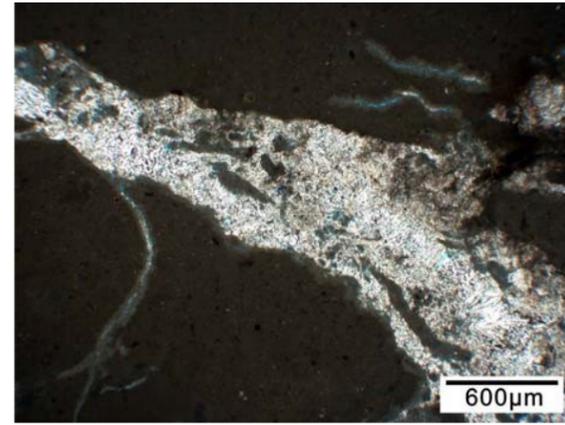
4177



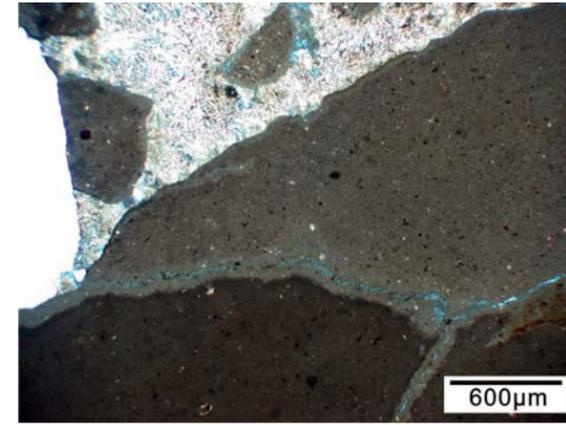
4177



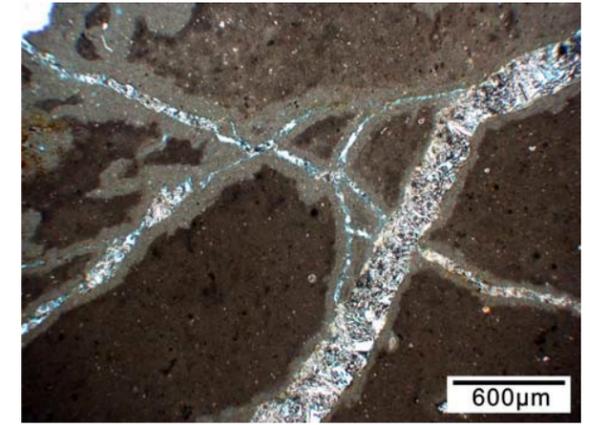
4185



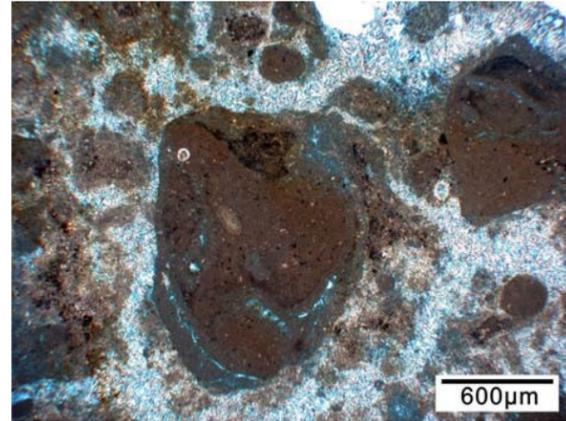
4185



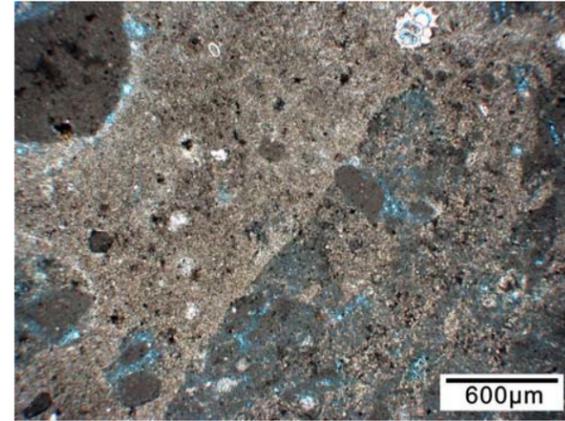
4185



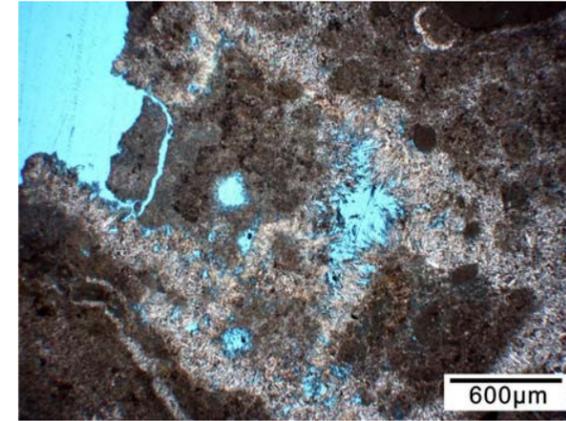
4185



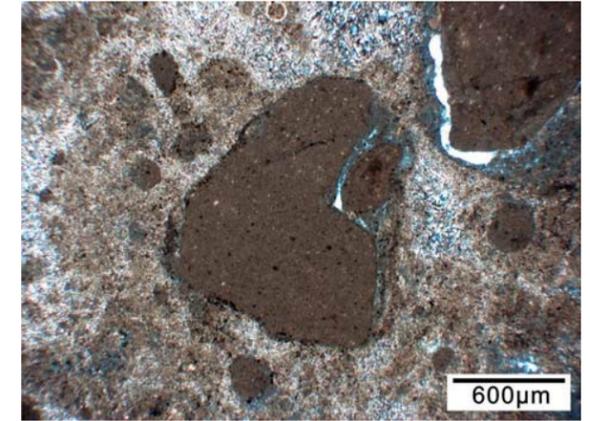
4186 Tubeworms



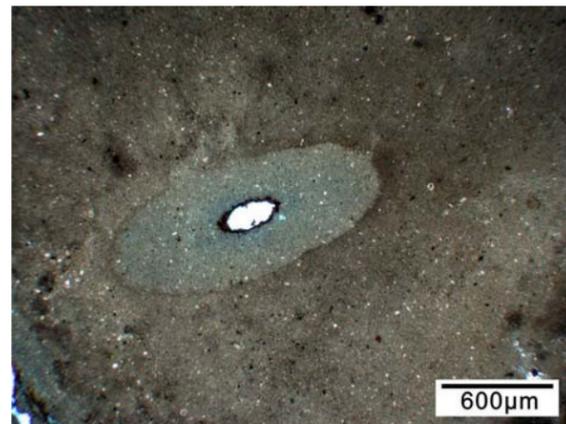
4186 Tubeworms



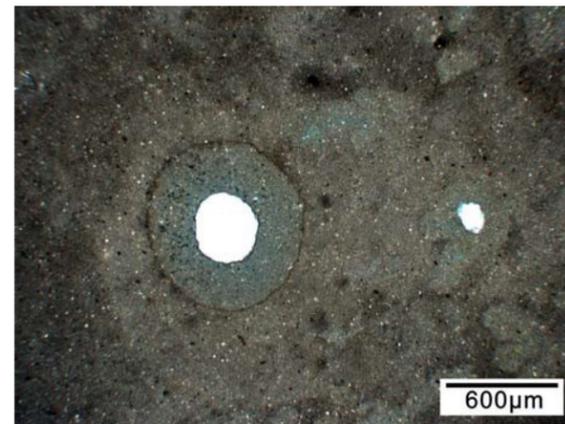
4186 Tubeworms



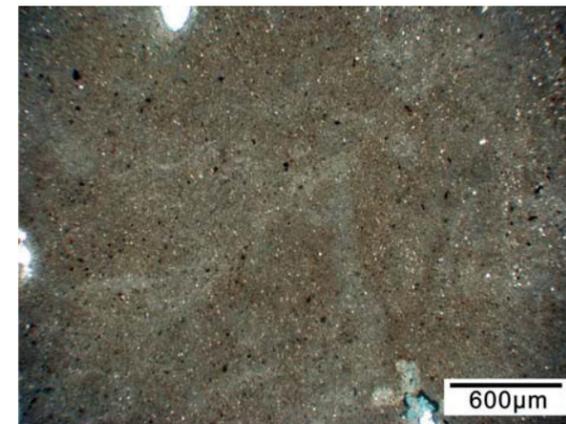
4186 Tubeworms



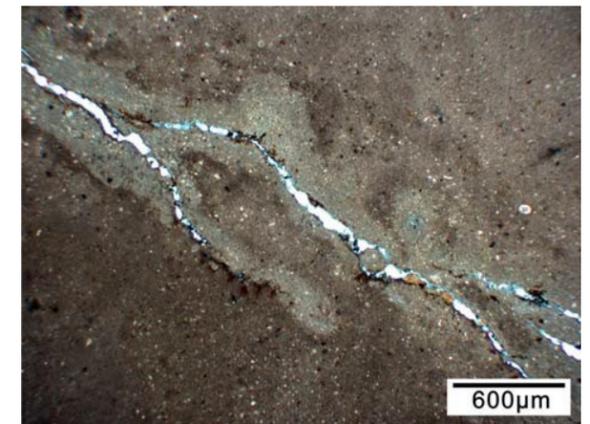
273 Rock sample Geo Target #2-Tom Mound (soft



273 Rock sample Geo Target #2-Tom Mound (soft

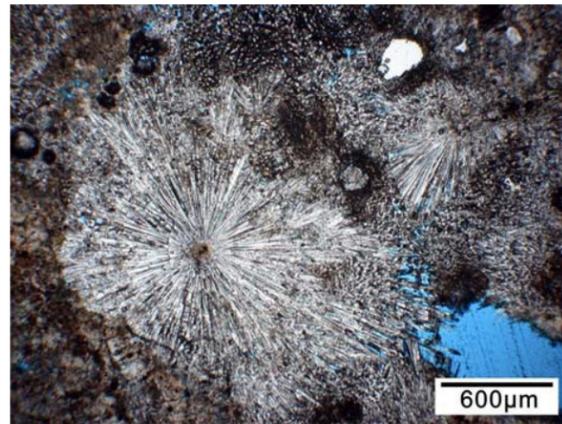


273 Rock sample Geo Target #2-Tom Mound (soft



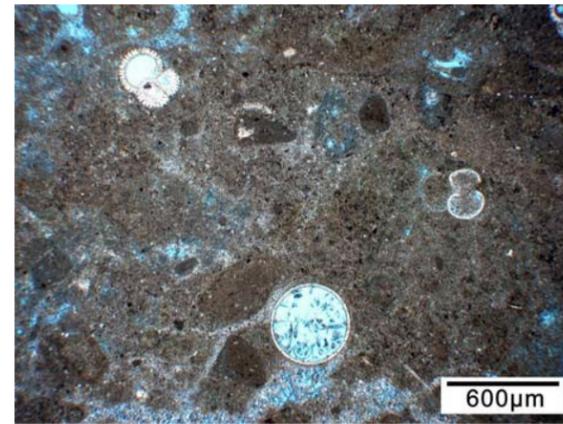
273 Rock sample Geo Target #2-Tom Mound (soft

coral site) (54)



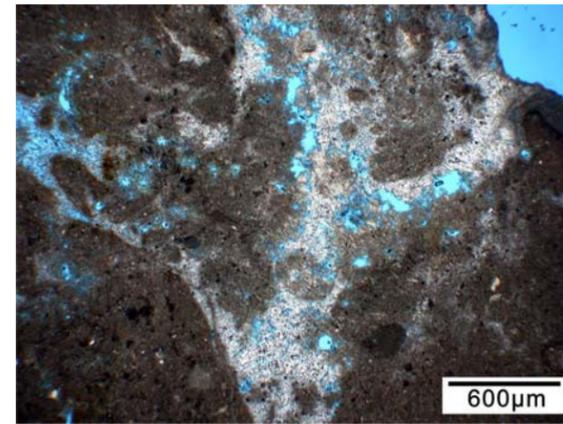
273 (2)

coral site) (54)



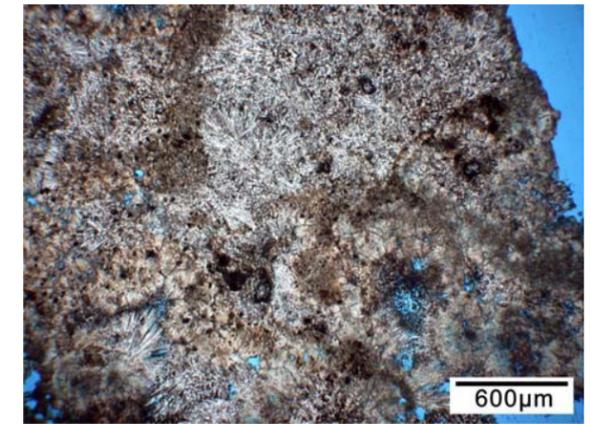
273 (2)

coral site) (54)



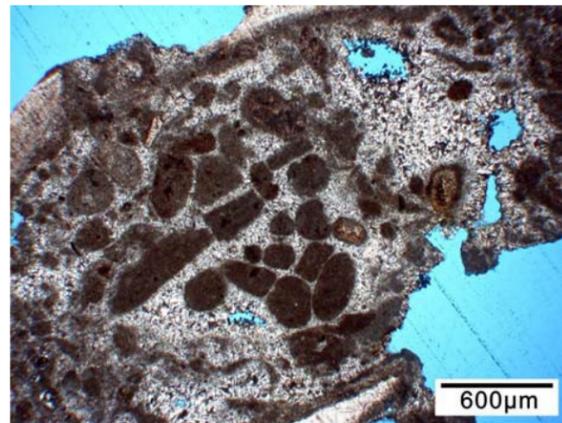
273 (2)

coral site) (54)

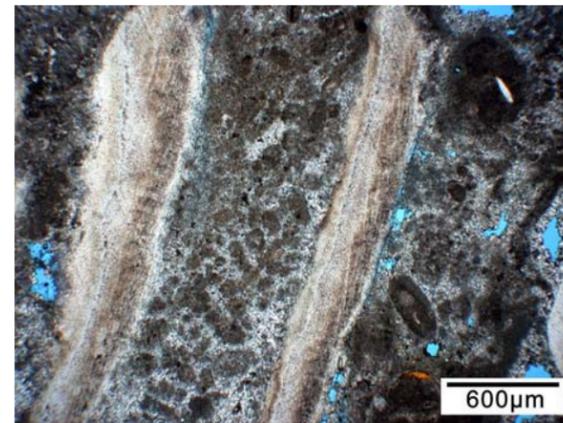


273 (2)

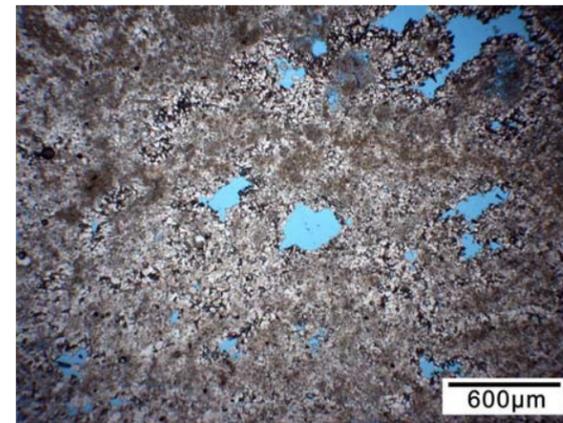
AC 601



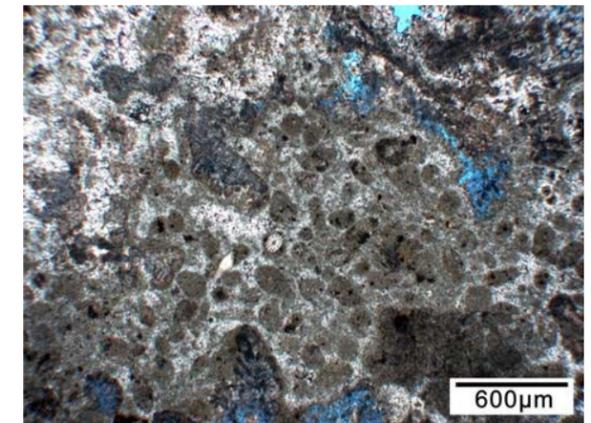
4193



4193



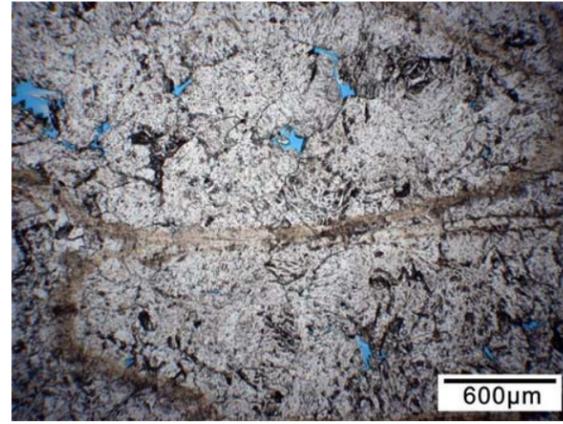
4193



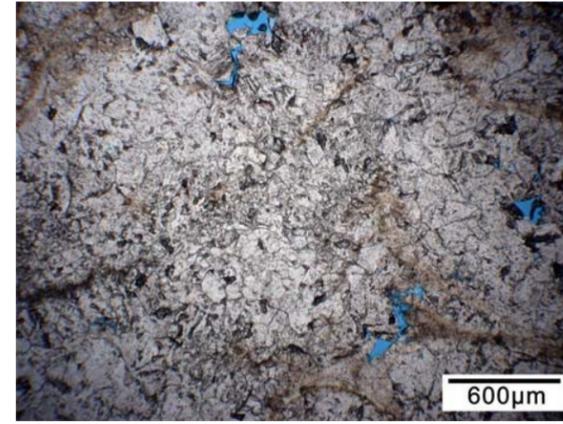
4193



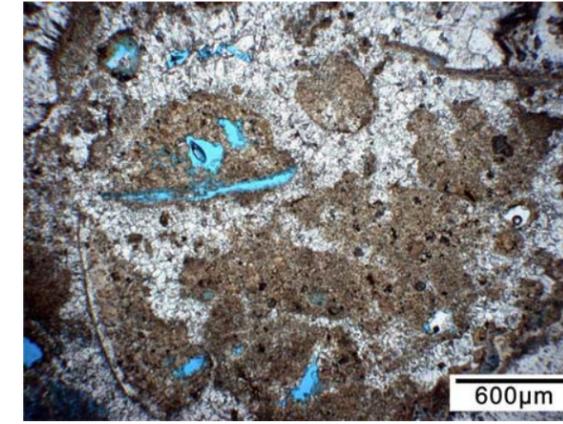
4196



4196



4196

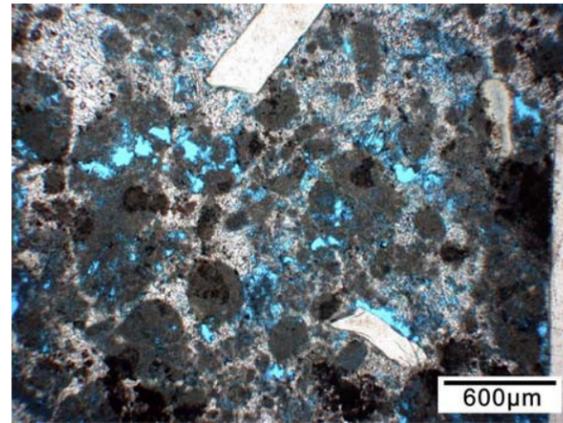


4196

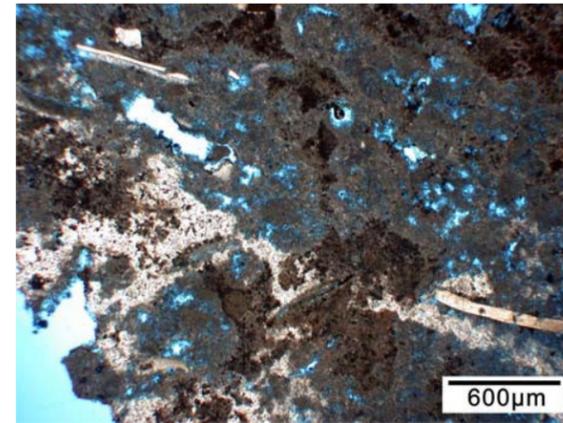
AC 645



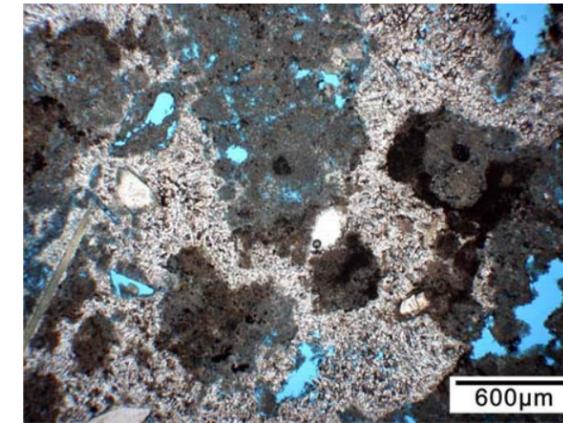
4194 Bottom



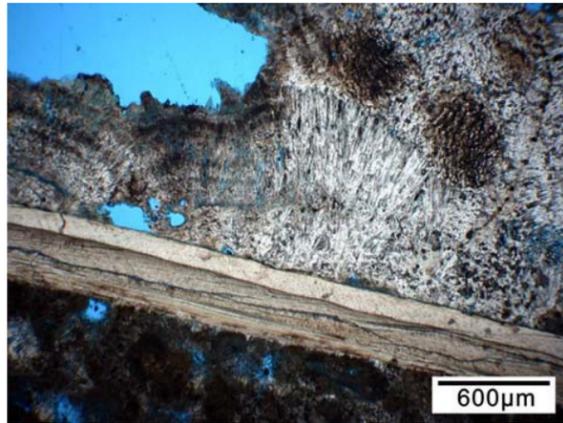
4194 Bottom



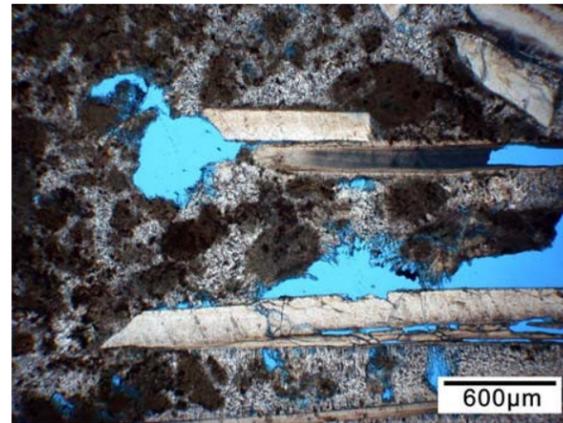
4194 Bottom



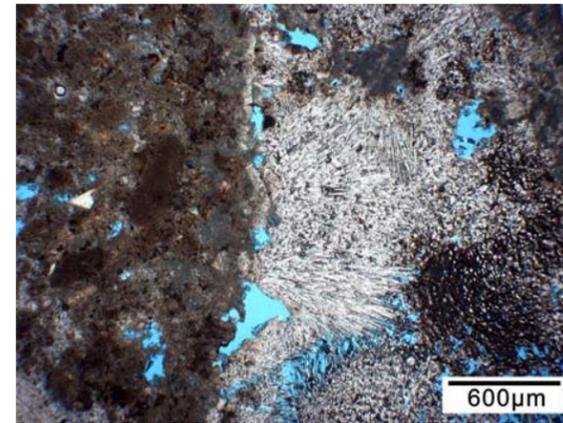
4194 Bottom



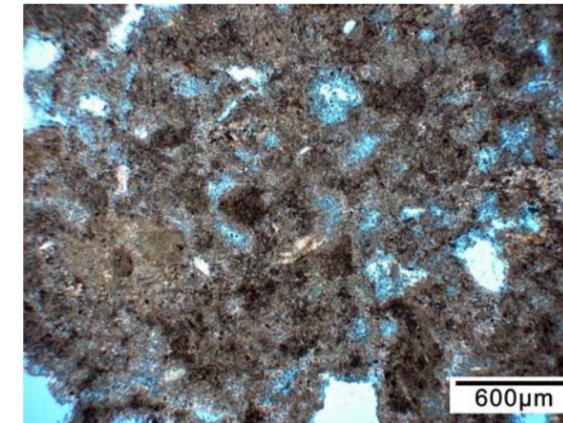
4197 Top Mound



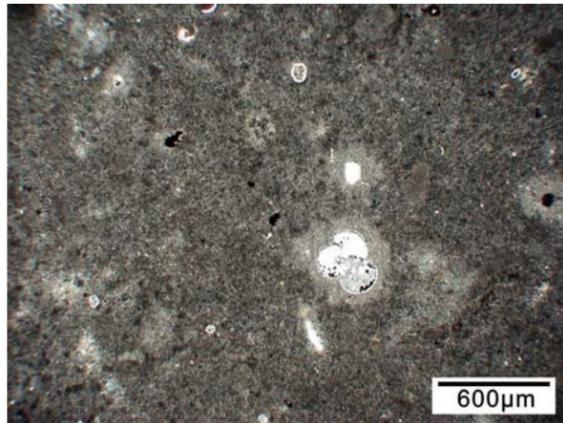
4197 Top Mound



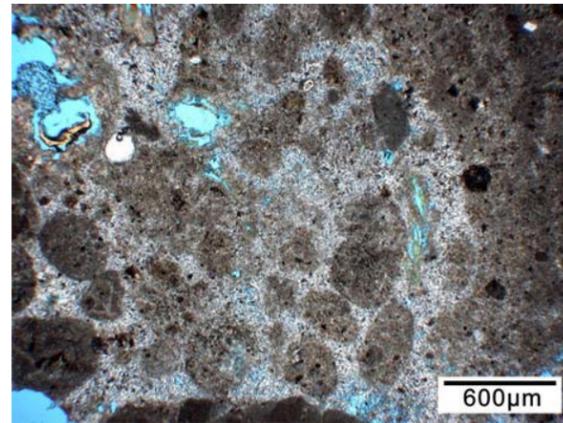
4197 Top Mound



4197 Top Mound

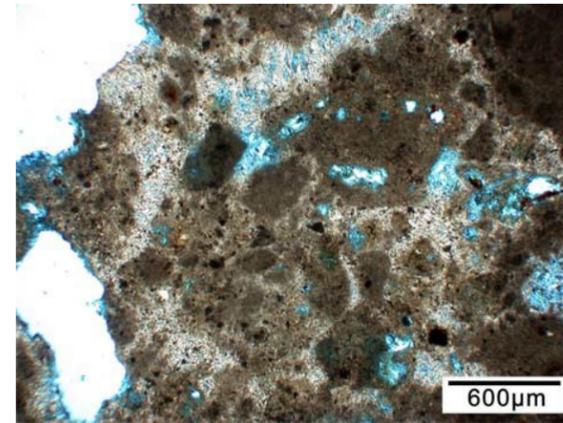


4192 Biobox



4195

AC 818

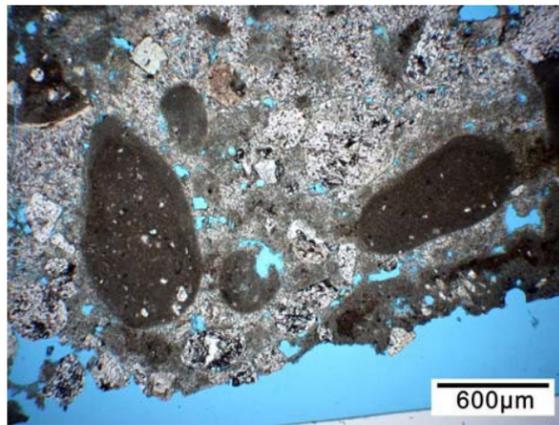


4195

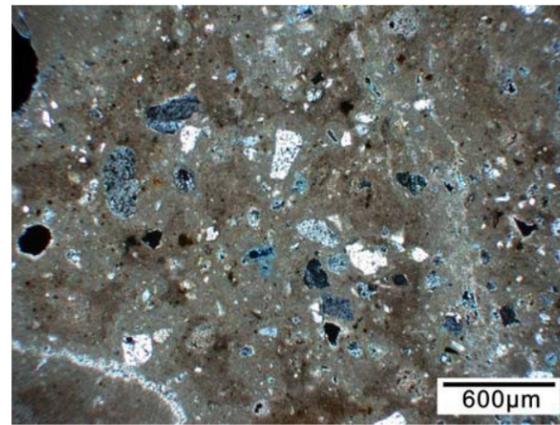


4195

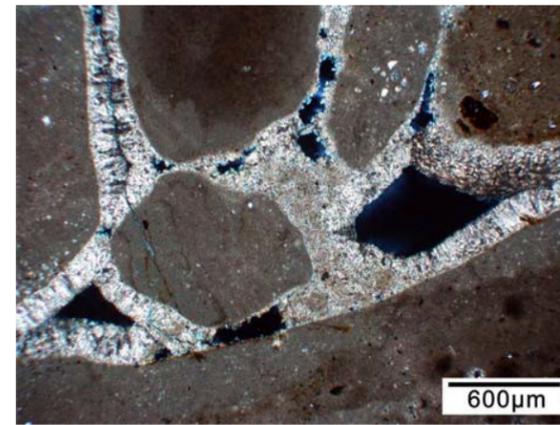
WR 269



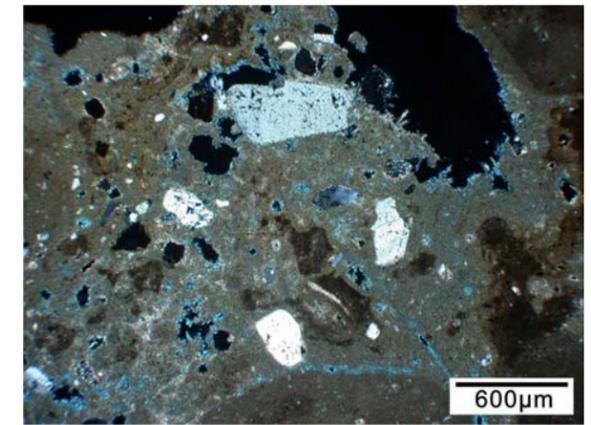
4191



4191*



4191*



4191*

*Cross-plane polarized light.

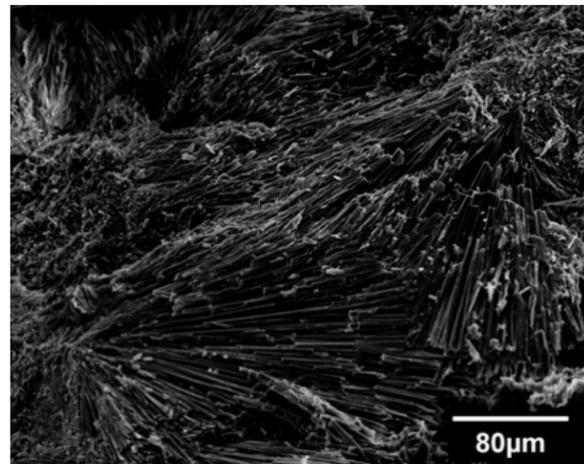
**Reflect light.

All others are plane-polarized light.

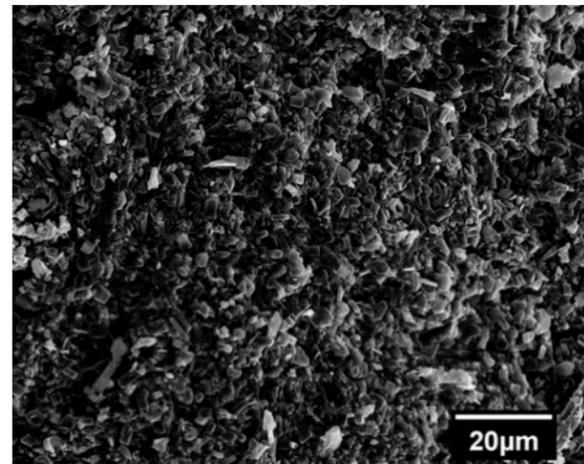
APPENDIX 8-C
Scanning Electron Microscope Photos

Scanning Electron Microscope Photos

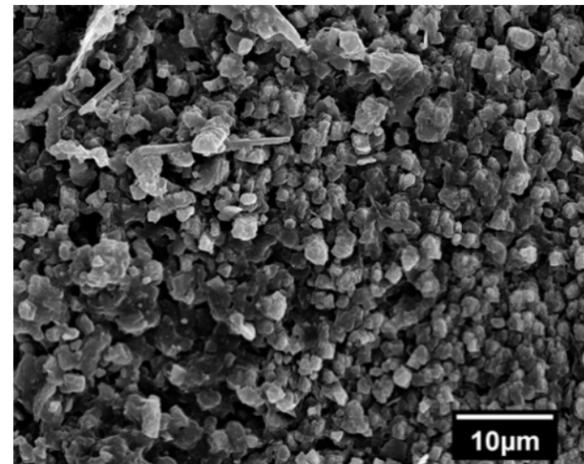
AT 340



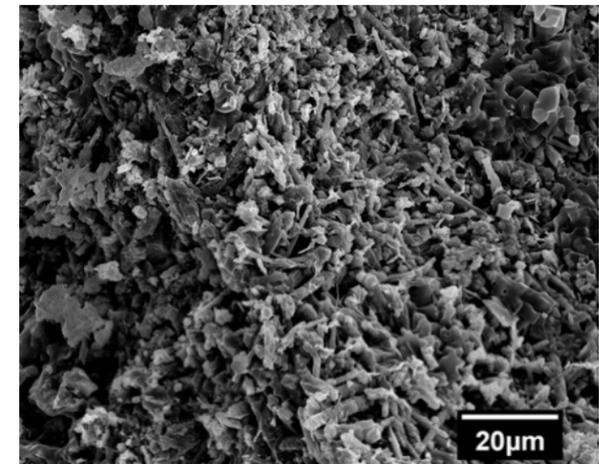
270 Large mussel bed carbonate (44)



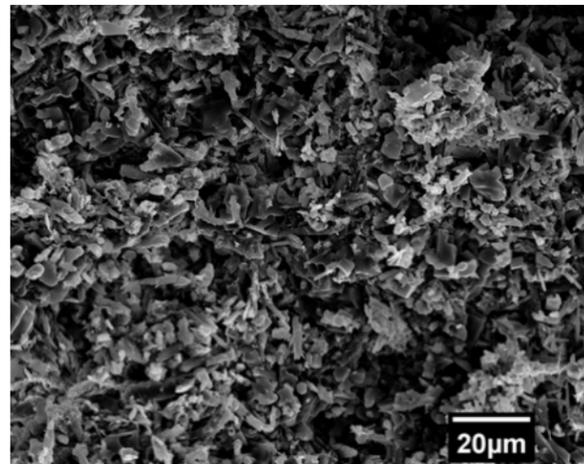
270 Large mussel bed carbonate (44)



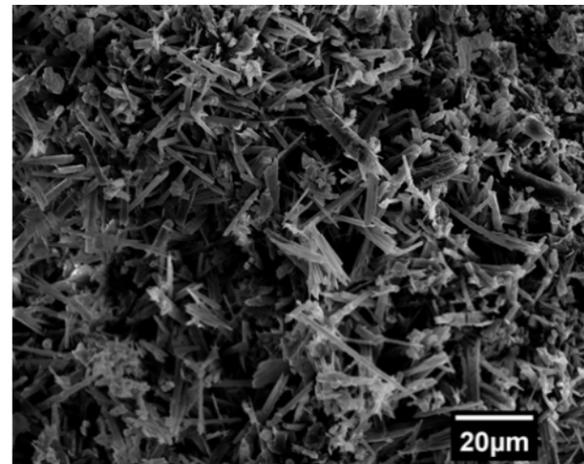
270 Carbonate below stained tubeworms (47)



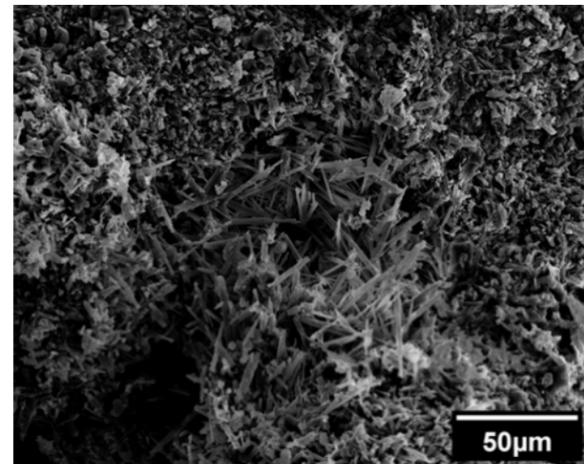
270 Carbonate below stained tubeworms (47)



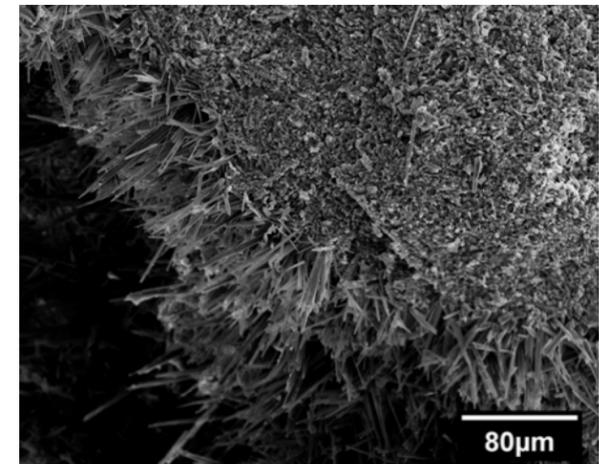
4173 Carbonate from tubeworm aggregation



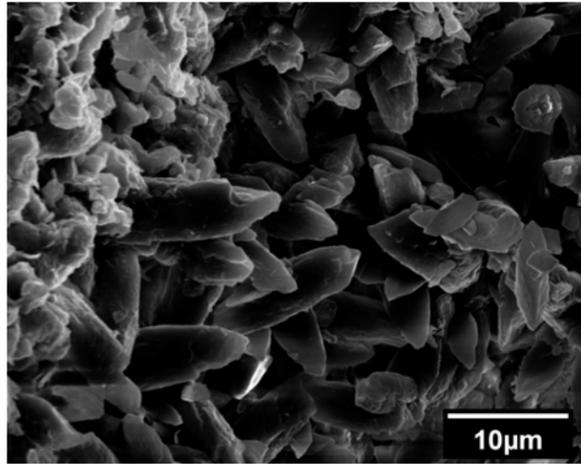
4173 Carbonate from tubeworm aggregation



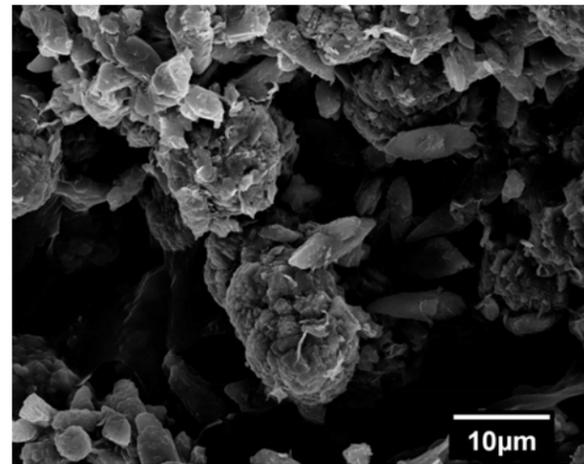
4173 Carbonate from tubeworm aggregation



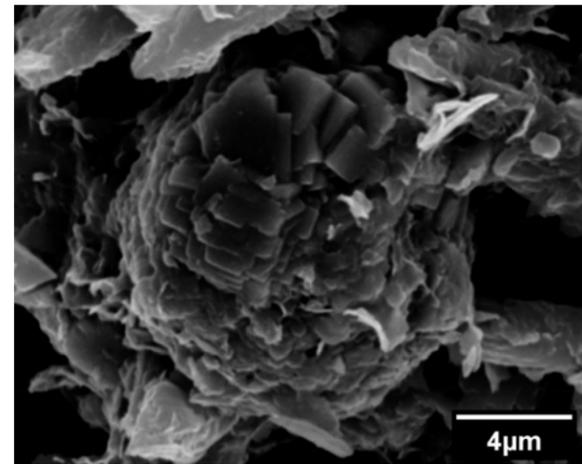
4173 Carbonate from tubeworm aggregation



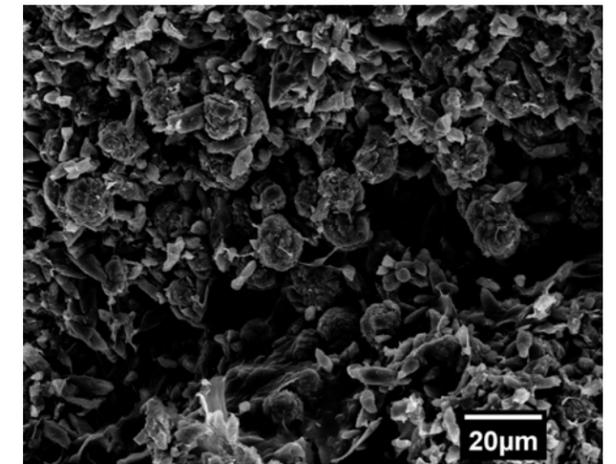
4173 Carbonate from mussel grab



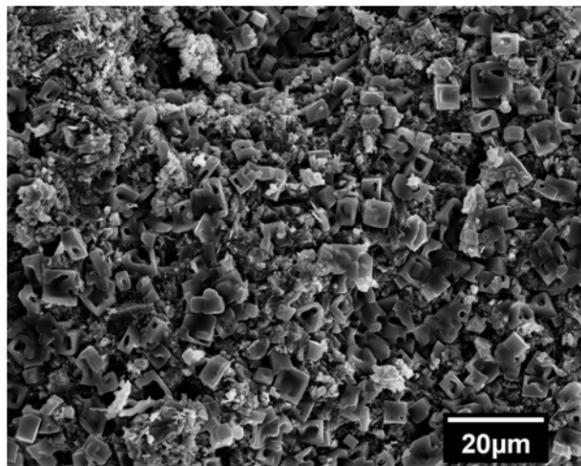
4173 Carbonate from mussel grab



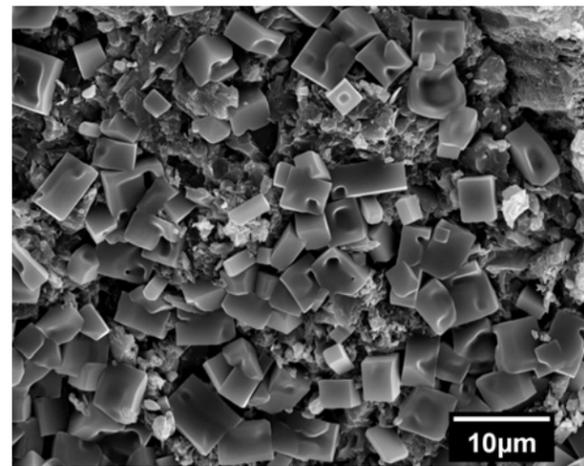
4173 Carbonate from mussel grab



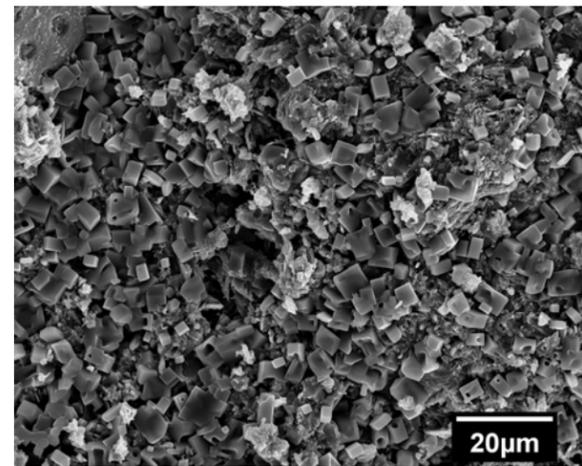
4173 Carbonate from mussel grab



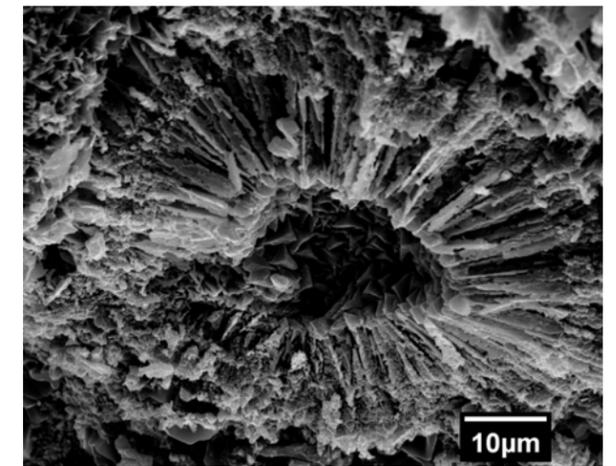
4183 Rock from baby tubeworms



4183 Rock from baby tubeworms

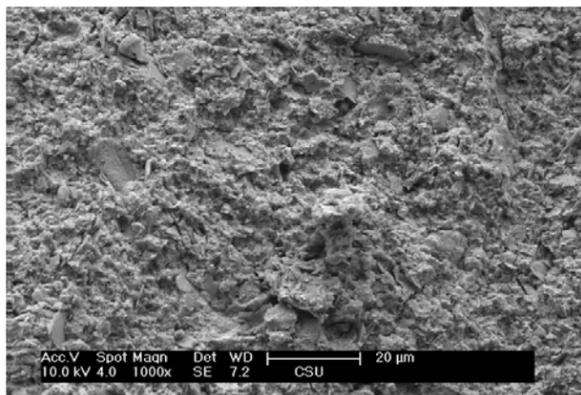


4183 Rock from baby tubeworms

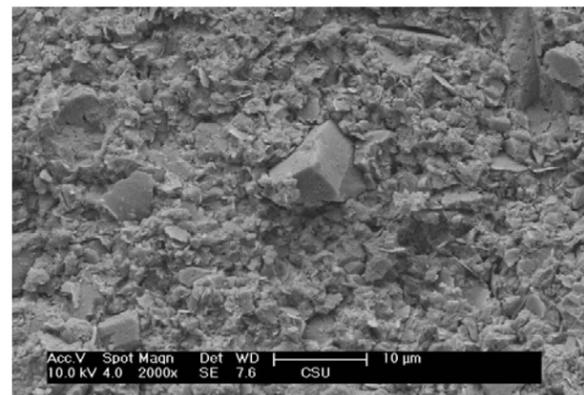


4183 Rock from baby tubeworms

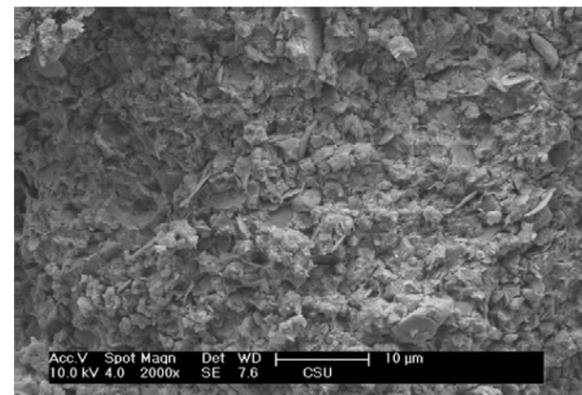
GB 647



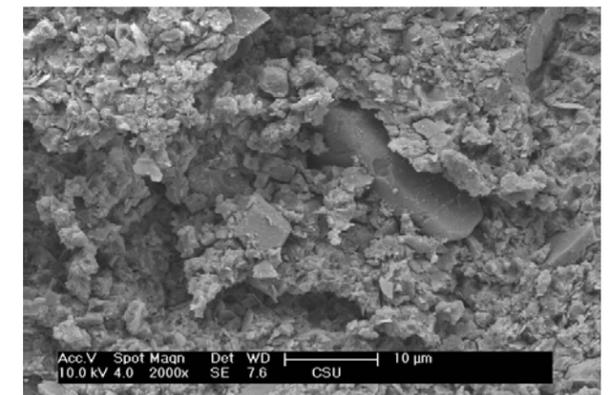
280 Carbonate rubble field (17)



280 Carbonate rubble field (17)

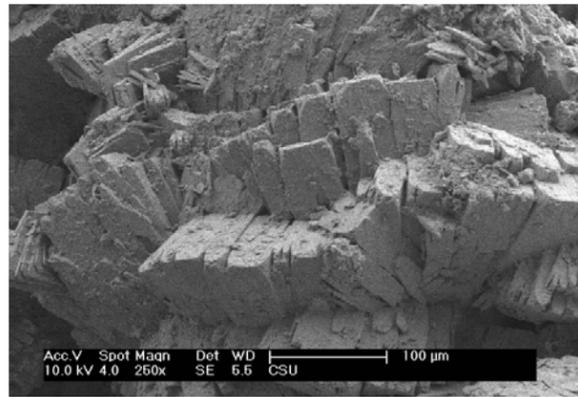


280 Carbonate rubble field (17)

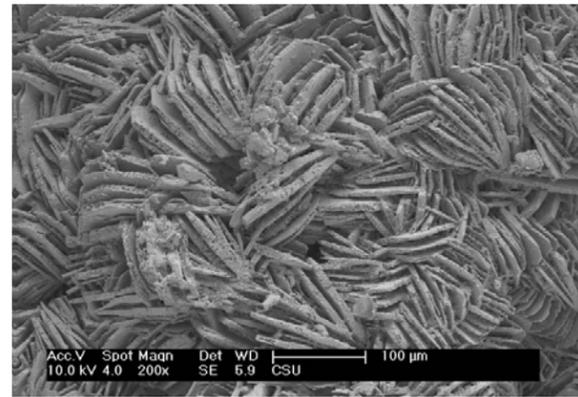


280 Carbonate rubble field (17)

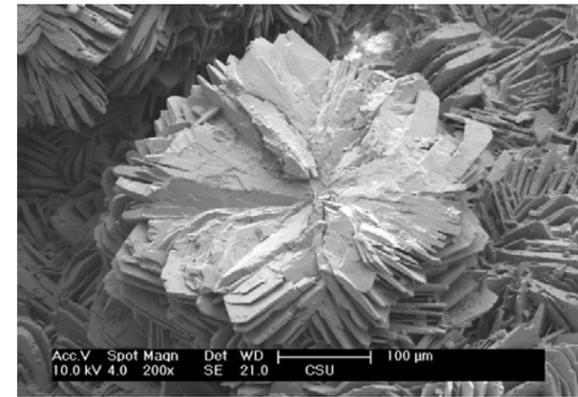
GB 697



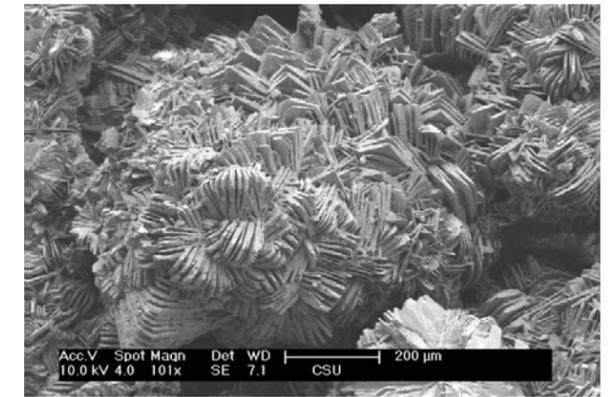
274 Between Geo Target 3-4 Barite



274 Between Geo Target 3-4 Barite

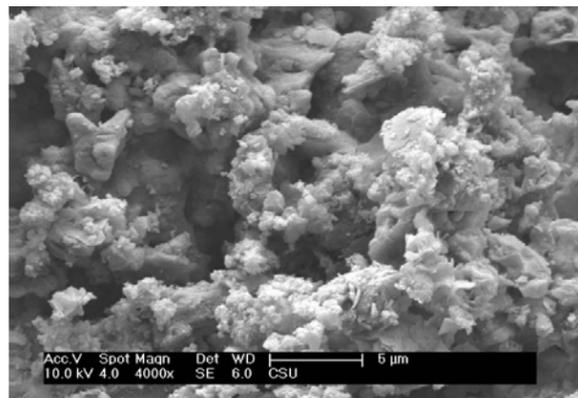


274 Between Geo Target 3-4 Barite

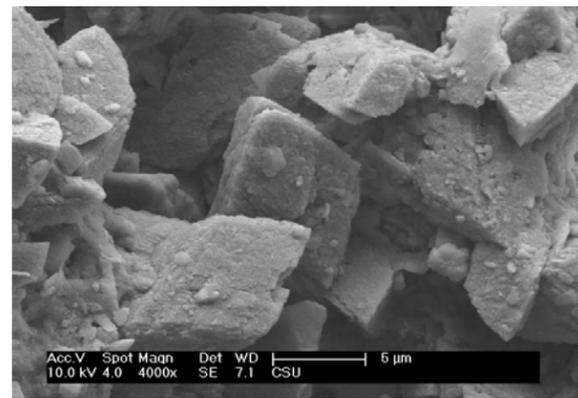


274 Between Geo Target 3-4 Barite

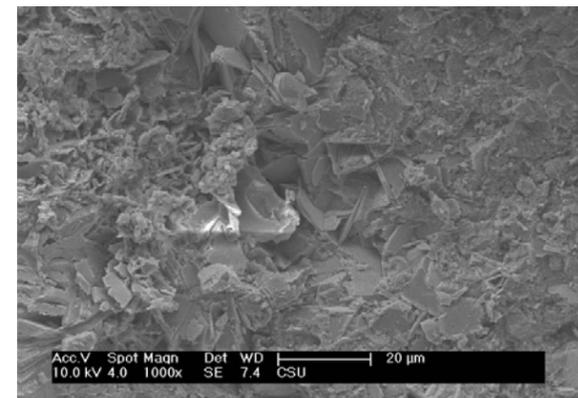
GC 415



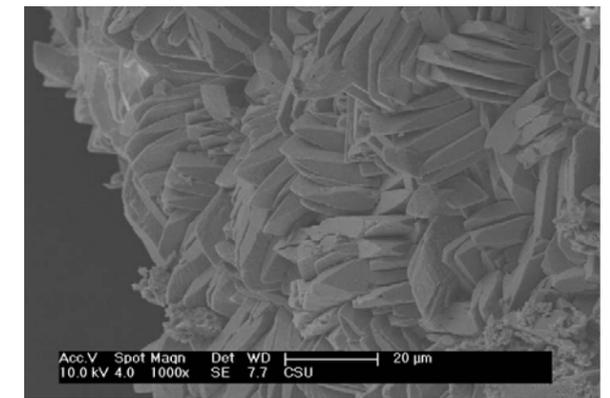
Carbonate crust above hydrate Geo Target 9 (41)



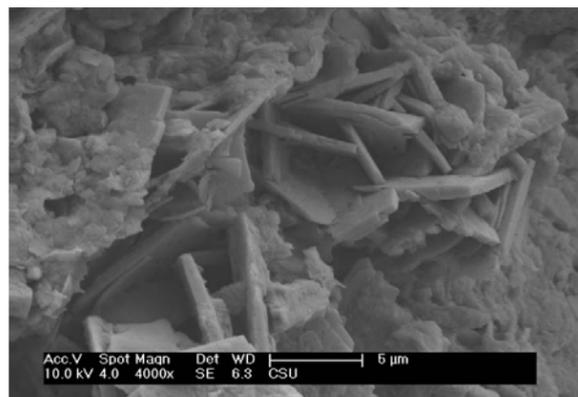
Carbonate crust above hydrate Geo Target 9 (41)



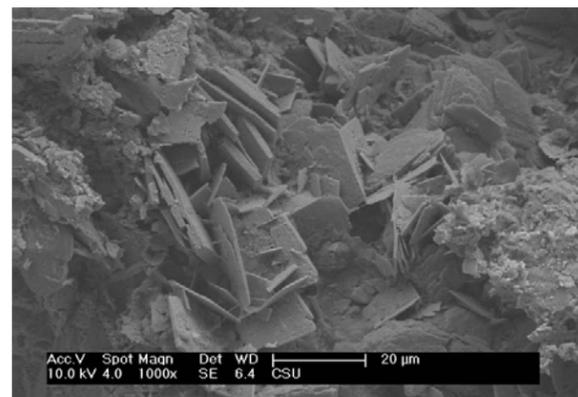
Carbonate crust above hydrate Geo Target 9 (41)



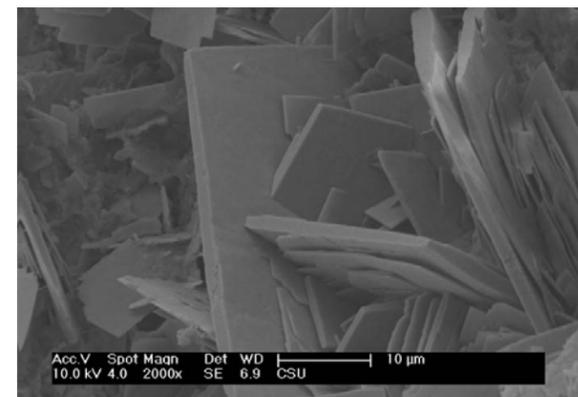
Carbonate crust above hydrate Geo Target 9 (41)



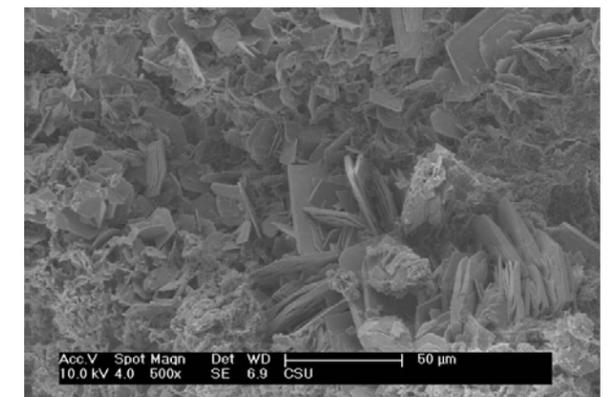
Carbonate crust Brine Area over hydrate (31)



Carbonate crust Brine Area over hydrate (31)

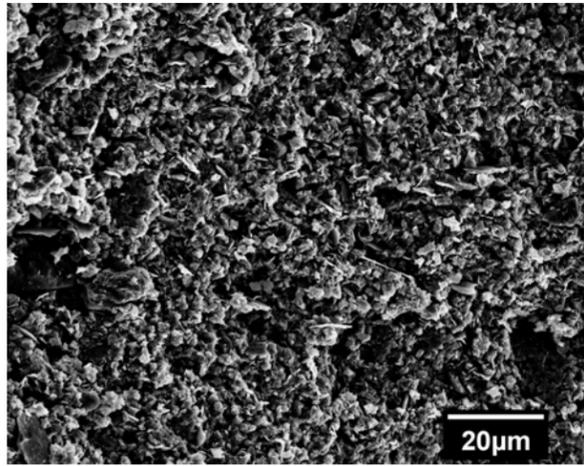


Carbonate crust Brine Area over hydrate (31)

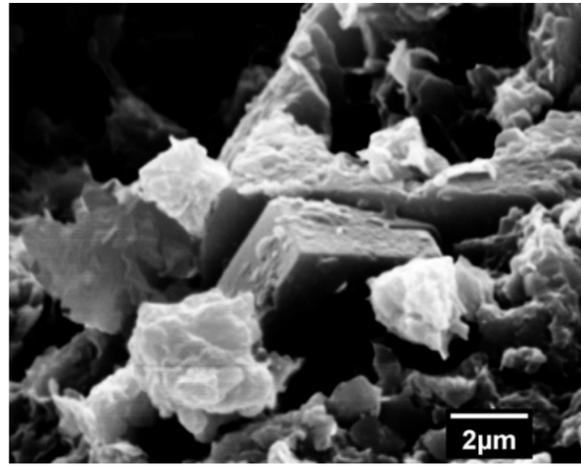


Carbonate crust Brine Area over hydrate (31)

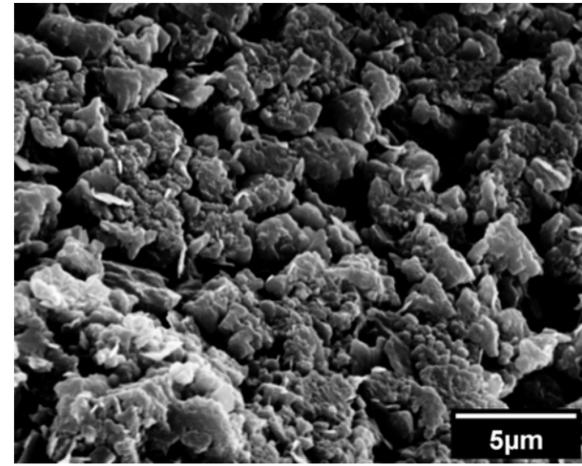
GC 600



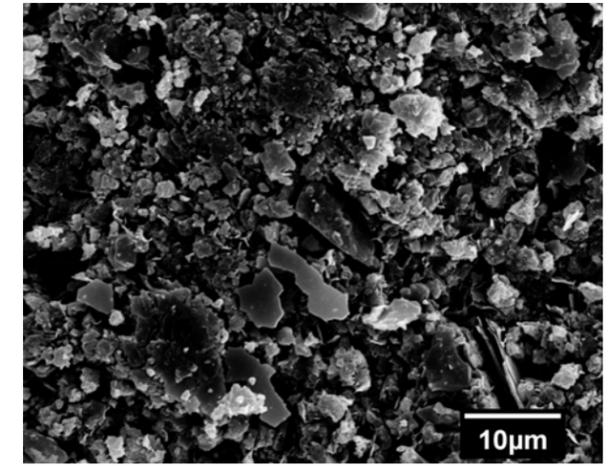
4174



4174

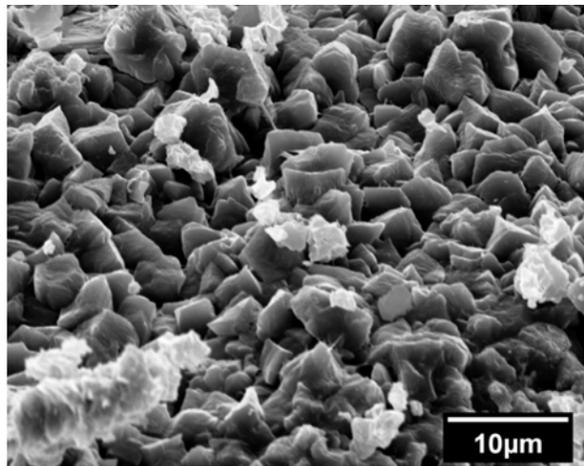


4174

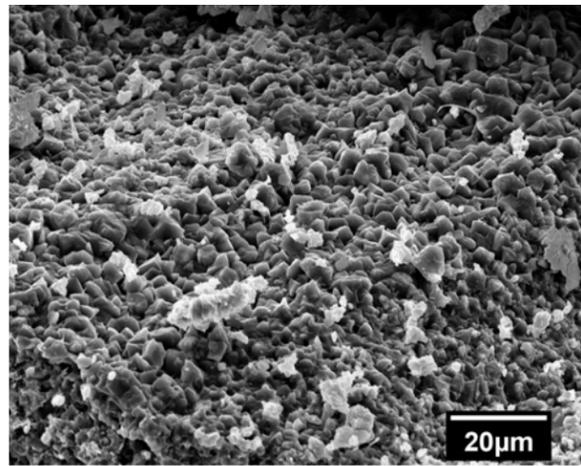


4174

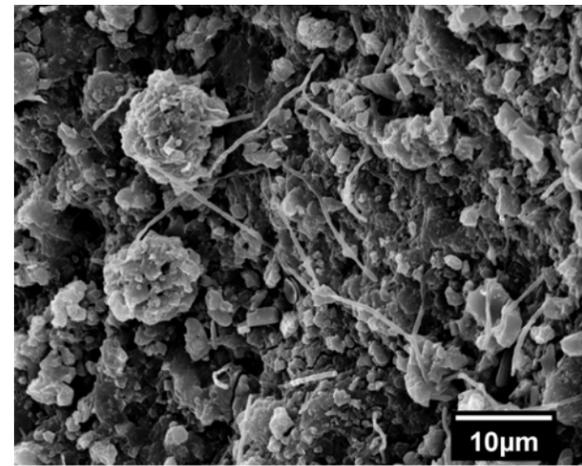
GC 852



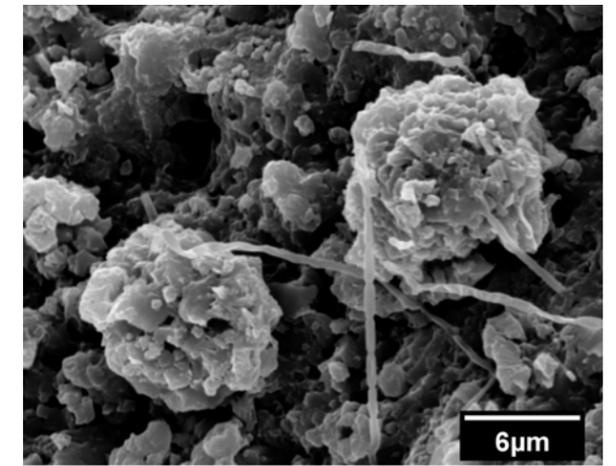
273 Blue Net Mussel Scoop (45)



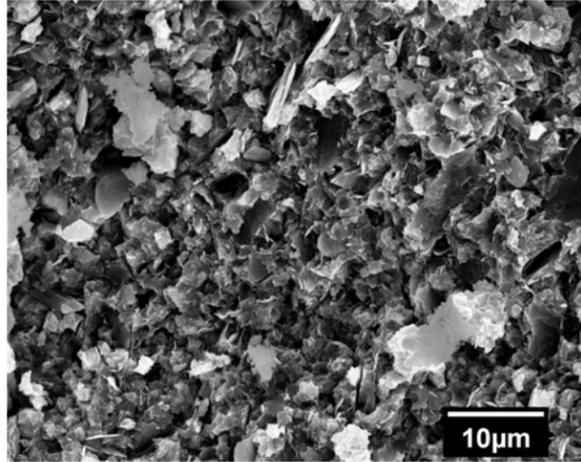
273 Blue Net Mussel Scoop (45)



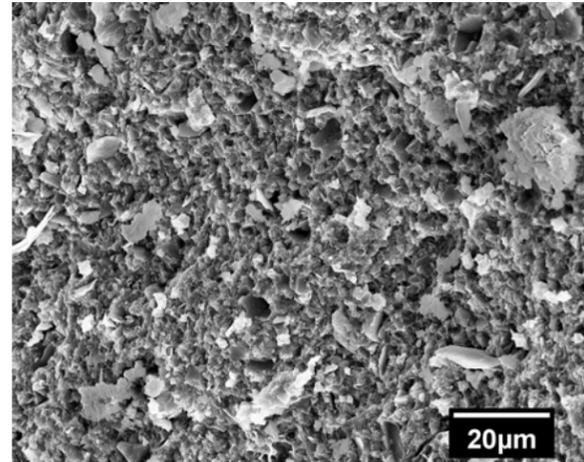
273 Blue Net Mussel Scoop (45)



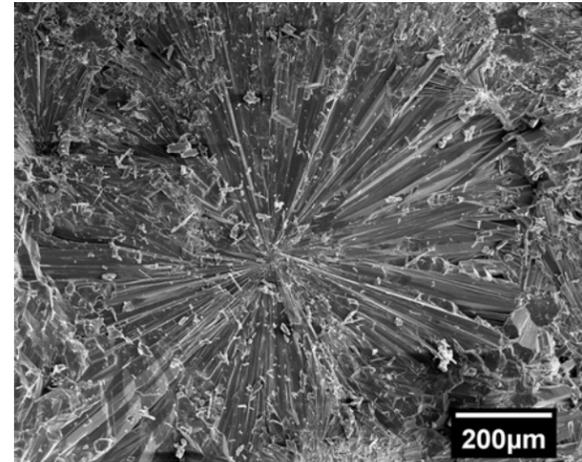
273 Blue Net Mussel Scoop (45)



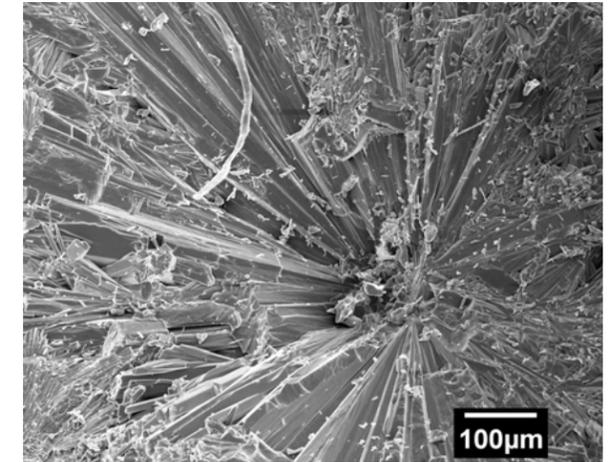
4185 (Grain)



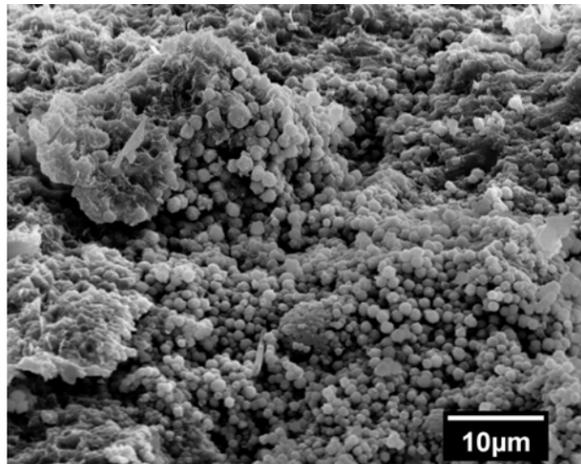
4185 (Grain)



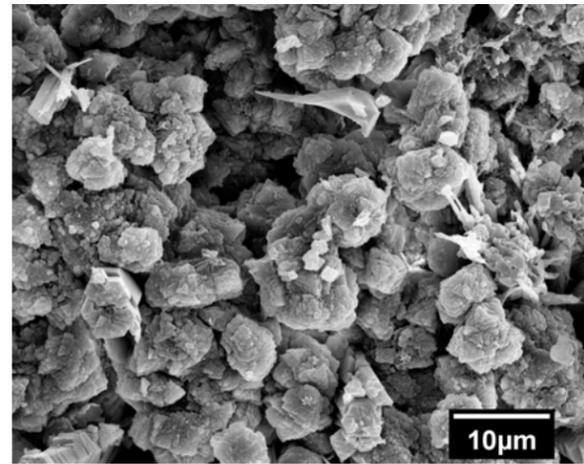
4185 (Cement)



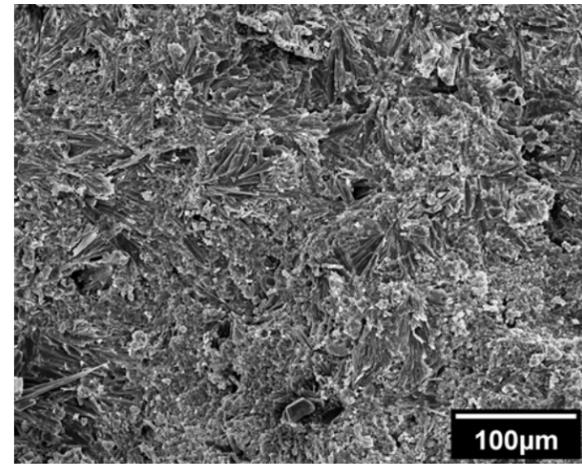
4185 (Cement)



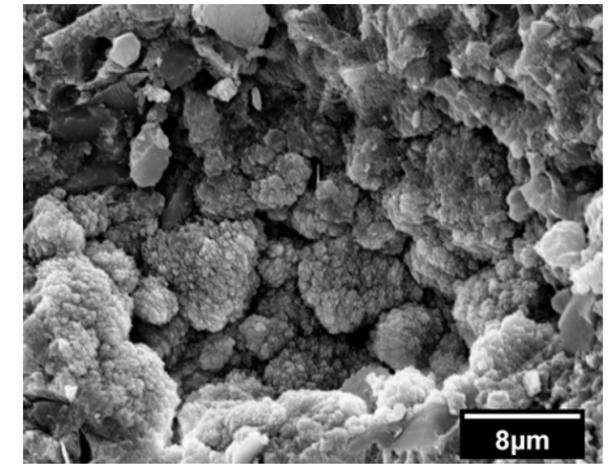
4185 (Matrix)



4185 (Matrix)

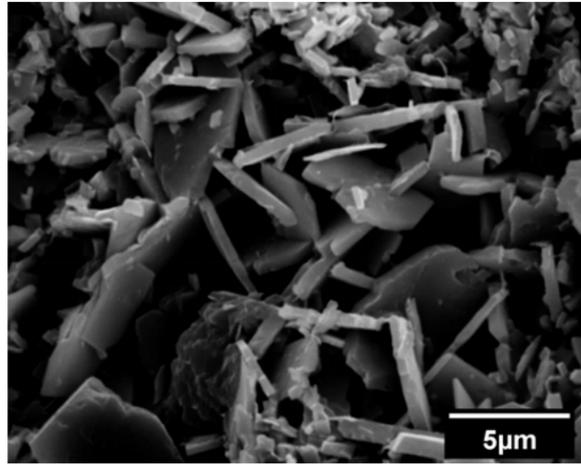


4185 (Matrix)

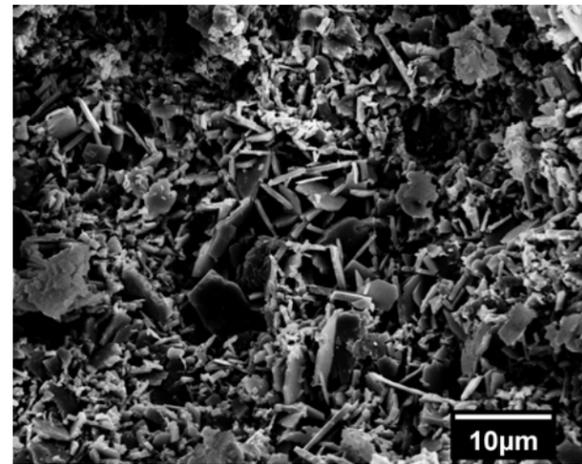


4185 (Matrix)

AC 601

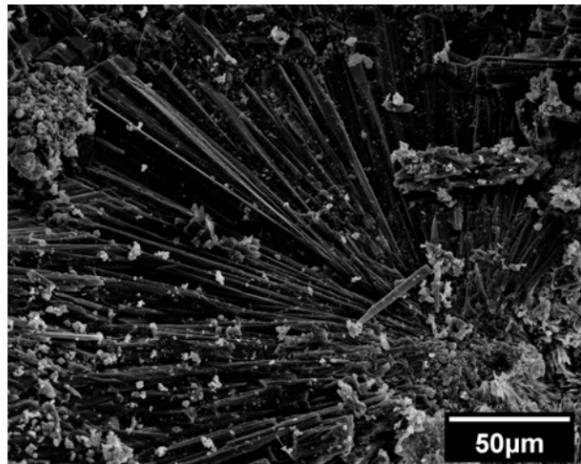


4193

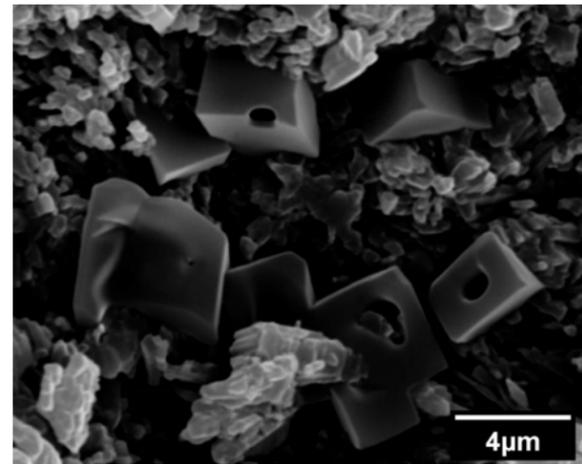


4193

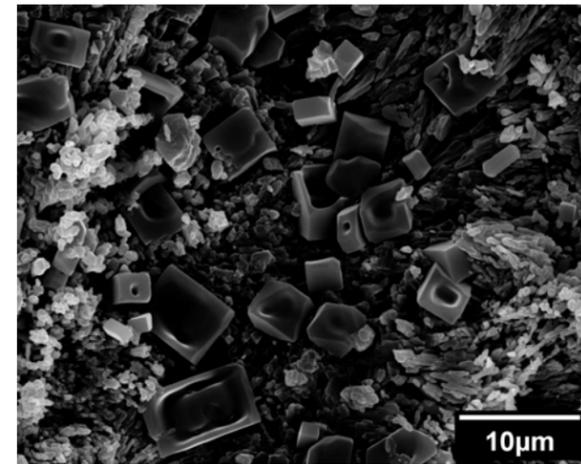
AC 645



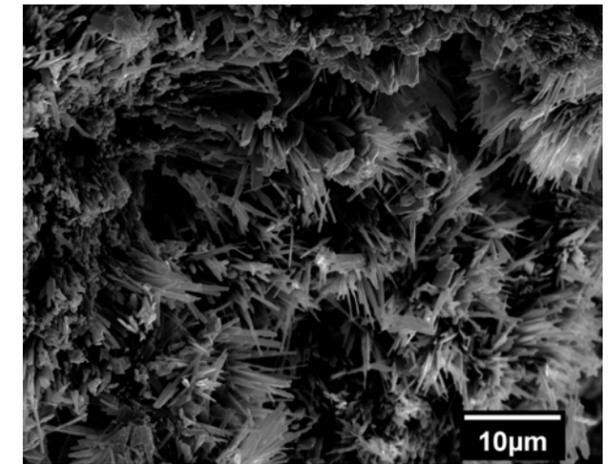
4194



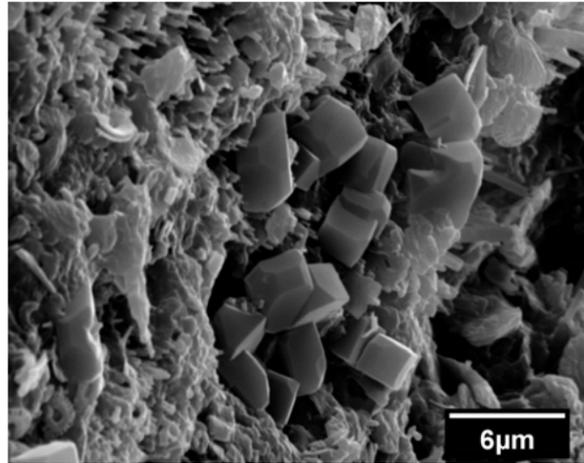
4194



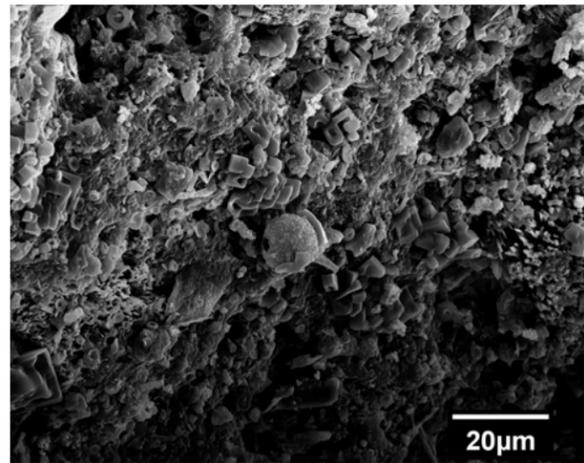
4194



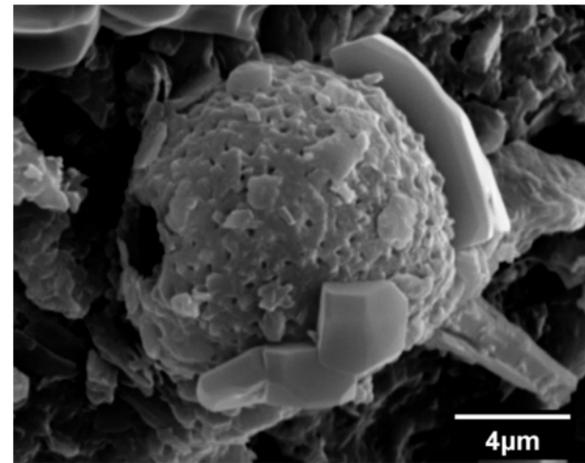
4194



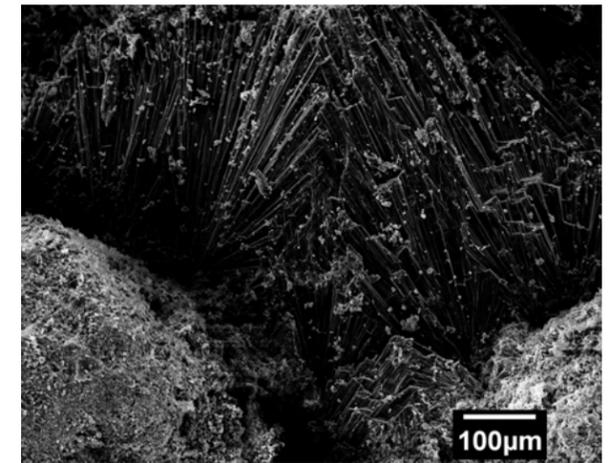
4197



4197

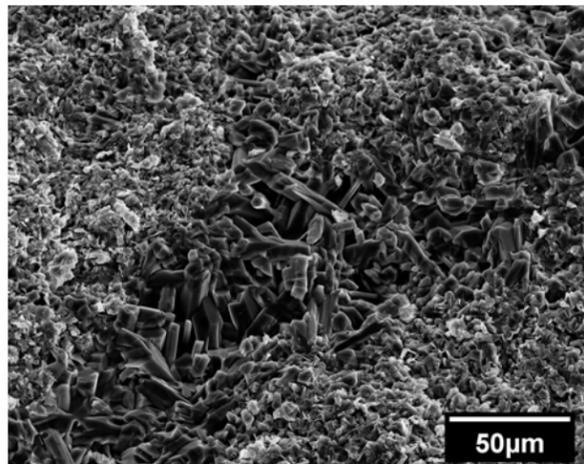


4197

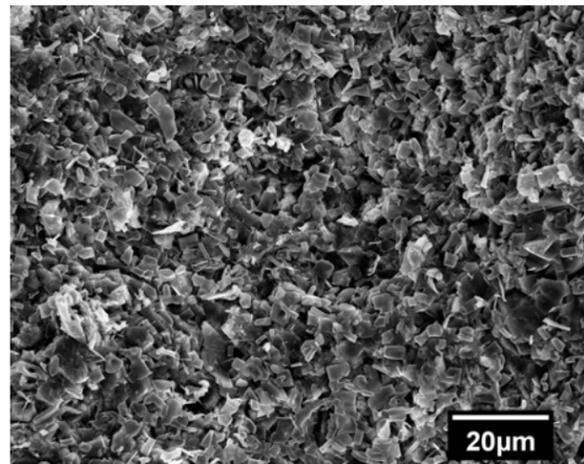


4197

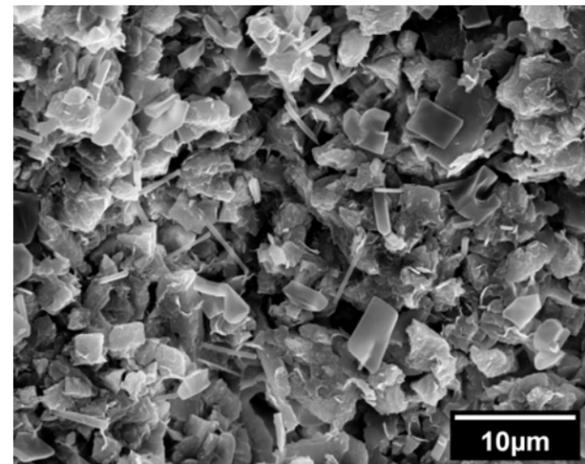
AC 818



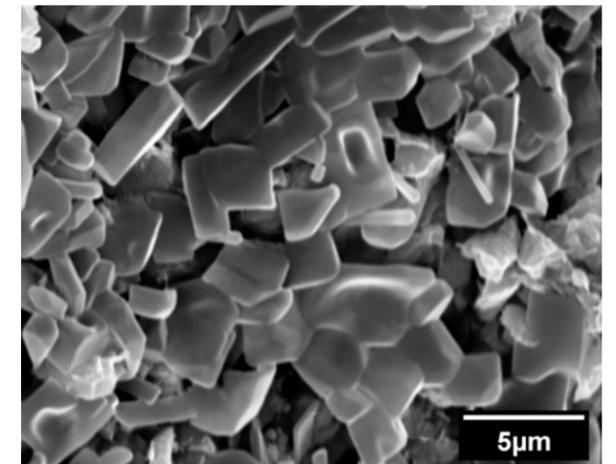
4195 Carbonate from Bushmaster



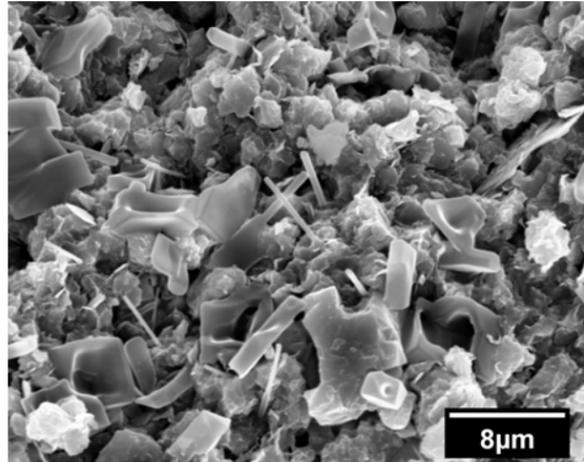
4195 Carbonate from Bushmaster



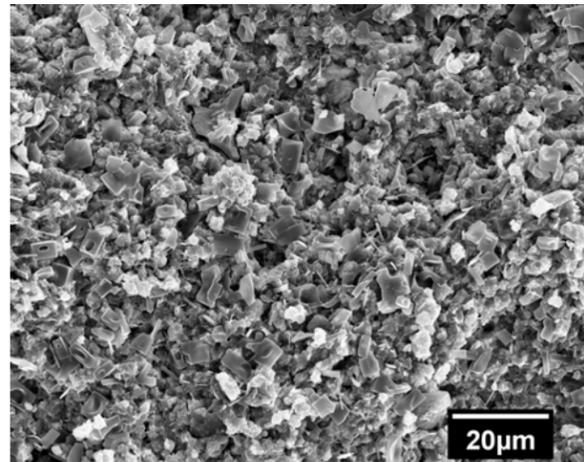
4195 Mussel scoop



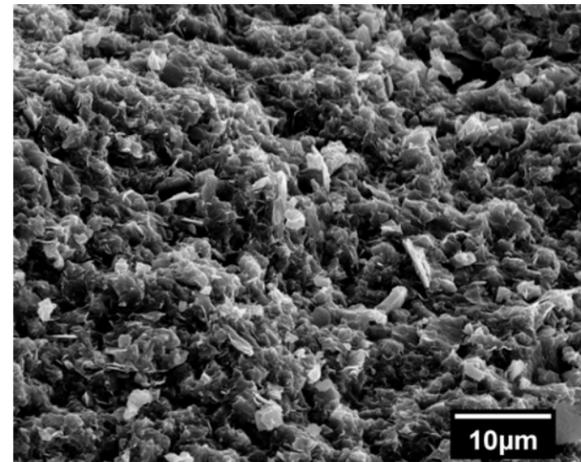
4195 Mussel scoop



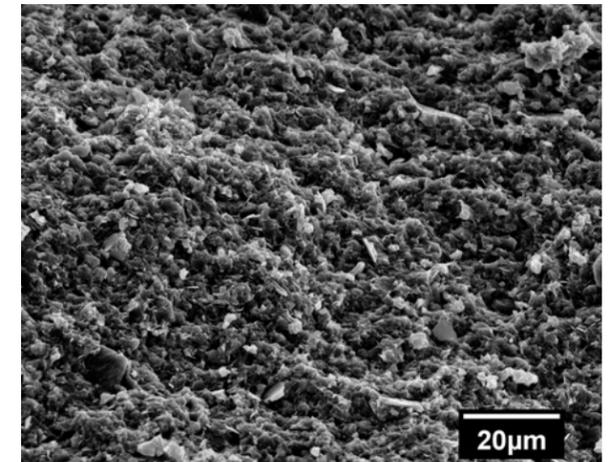
4192 Carbonate from mussel pot



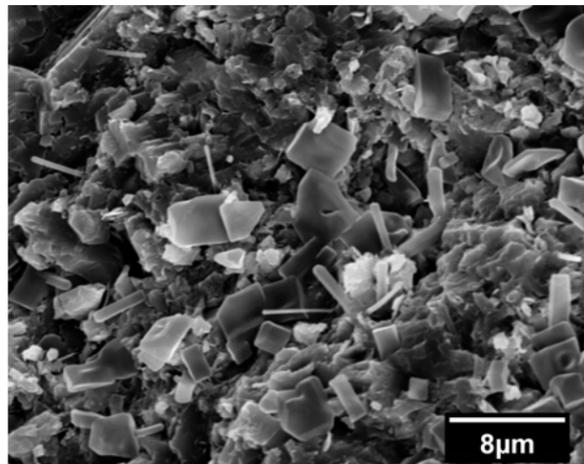
4192 Carbonate from mussel pot



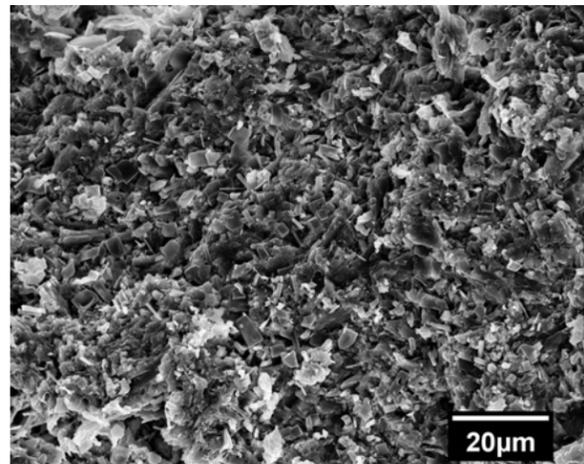
282 Mussel pot D



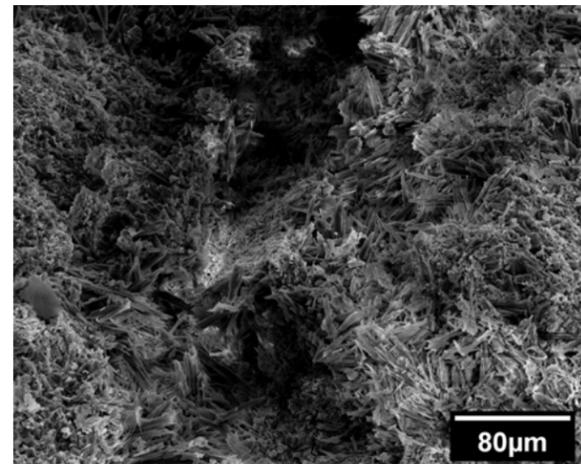
282 Mussel pot D



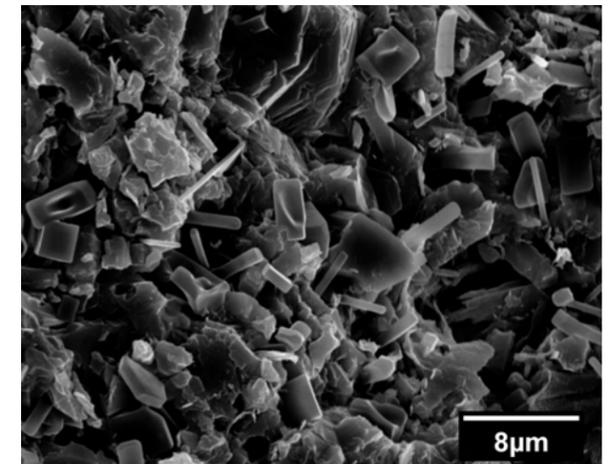
282 Tubeworm grab



282 Tubeworm grab

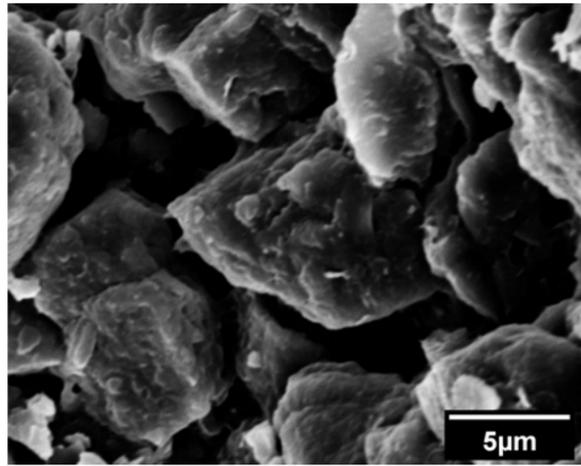


282 Tubeworm grab

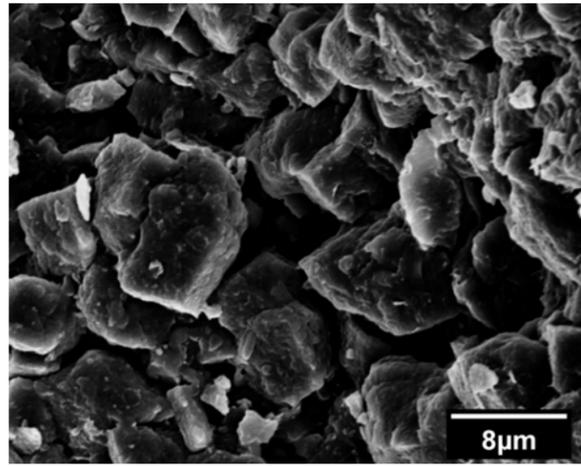


282 Tubeworm grab

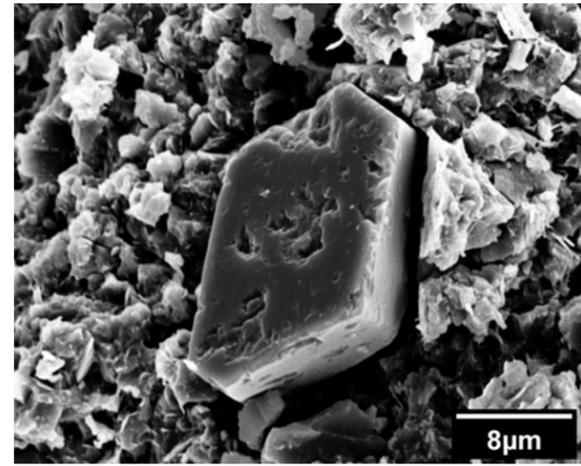
WR 269



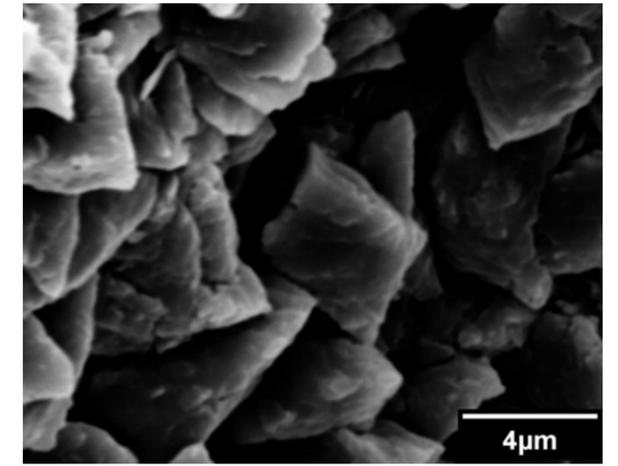
4191



4191



4191



4191

APPENDIX 8-D
X-Ray Diffraction Analyses

X-Ray Diffraction Analyses

Site	Sample ID	Analysis ID	Qtz (%)	LMC (%)	Mol% Mg	HMC %	Mol% Mg	Arag. (%)	Protodol./dolo. (%)	Mol% Mg
AT340	4173-1	1	12			16	7	84		
	4173-2	2	9	5	n.d.			95		
	4173-3	3	8			73	8	27		
	4173-4	4	5	7	n.d.			93		
	4173-5	5	10			30	14	66	4	n.d.
	4179-1	17	5			98	7		2	n.d.
	4180-1	18	n.d.	4	n.d.			96		
	4180-2	19	n.d.	7	n.d.			93		
	4183-1	22	n.d.	4	n.d.			96		
	4183-2	23	5			34	10	66		
	270-1	59	2	3	n.d.			97		
	270-2	60	n.d.			54	13	39	7	30
	270-3	61	3			72	16	13	15	40
	270-4	62	3			23	14	77		
	270-5	63	4			48	13	52		
	276-1	83	2			20	8	80		
	277-1	84	5			31	9	61	8	36
	277-2	85	5	23	1	5	13	72		
	277-3	86	3			100	8			
	4181-1	28	5			100	8			

Site	Sample ID	Analysis ID	Qtz (%)	LMC (%)	Mol% Mg	HMC %	Mol% Mg	Arag. (%)	Protodol./dolo. (%)	Mol% Mg
GC415	272-1	67	6			98	9		2	50
	272-2	101	n.d.			100	9			
	272-3	102	n.d.			100	8			
	272-4	103	10			20	10	80		
GC600	4174-1	6	4			100	20			
	4174-2	7	4			90	10		10	
	4174-3	8	4			44	14	56		
	4184-1	24	6			97	12		3	n.d.
	4184-2	25	6			68	13	32		
	4184-3	26	4			100	12			
	4184-4	27	4			100	13			

Site	Sample ID	Analysis ID	Qtz (%)	LMC (%)	Mol% Mg	HMC %	Mol% Mg	Arag. (%)	Protodol./dolo. (%)	Mol% Mg
GC852	4177-1	12	7			100	14			
	4177-2	13	8			48	14	45	7	
	4177-3	104	4			70	12		30	30
	4177-4	106	5			13	9	87		
	4177-5	107	n.d.	8	1			92		
	4177-6	108	10			38	14	35	26	40
	4177-7	109	6			73	12		27	34
	4185-1	29	8			100	15			
	4185-2	30	5			100	16			
	4185-3	31	6			100	13			
	4185-4	32	7			81	9	3	16	36
	4185-5	105	7			56	10		44	36
	4185-6	110	n.d.	7	2			93		
	4185-7	111	3			58	13	6	35	32
	4185-8	112	6			27	11	38	35	35
	4186-1	33	7			76	15	10	14	30
	4186-2	34	3			38	15	42	20	30
	4187-1	35	7			55	16	45		
	4187-2	36	5			26	16	69	5	n.d.
	273-1	68	7			98	11		2	50
	273-2	69	7			98	11		2	46
	273-3	70	16			97	10		3	46

Site	Sample ID	Analysis ID	Qtz (%)	LMC (%)	Mol% Mg	HMC %	Mol% Mg	Arag. (%)	Protodol./dolo. (%)	Mol% Mg
	273-4	71	7			74	12	3	23	36
	273-5	72	5			51	13	25	24	30
	273-6	73	5			74	11		26	34
	273-7	74	6			45	10	37	18	32
	273-8	75	8	2	1			98		
	273-9	76	7	4	1			92	4	50
	273-10	77	6			98	10		2	50
	273-11	78	6			98	12		2	50
	273-12	79	7			98	13		2	50
	273-13	113	12			5	18	95		
	273-14	114	6	5	2			95		
	273-15	115	n.d.	5	2			95		
	273-16	116	2			65	17	5	30	38
	278-1	87	4			51	10	24	25	34
MC462	271-1	65	3			5	11	95		
	271-2	66	3	9	1	10	12	81		
MC640	4182-1	20	7			100	5			
	4182-2	21	6			97	10		3	n.d.

Site	Sample ID	Analysis ID	Qtz (%)	LMC (%)	Mol% Mg	HMC %	Mol% Mg	Arag. (%)	Protodol./dolo. (%)	Mol% Mg
MC853	4178-1	14	3			100	9			
	4178-2	15	n.d.	100	2					
	4178-3	16	4			98	7		2	n.d.
K243	4176-1	9	5			100	6			
	4176-2	10	7			95	7	5		
	4176-3	11	n.d.			100	6			
AC601	4193-1	40	n.d.			92	6	8		
	4193-2	41	2			100	6			
	4196-1	48	n.d.	100	3					
	4196-2	49	4	100	2					
	4196-3	50		6	1			94		
AC 645	4194-1	42	n.d.	4	n.d.			96		
	4194-2	43	3	7	n.d.			93		
	4197-1	53	4	7	2			93		
	4197-2	54	n.d.					100		

Site	Sample ID	Analysis ID	Qtz (%)	LMC (%)	Mol% Mg	HMC %	Mol% Mg	Arag. (%)	Protodol./dolo. (%)	Mol% Mg
	4197-3	55	n.d.	4	1			96		
	4197-4	56	n.d.	4	2			96		
	4197-5	57	n.d.	3	2			97		
	4197-6	58	3	40	2			60		
	281-1	97	2	6	2			94		
AC 818	4192-1	38	5			100	18			
	4192-2	39	4			51	18	46	3	n.d.
	4195-1	44	5			19	13	80		
	4195-2	45	4			73	18	26		
	4195-3	46	6			35	18	60	4	n.d.
	4195-4	47	2			66	16	34		
	282-1	98	5			48	12	47	5	32
	282-2	99	2	3	n.d.			97		
	282-3	100	4			100	14			

Site	Sample ID	Analysis ID	Qtz (%)	LMC (%)	Mol% Mg	HMC %	Mol% Mg	Arag. (%)	Protodol./dolo. (%)	Mol% Mg
GB 647	280-1	89	9			10	10	90		
	280-2	90	4			76	7		4	50
	280-3	91	2			100	11			
	280-4	92	3	100	3					
	280-5	93	5	98	3				2	n.d.
	280-6	94	3			85	7	15		
	280-7	95	8			100	14			
	280-8	96	n.d.			87	7	13		
GB697	274-1	80	3	100	2					
	274-2	81	15	4	1			94		
	274-3	82	n.d.	100	1					
GB829	279-1	88	5			6	n.d.	88	5	n.d.
WR269	4191-1	37	8			92	14	5	3	n.d.

APPENDIX 8-E
Carbon-14 Dating, Carbon and Oxygen Isotopes
and Uranium-Thorium Dating

¹⁴C dating

Sample	LSU Test ID	GZ Test ID	$\delta^{13}\text{C}$ (‰)	¹⁴ C dating (a B.P.)	¹⁴ C dating (corrected) (a B.P.)
AC 818	# 37	GZ2279	-4.01	3171±27	3516±27
AC 818	# 16	GZ2461	-5.65	3348±30	3665±30
AC 818	# 50	GZ2991	-4.79	3390±28	3721±28
AC 645	# 36	GZ2282	-4.18	11207±37	11549±37
AC 645	# 14	GZ2460	-6.77	41390±315	41688±315
AC 645	# 15	GZ2574	-2.70	9688±32	10055±32
AC 645	# 20	GZ2582	-2.85	11475±40	11839±40
AC 645	# 23	GZ2575	-2.75	10912±35	11278±35
AC 601	# 12	GZ2459	-2.45	9826±39	10197±39
AC 601	# 19	GZ2581	-3.61	7040±28	7391±28
AC 601	# 39	GZ2577	-6.29	37642±205	37948±205
AC 601	# 51	GZ2992	-5.74	16937±49	17289±49
AC 601	# 52	GZ2993	-1.28	6724±32	7114±32
GC 852	# 29	GZ2465	-12.34	5381±27	5587±27
GC 852	# 10	GZ2580	-12.69	32893±139	33093±139
GC 852	# 11	GZ2573	-8.75	37226±178	37491±178
GC 852	# 38	GZ2585	-8.43	3954±27	4225±27
GC 600	# 9	GZ2458	3.25	2923±28	3390±28
GC 600	# 4	GZ2579	-4.59	12682±38	13017±38
GC 415	# 28	GZ2464	-7.74	40913±276	41195±276
GC 415	# 54	GZ2995	-12.71	38971±218	39171±218
GB 829	# 34	GZ2503	-3.14	2453±33	2812±33
GB 829	# 56	GZ2981	-9.24	2656±24	2913±24

GB 829	# 67	GZ2999	-8.43	4613±27	4884±27
GB 697	# 30	GZ2584	-3.51	2974±24	3327±24
GB 697	# 57	GZ2982	-9.16	3675±35	3934±35
GB 647	# 35	GZ2281	-8.43	32037±112	32308±112
GB 647	# 55	GZ2996	-8.45	42078±331	42348±331
AT 340	# 8	GZ2457	-7.36	10655±42	10944±42
AT 340	# 24	GZ2462	-13.11	10820±40	11013±40
AT 340	# 25	GZ2463	-3.63	1440±26	1791±26
AT 340	# 31	GZ2466	-6.10	10351±41	10661±41
AT 340	# 3	GZ2578	-10.71	7644±29	7877±29
MC 462	# 26	GZ2583	-9.62	15145±44	15396±44
MC 462	# 27	GZ2576	5.13	13990±40	14489±40
MC 462	# 53	GZ2994	-14.57	16409±80	16578±80

C and O stable isotopes

Site	Sample ID	Analysis ID	¹³ C _{PDB}	¹⁸ O _{PDB}
AT 340 (n=21)	AT 15-3 Dive 4173	#1	-53.45	3.68
		#2	-51.47	4.12
		#3	-50.85	4.37
		#4	-51.90	3.64
	4173 Carbonate from mussel grab	#8	-51.08	3.41
		#9	-50.00	3.73
		#10	-48.21	4.10
	4173 R1 Carbonate	#11	-49.47	4.08
		#12	-53.26	3.89
	4173 R1 Bottom	#13	-54.83	4.58
		#14	-51.78	3.95
		#15	-51.08	3.41
	4173 Carbonate from tubeworm aggregation	#479	-53.66	3.99
		#480	-54.52	3.98
		#481	-53.27	3.91
		#482	-56.13	3.98
		#483	-53.57	3.98
		#484	-55.19	4.24
		#485	-55.88	3.70
		#486	-52.06	3.75
		#487	-54.69	4.09
		#488	-54.53	4.35
		#489	-54.08	3.72
		#490	-52.83	3.85
		#491	-54.28	4.69
		#492	-55.32	3.63
	#493	-52.89	4.11	
	4179	#51	-35.81	3.51
		#52	-43.53	3.50
		#53	-47.94	4.09
	4180	#54	-46.27	3.30
		#55	-48.71	3.25
		#56	-35.81	3.51
	4180-1	#391	-55.22	4.19
		#392	-53.98	3.89
		#393	-50.60	4.28
		#394	-53.63	3.89
		#395	-46.45	3.64
		#396	-54.84	3.91
		#397	-55.05	4.63
#398		-52.28	3.65	
#399		-51.41	4.27	
#400	-51.20	4.24		

	#401	-53.52	4.65
	#402	-57.11	4.21
	#403	-54.08	4.17
	#404	-52.89	4.49
	#405	-54.85	4.21
	#406	-53.92	4.13
	#407	-50.68	4.92
	#408	-53.69	4.49
	#409	-54.83	3.83
	#410	-50.42	3.99
	#411	-54.18	4.45
	#412	-51.81	3.81
	#413	-53.35	3.68
	#414	-52.94	3.73
	#415	-55.41	4.09
	#416	-48.76	3.81
	#417	-53.56	3.50
	#418	-52.81	3.74
	#419	-55.91	3.82
	#420	-53.13	3.51
AD4181 AT340 Carbonate from mussel scoop #2	#85	-47.40	3.02
	#86	-53.57	3.04
	#87	-48.23	3.17
4183 Rock from baby tubeworms	#68	-47.72	3.43
	#69	-47.82	3.46
4183 Carbonate from bushmaster	#70	-49.12	4.04
	#71	-49.99	3.39
Port Biobox AT 340 Tubeworm environment (43)	#421	-53.25	3.19
	#422	-54.32	3.12
	#423	-54.82	4.41
	#424	-57.68	4.26
	#425	-55.95	3.89
	#426	-56.86	4.43
	#427	-56.81	4.65
	#428	-54.37	4.39
	#429	-54.37	3.40
	#430	-52.63	4.48
	#431	-52.92	3.91
	#432	-53.54	3.83
	#433	-53.67	3.84
	#434	-56.48	3.80
	#435	-57.75	3.72
	#436	-52.63	3.98
Large mussel bed 270-(44)	#512	-56.55	4.37
	#513	-56.39	3.91
	#514	-56.66	4.33
	#515	-54.83	3.70

	#516	-56.60	4.61
	#517	-53.66	4.87
	#518	-55.29	4.58
J2-270 AT340 Carbonate below stained tubeworms (47)	#201	-57.14	4.26
	#202	-55.83	3.63
	#203	-55.77	3.09
	#204	-54.40	4.21
Port Biobox Tubeworm environment AT 340 (52)	#437	-53.73	3.91
	#438	-58.08	4.61
	#439	-60.81	4.34
	#440	-55.42	4.75
	#441	-57.93	5.09
	#442	-54.05	3.77
	#443	-57.33	4.51
	#444	-55.64	4.26
	#445	-54.62	3.51
	#446	-57.10	4.82
	#447	-58.70	4.12
	#448	-55.13	3.74
	#449	-52.18	3.34
	#450	-54.27	3.33
	#451	-52.97	3.64
	#452	-56.02	3.31
	#453	-58.84	4.83
	#454	-56.62	4.65
	#455	-51.79	3.74
	#456	-59.28	3.99
	#457	-52.81	3.92
	#458	-56.08	4.38
	#459	-56.92	4.14
	#460	-58.84	4.72
Great mussel bed 270-(57)	#380	-46.76	3.85
	#381	-48.73	3.84
	#382	-49.22	4.03
	#383	-48.43	3.80
	#384	-55.66	3.55
	#385	-58.37	3.86
	#386	-56.87	3.65
	#387	-53.55	4.56
	#388	-49.79	4.20
	#389	-52.47	4.04
	#390	-48.57	3.63
AT 340 Urchin Bed Calibration Crater (53)			
Rock #1 J2-276 From pt-3m wbr wosaic (25)	#275	-51.00	3.81
	#276	-52.13	4.05
	#277	-53.51	3.75

	277 #4 (26)	#278	-53.42	3.65
		#279	-53.82	3.93
		#280	-54.27	3.20
		#281	-48.16	2.94
	Jason Dive 277 (12)	#282	-40.92	3.60
		#283	-50.38	3.85
		#286	-35.48	3.54
	J-277 Brine Flow Rock (10)	#287	-51.04	3.28
		#288	-49.19	3.37
GC 415 (n=4)	J2-272 Top Mound	#219	-38.19	3.16
		#223	-38.13	3.57
	GC415 Carbonate crust above hydrate Geo Target 9 (41)	#335	-39.30	3.60
		#336	-36.04	3.11
		#337	-40.32	3.77
	GC415 Carbonate Crust Brine Area Carbonate over hydrate (31)	#338	-46.35	4.44
		#339	-45.76	3.31
	GC 415 Carbonate crust in cone Y5 (32)	#341	-22.45	4.16
		#342	-17.47	3.67
		#343	-17.24	4.49
#344		-18.38	4.31	
GC 600 (n=7)	4174-1	#16	-26.34	6.66
		#17	-26.03	4.91
	4174-2	#19	-22.58	4.65
		#20	-20.88	4.82
		#21	-20.86	4.83
	4174	#22	-26.34	3.84
		#25	-25.78	3.70
	4184	#75	-19.20	3.12
		#76	-20.57	3.25
		#77	-18.31	3.23
	4184 Clam Site #2	#78	-27.16	3.94
		#79	-28.60	3.33
		#80	-28.12	3.79
		#81	-24.99	4.32
	4184 Clam Site #2-1	#82	-15.22	4.68
		#83	-22.87	3.33
		#84	-26.36	3.79
	4184 GC 600 Rock from clam scoop	#72		
		#73		
#74				
GC 852 (n=22)	4177 Carbonate from mussel scoop	#32	-50.33	4.41
		#33	-46.53	3.05
		#34	-50.04	3.09
	4177	#35	-47.86	3.26
		#36	-42.89	3.88
		#37	-48.35	4.85
		#38	-46.75	3.00

	#39	-46.02	3.07
	#40	-49.37	4.28
	#41	-47.63	3.70
	#42	-45.80	3.34
4185 Anemone Site	#88	-51.72	4.06
	#89	-51.26	3.46
	#90	-49.74	3.82
	#91	-53.70	3.56
4185	#92	-50.10	3.74
	#94	-48.64	3.75
	#95	-49.78	3.01
4185-1	#96	-49.72	4.16
	#97	-45.36	3.61
	#98	-48.71	3.03
	#99	-48.39	2.99
	#100	-44.98	3.50
	#101	-48.77	3.57
4186 GC852 Rocks from Bushmaster	#102	-50.21	3.57
	#103	-49.61	4.03
	#104	-51.81	3.53
4186 Tubeworms	#105	-46.87	3.34
	#106	-48.49	3.29
	#107	-48.15	4.09
	#108	-48.39	3.64
4187 GC852 Carbonate from mussel pot	#109	-45.06	4.25
	#110	-51.77	4.63
	#111	-49.57	3.34
	#112	-49.58	3.57
4187	#113	-48.14	3.60
	#114	-47.51	3.56
	#115	-46.63	4.04
	#116	-43.46	3.97
	#119	-45.92	4.88
Dive 273 GC852 Mussel Scoop Blue (55)	#226	-41.21	3.76
	#227	-36.39	3.60
	#228	-42.86	3.67
Dive 273 GC852 Rock Sample Geo Target #2-Top Mound (soft coral site) (54)	#229	-38.38	3.82
	#231	-41.89	3.65
Dive 273 Rock Sample GC852 Western Slope anomaly (56)	#232	-49.65	4.68
	#233	-46.51	4.32
Blue Net Mussel Scoop GC852 (45)	#234	-50.07	4.65
	#235	-50.83	3.83
	#236	-39.21	4.02
	#494	-46.51	3.85
	#495	-45.86	3.79
	#496	-46.28	3.96
J2-273 GC852 Stbd Biobox Tubeworm	#237	-50.62	4.14

Grab (51)	#238	-49.47	4.24
	#239	-50.11	4.65
Dive 273 GC852 Port biobox Tubeworm/ Mussel area (37)	#240	-52.96	3.61
	#241	-55.24	4.22
	#242	-55.14	4.33
GC852 Dve 273 Mussel Scoop blue (48)	#243	-49.99	3.96
	#244	-50.88	3.69
	#245	-50.69	4.59
J2-273 GC852 Carbonate rock from white mussel scoop (46)	#258	-38.05	3.62
	#259	-37.85	3.28
Dive 273 GC852 Rock with Sponge close to mussels (50)	#260	-44.61	4.23
	#261	-43.30	3.32
Dive 273 GC852 Sponge Area (36)	#262	-38.08	3.59
	#263	-38.26	3.89
J2-278 bm	#289	-46.44	3.14
	#290	-51.61	3.92
	#291	-50.41	3.37
	#292	-46.87	3.26
	#293	-50.40	4.08
GC 852 Dive 273 Tubeworm Area	#345	-46.42	4.13
	#346	-46.83	4.69
	#347	-44.78	3.98
	#348	-47.48	3.85
	#349	-45.11	3.91
	#350	-53.86	4.01
	#351	-46.13	3.66
	#352	-49.86	3.63
	#353	-46.10	4.26
	#354	-43.51	3.50
	#355	-46.30	3.56
	#356	-49.74	4.23
	#357	-43.15	4.86
	#358	-45.23	4.84
GC 852 Dive 273 Tubeworm Area (2)	#359	-44.99	4.80
	#360	-49.72	3.69
	#361	-48.80	3.72
	#362	-48.59	3.63
	#363	-43.41	3.95
	#364	-46.05	4.06
	#365	-49.92	3.83
	#366	-50.70	4.07
	#367	-45.23	3.12
	#368	-46.72	4.05
	#369	-44.24	4.40
	#370	-44.19	4.83
	#371	-49.22	4.76
	#372	-52.56	4.55

		#373	-48.54	4.07
		#374	-48.00	4.31
		#375	-50.06	4.70
		#376	-44.94	3.56
		#377	-47.23	3.95
		#378	-53.70	3.35
		#379	-48.15	3.87
MC 462 (n=2)	Dive 271 MC462 Anemone Rock- Grab (49)	#212	-42.13	4.15
		#213	-38.86	4.65
		#214	-40.39	5.05
	Dive 271 MC462 (Chuck Collected) Rk W/shells -Dating (56)	#215	-36.50	2.69
		#216	-37.36	3.26
		#217	-37.98	3.45
MC 640 (n=2)	4182	#62	-38.20	2.67
		#63	-27.19	3.01
		#64	-27.67	3.77
		#65	-32.59	2.45
	4182 Aft biobox Mussel Scoop	#66	-40.47	3.41
		#67	-37.15	2.57
MC 853 (n=2)	4178	#43	-41.15	2.73
		#44	-41.38	3.48
		#45	-44.33	2.54
		#46	-39.48	3.01
		#47	-45.14	3.88
	4178-1	#48	-38.21	3.50
		#50	-37.75	3.88
KC 243 (n=3)	4176 KC243 Mussel Scoop sample	#26	-44.24	3.55
	4176 KC243 Carbonate	#28		
		#29		
		#30		
	4176 KC243 Carbonate/Black powder	#31	-39.77	3.46
AC 601 (n=6)	4193	#133	-8.91	3.40
		#134	-9.94	3.88
		#135	-2.35	4.54
		#136	-1.22	3.54
		#137	-0.05	4.09
	Dive 4193 Milk Gate	#138	-7.52	4.97
		#139	-20.13	5.98
		#140	-16.06	5.94
	4196	#164	-12.88	4.72
		#165	-11.01	4.83
		#166	13.97	4.72
	4196-1	#168	-11.56	5.35
		#169	-13.36	4.96
		#170	-13.41	4.63

		#171	-3.97	4.23
	4196 Bushmaster	#172	-32.18	4.53
		#173	-32.13	3.59
		#174	-32.19	3.25
	4196 Slurp Sample	#176		
		#177		
AC 645 (n=7)	4194 Top	#141	-26.30	6.84
		#142	-27.62	4.01
		#143	-29.98	5.40
		#144	-22.23	5.38
		#145	-24.95	5.33
	4194 Bottom	#146	-26.76	4.79
		#147	-31.45	3.93
		#148	-33.92	5.16
	4197 Top Mound	#461	-30.88	4.09
		#462	-30.77	3.80
		#463	-25.40	4.53
		#464	-32.08	3.77
		#465	-27.64	4.30
		#466	-26.46	4.29
		#467	-25.64	4.07
		#468	-33.37	4.06
		#469	-29.32	4.14
		#470	-17.13	4.50
		#471	-30.99	4.52
		#472	-28.78	4.23
		#473	-29.60	4.29
		#474	-30.66	3.94
		#475	-33.24	4.06
		#476	-20.40	4.53
		#477	-25.18	4.55
		#478	-28.95	3.99
	4197 Top Mound-1	#181	-28.12	4.12
		#182	-25.98	4.15
	4197 Top Mound-2	#183	-26.48	4.28
		#184	-26.88	4.38
		#185	-30.16	3.66
		#191	-30.43	3.41
		#192	-26.18	4.00
	Dive 281 AC645 Ubauance site (23)	#323	-28.51	2.57
		#324	-30.92	2.57
	4197 Top Mound-3	#186	-29.66	4.38
		#187	-25.25	3.32
#188		-29.00	3.98	
#497		-26.65	4.37	
#498		-25.70	4.04	
#499		-28.90	4.01	

		#500	-28.02	4.13
		#501	-29.14	3.30
		#502	-29.17	3.97
		#503	-27.50	3.73
		#504	-29.35	4.09
		#505	-25.39	4.35
		#506	-28.77	3.53
		#507	-27.90	4.02
		#508	-28.29	3.98
		#509	-29.29	4.29
		#510	-27.08	3.98
		#511	-28.53	3.78
AC 818 (n=9)	4192 AC818 Carbonate from mussel pot	#125	-31.12	4.54
		#126	-31.62	3.63
		#127	-32.22	4.52
		#128	-34.93	4.23
	4192 Biobox	#129	-33.24	3.39
		#130	-33.59	3.46
		#131	-32.89	4.16
		#132	-29.95	4.26
	4195 AC818 Carbonate from Bushmaster	#149	-29.88	4.35
		#150	-33.42	3.94
		#151	-29.99	3.89
	4195 Mussel Scoop	#152	-37.38	3.88
		#153	-28.74	3.19
		#154	-34.87	4.50
		#155	-35.49	5.10
	4195	#156	-28.86	4.36
		#157	-28.62	4.00
		#158	-31.89	3.99
		#159	-29.61	4.40
	4195-1	#160	-32.67	3.53
		#161	-33.42	4.29
		#162	-30.83	4.33
		#163	-31.97	4.08
	J2-282 AC818 Mussel Pot B	#326	-31.89	2.55
		#327	-26.08	2.46
	J2-282 tw grab	#328	-28.73	3.87
		#329	-34.52	4.17
		#330	-30.47	3.47
J2-282 AC818 Mussel Pot D	#331	-35.51	2.85	
	#332	-30.01	3.19	
	#333	-30.50	3.04	
GB 647 (n=7)	J-280 Carbonate (19)	#299	-25.10	3.59
		#300	-30.40	3.25
		#302	-22.19	3.64
	J-280 Carbonate rubble field (17)	#303	-27.52	3.38

	Port Biobox GB647 JII-280	#305	-16.75	4.34
		#306	-6.79	4.76
		#307	-21.56	4.43
	J2-280 GB647 STBD Biobox	#309	-24.00	6.11
		#310	-26.81	4.22
		#311	-18.95	6.21
	Port Biobox GB647 J2-280 (28)	#312	-23.44	4.67
		#313	-21.58	4.94
		#314	-24.24	5.55
		#315	-22.93	5.13
	J-280 Carbonate of bruhiopod site stbd biobox (18)	#316	-22.46	5.00
		#317	-14.78	4.95
		#318	-22.84	5.25
		#319	-24.00	6.11
	Port Biobox GB647 J2-280 (29)	#320	-20.57	4.26
#322		-22.75	5.36	
GB 697 (n=3)	274 GB697 Stbd (11)	#264	-22.72	3.73
		#265	-23.08	4.95
		#266	-17.39	4.99
		#267	-10.29	4.67
	J-274-01 GB697 Port	#268	-26.50	3.66
		#269	-42.16	2.67
		#270	-45.75	2.89
		#271	-40.79	2.37
	274 GB697 Between Geo Target 3-4 Barite (3)	#273	-26.66	3.48
GB 829 (n=1)	J2-279 Rock #2	#294	-36.80	3.04
		#295	-41.96	3.09
		#296	-38.01	2.32
		#297	-36.62	2.52
		#298	-37.53	2.67
WR 269 (n=1)	4191	#120	-44.06	4.27
		#121	-44.31	2.66
		#122	-43.82	3.38
		#123	-45.06	3.25
		#124	-44.33	3.81

U/Th Dating

²³⁰Th dating results. The error is 2s error.

Sample	²³⁸ U	²³² Th	²³⁰ Th / ²³² Th	δ ²³⁴ U*	²³⁰ Th / ²³⁸ U	²³⁰ Th Age (yr)	²³⁰ Th Age (yr)	δ ²³⁴ U _{Initial} **	²³⁰ Th Age (yr BP)***
Number	(ppb)	(ppt)	(atomic x10 ⁻⁶)	(measured)	(activity)	(uncorrected)	(corrected)	(corrected)	(corrected)
AC 546 4194 Top Mound (LSU-1)	9033 ±24	419797 ±4303	158 ±2	121.2 ±1.7	0.4457 ±0.0017	54687 ±297	53495 ±892	141 ±2	53437 ±892
AC 546 4194 Bottom Mound (LSU-2)	6771 ±24	1672663 ±17648	18.8 ±0.2	131.2 ±2.1	0.2819 ±0.0016	31072 ±216	24588 ±4601	141 ±3	24530 ±4601
GC 852 4177 (LSU-3)	941 ±4	29048 ±332	24 ±1	143.7 ±1.9	0.045 ±0.0020	4371 ±196	3584 ±590	145 ±2	3526 ±590
GC 852 4185 (LSU-6)	991 ±3	4103 ±96	154 ±7	145.4 ±2.0	0.0386 ±0.0016	3736 ±158	3631 ±174	147 ±2	3573 ±174
AT 340 4180 (LSU-4)	5777 ±16	420609 ±4345	27.5 ±0.3	137.1 ±1.6	0.1214 ±0.0006	12288 ±67	10416 ±1326	141 ±2	10358 ±1326
AT 340 4180 (LSU-5)	6191 ±19	474 ±59	17380 ±2165	143.1 ±1.8	0.0806 ±0.0004	7965 ±45	7963 ±45	146 ±2	7905 ±45

*d²³⁴U = ((²³⁴U/²³⁸U)_{activity} - 1) x 1000. ** d²³⁴U_{initial} was calculated based on ²³⁰Th age (T), i.e., d²³⁴U_{initial} = d²³⁴U_{measured} x e^{1234xT}.

Corrected ²³⁰Th ages assume the initial ²³⁰Th/²³²Th atomic ratio of 4.4 ±2.2 x10⁻⁶. Those are the values for a material at secular equilibrium, with the bulk earth ²³²Th/²³⁸U value of 3.8. The errors are arbitrarily assumed to be 50%.

***B.P. stands for "Before Present" where the "Present" is defined as the year 1950 A.D.

APPENDIX 9. COLD SEEP COMMUNITY CARDS

Gulf of Mexico Cold Seep Cards

General information and instructions

The Gulf of Mexico cold Seep Cards feature animals of the Gulf of Mexico (GOM) cold seep environment. The card deck features a total of 15 different species representing the organisms associated with tubeworm communities in the GOM. The front of each card features an image of the animal, and the back of each card features the scientific and common names for the animal, as well as a brief description of the animal's habitat and trophic ecology.

The number of cards of each species is representative of the actual abundance of that species in the seep community, based on deep-sea collections made by Dr. Erik Cordes of Temple University and colleagues. Some animals such as tubeworms, mussels and gastropods are very abundant (and therefore have many copies of cards) while some animals such as the hagfish and sea star are rare (with fewer copies of those cards).

The card deck was designed for use with FLEXE Ecology Unit Activity 6: Food Web and Succession, and FLEXE Ecology Unit Activity 7: Exploring Deep-Sea Communities and Biodiversity Patterns. In Activity 6, students learn that ecological communities change over time through a process known as succession. As a community changes, some species disappear while others flourish. The deck of cards is actually divisible into three subsets, featuring three communities (referred to as Young, Mid, and Old). To accommodate classes with more students, the deck may be divided further (see below) as designated by the color border.

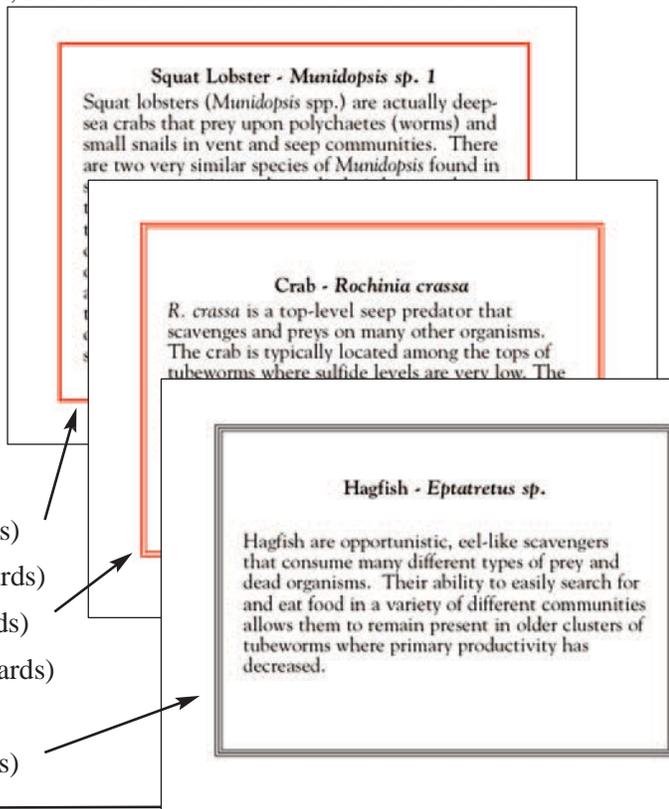
How to sort the cards:

On the back of each card, a border surrounds the paragraph of information. The successional stage of community to which the animal belongs can be determined by the number of lines in the border. For "Young" communities, the border is 1 line thick, for "Middle" communities the border is two lines thick, and for "Old" communities the border is 3 lines thick.

DO NOT TELL THE STUDENTS. THEY WILL WORK OUT WHICH COMMUNITY THEIR SUBSET CORRESPONDS TO BASED ON TROPHIC LEVEL PROPORTIONS.

To facilitate more students groups working with the cards, the deck was designed with two complete sets of organisms for each community, differentiated by border color. You can therefore divide the deck into six sets for six groups.

- 1 Young community with a red border (25 cards)
- 1 Young community with a black border (25 cards)
- 1 Middle community with a red border (25 cards)
- 1 Middle community with a black border (25 cards)
- 1 Old community with a red border (25 cards)
- 1 Old community with a black border (25 cards)



APPENDIX 10. WORKSHOP AGENDAS, EVALUATIONS, OBJECTIVES

**FLEXE: From Local to EXTreme Environments Bringing
Deep-sea Science into the Earth Science Classroom A
Workshop for Educators**

**J.L. Scott Marine Education Center
Gulf Coast Research Lab
The University of Southern Mississippi
Ocean Springs, MS**

Presented by:

**The Pennsylvania State University
Texas A&M University COSEE:
CGOM**

Workshop Objectives:

- ¾ To introduce teachers to deep-sea research and teach specific learning objectives
- ¾ To introduce teachers to the GLOBE program, the FLEXE project, and various educational resources
- ¾ To help teachers bring the deep-sea into your Earth Science Classroom

Learning Objectives:

Workshop participants will learn:

- The distribution and formation of deep-sea hydrothermal vents
- The history of the discovery of hydrothermal vents and how they are studied
- The major fauna present in vent ecosystems and that microbes are at the base of the food web
- How energy transfers through components of the Earth system and energy transfer processes are similar in local and extreme environments
- How patterns of heat energy (as measured by temp) vary in time and space
- How to use GLOBE protocols and learning activities to explore these concepts

Workshop Facilitators: Liz Goehring (PSU), Dr. Shelia Brown (COSEE)

Deep sea Researcher: Dr. Ian MacDonald (TAMU)

Workshop funding: National Science Foundation (FLEXE grant) and Minerals Management Services, US Department of the Interior and NOAA-OE (CHEMO III grant)

Day one - Thursday, July 24, 2008

8:30 Workshop Overview: Welcome, Introductions, Review workshop objectives and agenda, Logistics, Paperwork **(LG)**

9:15 Opening activity: KWL "What do you know about the deep-sea?" **(LG)**

9:30 Introduction to the Deep-sea (presentation by Dr. Ian MacDonald)

- Earth—the ocean planet
- The deep-sea environment

10:00 Hands-on Activity: Animal distribution patterns in the deep-sea

- What is the relationship between animal distribution and temperature?
- Why? Correlation vs. Causation

10:30 Break

10:45 Introduction to Hydrothermal Vents (presentation by Dr. Ian MacDonald)

- Where are vents found? (e.g., plate tectonics, mid-ocean ridges)
- History of vent discovery, distribution worldwide
- What is a vent (vent chemistry, chimney vs. diffuse flow, how they form)
- Who lives there? (vent ecosystems)
- How do we explore them? (Ships and submersibles: ROVs, AUVs, subs)

Lunch

1:00 Bringing this into the Earth Science Classroom? (LG)

GLOBE ESSP - FLEXE Introduction

What is GLOBE, and the "Next Generation of GLOBE"?

What is FLEXE?

FLEXE Energy Unit Overview

- Energy is transferred between components of the Earth system by the processes of radiation, conduction, convection
- Earth has internal and external sources of energy
- Patterns of temperature variation differ in time and space

1:15 Temporal Patterns in Temperature variation around the Globe (LG)

In our local environment (On-line Demo - 30 minutes)

- FLEXE on-line activity exploring diurnal and seasonal patterns at local school and other GLOBE schools, patterns vary with geographic location

1:45 FLEXE Forum - Water Column Temperature Profile (computer lab)

- <http://flexe.psu.edu/ff/> {dataset 1}
- Water Column Profile Forum
- Profile at different latitudes (Knauss figure)

2:15 Break

2:30 FLEXE Forum – Temperature variation at a deep-sea hydrothermal vent (computer lab)

- <http://flexe.psu.edu/ff/> {dataset 2}
- FLEXE on-line data activity of temperature at Bio9 vent over three years
- Contrast terrestrial patterns with extreme site patterns and causes

3:15 Deep-sea Research (presentation by Dr. MacDonald)

4:15 Wrap-up (return to KWL chart), New Questions?

4:30 Adjourn for the day

Day two – Friday, July 25, 2008

8:30 Recap – what did we learn? What do we still want to learn? (LG)

8:45 "Plume Teaser" Modeling plume dynamics in the classroom

9:15 Back to FLEXE – Mechanisms of Heat Transfer

Energy transfer in our Local environment – FLEXE Learning Activity

- Introduce model of energy transfer
- Review Temperature Tower protocol
- Obtain temp measurements and make class dataset
- Demos: radiation, conduction, convection, heat capacity (jigsaw)
- Summarize findings and areas of uncertainty

10:45 Break

11:00 FLEXE Forum – Energy transfer at a hydrothermal vent plume and diffuse flow field (computer lab)

- <http://flexe.psu.edu/ff/> {dataset 3}
- FLEXE on-line data activity exploring the temperature of a mid-Atlantic plume cooling as the plume rises illustrating conduction and convection.

Lunch

1:00 Discussion of spatial patterns of variation in both local and vent environment – similarities and differences.

1:15 Research Cruise On-Line Event (computer lab)

- Cruise mission and Study Site description
- Cruise Participants & FLEXE schools/students involved
- Student questions & answers, Podcasts
- Teacher Blog

2:15 FLEXE Forum Wrap-up (Review Together) – What is “Extreme”?

Break

2:45 Movie clips – Using "Aliens of the Deep" in your classroom

3:45 Review related curriculum (NOAA OE)

- **Who Promised You a Rose Garden?**
- **The Galapagos Spreading Center**
- **AdVENTurous Findings on the Deep Sea Floor**
- **One Tough Worm**
- **InVENT a Deep-Sea Invertebrate**

4:15 Questions, Ways to participate to FLEXE, Evaluation

4:30 Adjourn

**FLEXE: From Local to EXtreme Environments Bringing
Deep-sea Science into the Earth Science Classroom A
Workshop for Educators**

21-22 July 2009

**J.L. Scott Marine Education Center
Gulf Coast Research Lab
The University of Southern Mississippi
Ocean Springs, MS**

**Presented by:
The Pennsylvania State University
Temple University
COSEE: CGOM**

Workshop Objectives:

- ¾ To introduce teachers to deep-sea research and teach specific learning objectives
- ¾ To introduce teachers to the GLOBE program, the FLEXE project, and other NOAA OE educational resources
- ¾ To help teachers bring the deep-sea into their Life Science/Biology Classroom
- ¾ To invite teachers to pilot test new FLEXE curricular activities

Learning Objectives:

Workshop participants will learn:

- The distribution/formation of deep-sea hydrothermal vents & hydrocarbon seeps
- The major fauna present in vent and seep ecosystems and that microbes are at the base of the food web in both.
- Patterns of biodiversity in vent, seep and seafloor environments, and how scientists measure biodiversity
- Vent and seep community trophic structure and changes with succession
- Feeding strategy adaptation and symbiosis in vent and seep mussel species
- How scientists study seafloor ecosystems and what tools they use
- How to use FLEXE and NOAA Ocean Exploration learning activities and on-line resources to explore these concepts with students

Workshop Facilitators: Liz Goehring (PSU), Dr. Shelia Brown (COSEE)

Deep-sea Researcher: Dr. Erik Cordes (Temple)

Workshop funding: Minerals Management Services, US Department of the Interior; NOAA-OE; and NSF

Day one - Tuesday, July 21, 2009

8:30 Workshop Overview: Welcome, Introductions, Review workshop objectives and

agenda, Logistics, Paperwork (LG)

9:00 Setting Expectations: “KWL...about deep-sea ecology?” (LG)

9:15 Opening Activity: How do we study remote ecosystems like the seafloor? (LG)

Handout and dataset:

- What animals are living there?
- What patterns do we observe?
- What is the relationship between animal distribution and temperature?
- Correlation vs. Causation – how can we know?

10:00 Break

10:15 Introduction to Deep-sea Ecology (EC)

- Characteristics of the deep-sea environment: abyssal plane, vents, seeps *Abiotic*
 - Vent distribution worldwide, MOR, spreading centers, vent chemistry, chimney vs. diffuse flow, characteristics
 - Formation of seeps, distribution, seep chemistry, characteristics
- Who lives there? (vent and seep ecosystems) *biotic*
- How does life survive in that environment?
- How do we explore them? (Ships and submersibles: ROVs, AUVs, subs)
- Current ecological research questions – (i.e., MMS/NOAA OE; R2K)

11:15 Exploration of Cruise website and “Try This!” activity (LG)

Computer lab: <http://www.globe.gov/projects/flexecruise/sampleactivity09>

Check your answers.

Lunch

1:00 Bringing the Deep-Sea into the Life Science Classroom (LG)

- GLOBE ESSP – FLEXE Introduction
 - What is FLEXE (From Local to Extreme Environments)?
 - FLEXE Project, pilot results, demonstration of on-line components
- "Next Generation of GLOBE" – Student Research Campaigns
- FLEXE Extreme Ecology Unit Overview & Essential Questions
 - Does life exist in the deep-sea? How diverse is it?
 - What are the interactions between organisms and their environment?
 - How do the challenges of an environment shape life?
- FLEXE 2009-2010 Pilot Overview

1:30 FLEXE Forum: Biodiversity – how many species ARE there? (LG)

Handout and dataset:

- Brief introduction to biodiversity, and why ecologists study it
- How to measure diversity (e.g., sampling tools, indices)?
- Creating a rarefaction curve, and interpreting curves for different environments

2:15 Break

2:30 FLEXE Forum – Live! Deep-sea Biodiversity (EC)

- Deep-sea biodiversity patterns and explanations
- What have we learned about biodiversity from the ChemOIII cruises

3:15 Further Exploration: (computer lab)

- Webquest: Deep-sea Research (GOM NOAA OE)
- NOAA OE: “How Diverse is That?” and VIMS “Diversity of the Deep”

4:00 Questions from Webquest? Questions from the day? (EC)

4:14 Wrap-up (return to KWL chart), new questions?

4:30 Adjourn for the day

Day two – Wednesday, July 22, 2009

8:30 Recap – what did we learn? What do we still want to learn? (LG)

8:45 “Tubeworm Teaser” (LG)

- How does this animal (i.e., *Riftia pachyptila*) ‘make a living’?
- Are all deep-sea tubeworms the same (e.g., *Lamellibrachia luymesii*)?
- “How we figured out how seep tubeworms get food” (EC)

9:00 Food Webs in the Deep Sea – chemosynthetic systems (LG)

- Hydrothermal Vent Trophic Levels– NOAA Website (computer lab)

10:15 Exploring Seep Communities over Time (still in computer lab?)

- Hydrocarbon Seep Trophic levels – FLEXE Cards
- Seep Community Succession – The Trophic Card Game
- Further Exploration: “How do we know who eats whom?” NOAA OE, MAR-ECO websites)

Break

11:15 FLEXE Forum – Live! Seep Community Succession (EC)

- What have we learned about community succession in the seep?
- What abiotic factors contribute to these successional changes?
- What do we still want to know – current research questions?

11:45 Lunch

12:45 Mussel Anatomy and Adaptations Lab (LG)

- Mussel Dissections – 1 per pair of teachers
- Compiling a class dataset – what have we found?

2:00

FLEXE Forum Comparison of data from Vent and Seep environment (LG)

Handout and dataset:

- Use handout/excel file to compare data and interpret results
- Read “Field Notes” from Vent cruise and Seep cruise
- What did we find?

2:45

FLEXE Forum – Live! Symbiosis and Adaptation (EC)

- Discussion of results, possible explanations
- How chemosynthetic bacteria and deep-sea mussels make a living together
- Differences between vent and seep species
- Importance of symbiosis in chemosynthetic communities

Break

3:45 Overview related curriculum (NOAA OE) (LG)

4:00 FLEXE Extreme Ecology Pilot (spring 2010) – how to participate (LG)

4:15 Questions, KWL Revisited, Evaluation

4:30 Adjourn

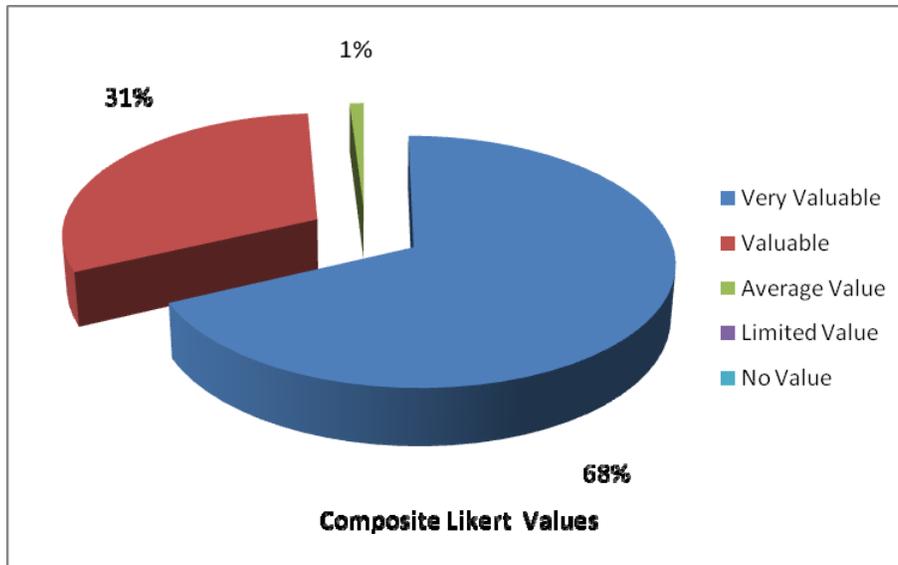
Grade Taught	Participate in Pilot
7-8, Life, Earth	y
10-12, Biology	
7-12, Biology	
8, Earth	y
6-8, Life, Earth	
6, Science	
4, Tutor Lab	
6, Science	
6-8, Earth, Life, Physi	y
College/GLOBE Trainer	
9-10, Biology	
10-12, Marine Biology	y
4-5, Gifted	
Scie Specialist, all grades	
10-12, Environmental	
10-12, Marine Biology	y
8-9, Earth, Physical	y
7-8, Science	
10-11, Biology	
Teacher Intern	
64	

**FLEXE: From Local to Extreme Environments Bringing
Deep-sea Science into the Earth Science Classroom J.L. Scott**
Marine Education Center
Gulf Coast Research Laboratory The
University of Southern Mississippi
Ocean Springs, MS 39564
July 21 – 22, 2009

**Presented by: Pennsylvania
State University Temple
University COSEE:CGOM**

EVALUATION

DAY ONE (7/21/09)	Very Valuable	Valuable	Average Value	Limited Value	No Value
Hands-on Activity: How do we study remote ecosystems like the seafloor?	61%	39%			
Introduction to Deep-sea Ecology(Dr. Erik Cordes)	78%	22%			
Exploration of Cruise website and “Try This!”activity	66%	28%	6%		
Bringing the Deep-sea into the Life Science Classroom	89%	11%			
FLEXE Forum: Biodiversity- how many species ARE there?	67%	33%			
FLEXE Forum – Live! Deep-sea Biodiversity	67%	33%			
Further Exploration (computer lab)	87%	13%			
DAY TWO (7/22/09)	Very Valuable	Valuable	Average Value	Limited Value	No Value
Recap – what did we learn? What do we still want to learn? (LG)	56%	33%	11%		
“Tubeworm Teaser”	59%	41%			
Food Webs in the Deep Sea-chemosynthetic systems	67%	33%			
Exploring Seep Communities Over Time	59%	41%			
FLEXE Forum- Live! Seep Community Succession	67%	33%			
Mussel Anatomy and Adaptations Lab	72%	28%			
FLEXE Forum: comparison of data from Vent and Seep environment	67%	33%			
FLEXE Forum: Live! Symbiosis and Adaptation	61%	39%			



Comments:

1. How did the FLEXE: From Local to Extreme Environments help to further your professional goals?
 - Ideas and activities will enable students in classroom to gain better understanding of ecological interactions.
 - FLEXE helped me understand the biology of the deep sea. Since I mainly teach earth science a lot of the information was new to me.
 - I wanted to increase my knowledge about our ocean. We had very deep discussions about new data.
 - I feel like I am more knowledgeable of my subject, which can do nothing but help my teaching. I am also glad to be getting involved with the pilot program and getting the opportunity to make connections with scientists.
 - Gave me a good idea of what I want to study.
 - It has given me some resources that will help me teach ecology.
 - Underwater vent communities are great for teaching concepts in both life and earth. Concepts like symbiosis, chemosynthesis, plate tectonics, and biological processes are taught through this program.
 - Better understanding of how to teach ecological concepts.
 - It will bring a new curriculum into use.
 - I will introduce FLEXE to teachers in Jackson and state teachers through the mailing list which has 5,000 people.
 - No answer.
 - No answer.
 - Gave me a deeper understanding and taught me how to implement.
 - No answer.

- It actually motivated and confirmed that I will get my doctorate in Ecology.
 - No answer.
 - No answer.
 - Activities were great and information was extensive.
2. What changes or improvements would you make to the FLEXE Workshop?
- The two-day length was just right.
 - None.
 - ?
 - I really enjoyed this. Every teacher has his/her own way of “tweaking” their own lessons. I think the workshop would have been as successful no matter how it was organized.
 - NA
 - Management – have teachers turn off phones at beginning and implement a way to get attention of the talkers.
 - NA
 - More hands-on!
 - Make it a three day event.
 - NA
 - No answer.
 - No answer.
 - N/A
 - No answer.
 - Comments:
 - Less talk and ramblings.
 - Start activity and then go over it immediately Do not wait until the end.
 - Do not continue starting the lesson over when after-comers arrive.
3. Will this experience enable you to improve student learning at your school and in your area/district? If so, how?
- Yes – I will be able to interest students in new areas that may not have been touched on in the past.
 - Yes. It will because my students do not have much knowledge about the ecology of the deep sea.
 - Yes, I will use the NOAA site, the forums online, and the data we received from the start of my year.
 - Absolutely! I am so much more knowledgeable of deep sea ecology, and I will pass that on for sure.
 - Well, eventually when I get my own classroom.
 - Yes. I will be able to teach ecology and integrate physical science by using these activities.
 - Absolutely! The more comfortable I am in teaching this and the more knowledgeable I am about the topics will help students understand it better and excite them about it.
 - The hands on activities will help bring relevance to the concepts.
 - Yes -so students can experience real-time marine topics.

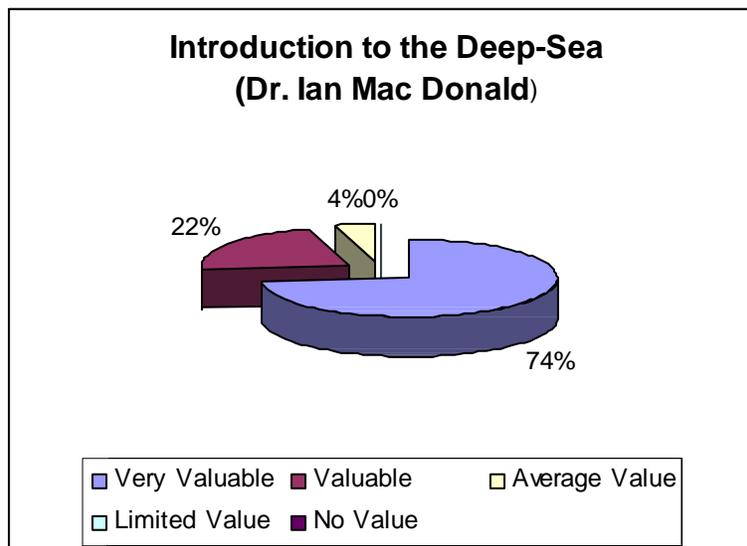
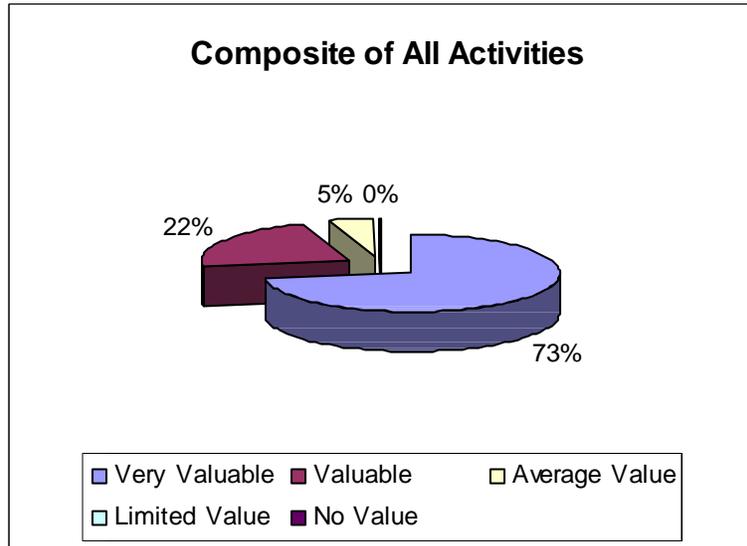
- I talk to the public at the planetarium and now we run a movie about sea creatures, so I will definitely use the materials. I will offer the activities to teachers. I have 5,000 in my address list.
- No answer.
- No answer.
- Yes, enabling me with the resources and knowledge to teach with.
- No answer.
- Yes, I have more hands-on activities, website, and resources. I learned how to incorporate web-quest. Fun!
- No answer.
- Diversify ecology lessons.
- Absolutely! I can easily use the activities to enhance student learning.
-

Number of students you anticipate you will reach with content from this workshop?

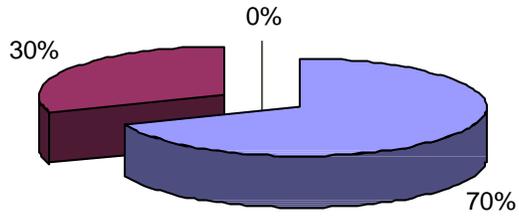
- 90
- NA
- 30
- 50
- NA
- 85
- 100
- 50
- 125
- It always depends on the public or school teachers who invite me to talk in their classrooms.
- 100
- 160
- No answer.
- No answer.
- No answer.
- 40 – 50
- 100 – 120

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**COSEE:CGOM FLEXE/GLOBE
Teacher Workshop
July 24-25, 2008
Ocean Springs, MS**

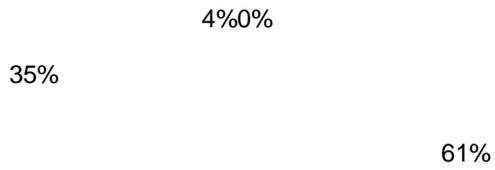


Animal Distribution in the Deep-Sea



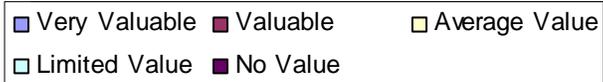
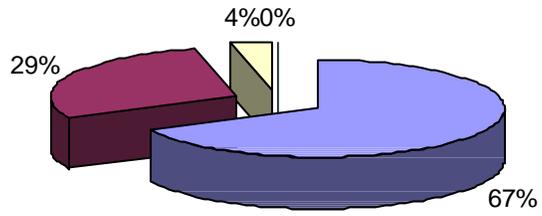
Very Valuable	Valuable	Average Value
Limited Value	No Value	

Introduction to Hydrothermal Vents (Dr. Ian MacDonald)

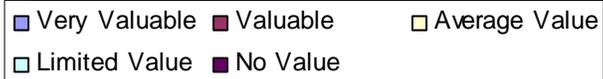
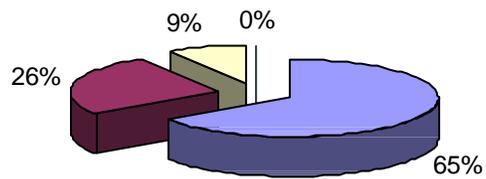


Very Valuable	Valuable	Average Value
Limited Value	No Value	

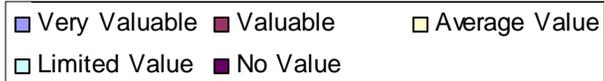
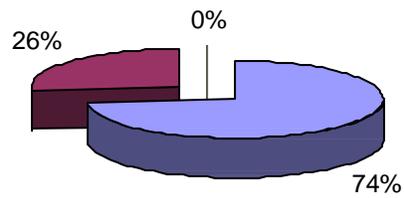
GLOBE ESSP - FLEXE Introduction



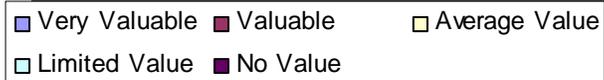
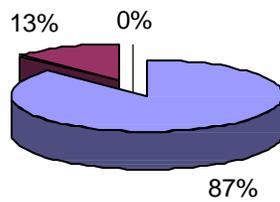
Temporal Patterns in Temperature Variation Around the Globe



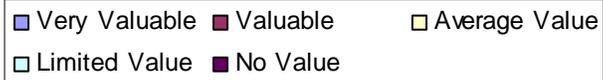
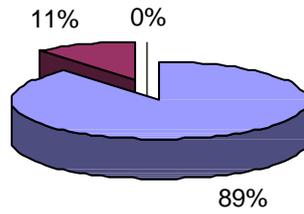
FLEXE Forum Water Column Profile



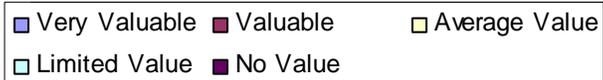
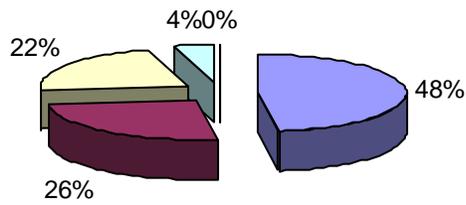
FLEXE Forum Temperature Variation at a Deep-Sea Hydrothermal Vent



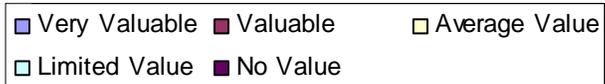
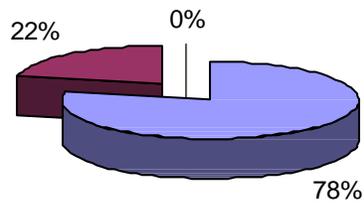
Deep-Sea Research (Dr. Ian MacDonald)



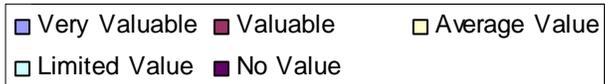
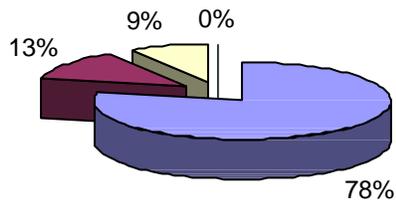
Recap of First Day What did we learn? What do we still want to learn?



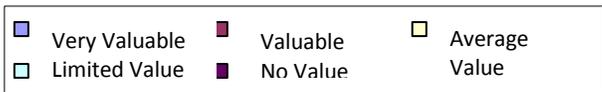
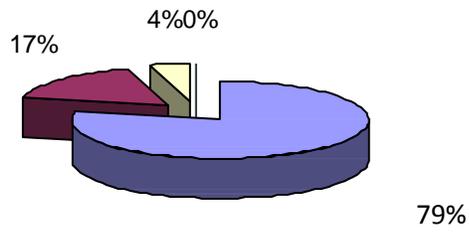
Plume Teaser



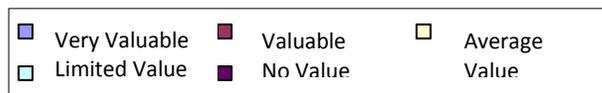
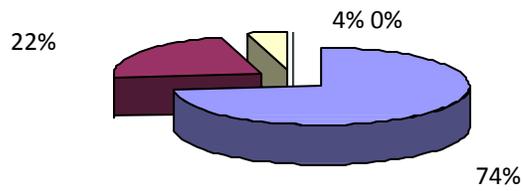
Mechanisms of Heat Transfer



Energy Transfer at a Hydrothermal Vent Plume and Diffuse Flow Field



Discussion of Spatial Patterns of Variation in Both Local and Vent Environments



LIKERT SCALE EVALUATION

DAY ONE (7/24/08)	Very Valuable	Valuable	Average Value	Limited	No Value
Introduction to the Deep-sea (Dr. Ian MacDonald)	74%	22%	4%		
Hands-on Activity: Animal distribution patterns in the deep-sea	70%	30%			
Introduction to Hydrothermal Vents (Dr. Ian MacDonald)	61%	35%	4%		
Bringing this into the Earth Science Classroom? (LG)	67%	29%	4%		
GLOBE ESSP- FLEXE					
Introduction					
Temporal Patterns in Temperature variation around the Globe (LG)	65%	26%	9%		
FLEXE Forum – Water Column Temperature Profile (computer lab)	74%	26%			
FLEXE Forum – temperature variation at a deep-sea hydrothermal vent (computer lab)	87%	13%			
Deep-sea Research (Dr. Ian MacDonald)	89%	11%			
DAY TWO (7/25/08)	Very Valuable	Valuable	Average Value	Limited	No Value
Recap – what did we learn? What do we still want to learn? (LG)	48%	26%	22%	4%	
“Plume Teaser” Modeling plume dynamics in the classroom	78%	22%			
Back to FLEXE – Mechanisms of Heat Transfer	79%	13%	9%		
FLEXE Forum – Energy transfer at a hydrothermal vent plume and diffuse flow field (computer lab)	79%	17%	4%		
Discussion of spatial patterns of variation in both local and vent environment—similarities and differences.	74%	22%	4%		

GLOBE ESSP- FLEXE					
Introduction					
	Very Valuable	Valuable	Average Value	Limited	No Value
Temporal Patterns in Temperature variation around the Globe (LG)	65%	26%	9%		
FLEXE Forum – Water Column Temperature Profile (computer lab)	74%	26%			
FLEXE Forum – temperature variation at a deep-sea hydrothermal vent (computer lab)	87%	13%			
Deep-sea Research (Dr. Ian MacDonald)	89%	11%			
DAY TWO (7/25/08)	Very Valuable	Valuable	Average Value	Limited	No Value
Recap – what did we learn? What do we still want to learn? (LG)	48%	26%	22%	4%	
“Plume Teaser” Modeling plume dynamics in the classroom	78%	22%			
Back to FLEXE – Mechanisms of Heat Transfer	79%	13%	9%		
FLEXE Forum – Energy transfer at a hydrothermal vent plume and diffuse flow field (computer lab)	79%	17%	4%		
Discussion of spatial patterns of variation in both local and vent environment—similarities and differences.	74%	22%	4%		

FLEXE/GLOBE Comments

1. How did FLEXE: From Local to Extreme Environments help to further your professional goals?
 - Increased content knowledge and enhanced understanding of how to facilitate directed inquiry online.
 - I am always looking for new ways to explain physical concepts to my students and this will add to my repertoire.
 - Increase of knowledge which furthers my students’ awareness.
 - 1. Updated me and/or gave me information I did not have.
 - 2. Gave me new materials.
 - 3. Gave me some new equipment and made me come up with new ideas.
 - Gave me information to help explain to students how all environments relate. Strengthened my understanding.
 - How to incorporate interest in deep sea vents and learning chemistry and environmental science concepts. How to make research meaningful to students.
 - It gives me a new instructional component to use the study of Earth processes and oceanography. Thanks! It also gives me an opportunity to engage my students in exciting activities.
 - The more I learn the better I teach.
 - Gave me a broader outlook and information that I can include in my school/grade curriculum that would enhance my students understanding of competencies that must be taught in the MS state curriculum.
 - Finding ways to motivate students- students will enjoy these hands-on activities- plus technology.
 - I would love to be able to fit this into the biology curriculum. It will catch the students’ attention!
 - N/C
 - I covered most of the information given in workshop in one way or another so it all affirmed what I have been doing for 35 years.
 - None.
 - It has broadened my teaching scope.

- I am interested in being more involved in FLEXE. It will help in Earth Science and Environmental Science teaching.
- I was able to study material relevant to my class.
- The knowledge I gained here will allow me to bring lots of interest to the aquatic science classroom.
- Really gave me some great “stuff” PowerPoint ideas, and having the opportunity to meet Dr. MacDonald.
- Watching the demonstrations gave me ideas for my classrooms and gets me excited about teaching.
- Has great ideas that I will incorporate into my class.

2. What changes or improvements would you make to FLEXE Workshop?

- None
- None
- All though Dr. MacDonald was very good, applicability together with information is better ... overview was thorough yet long.
- First day a lot of sitting, great stuff but we needed to interact a little more.
- None
- The seats got pretty hard at the end of the first day.
- More movement, either in activities or structured breaks.
- I loved the demonstrations, PowerPoint, and information. The presenters were friendly, informative, and knowledgeable. Don't change anything.
- I would make the first day more interactive like the second day.
- None
- The only thing I would change would be to break up the lecture PowerPoint with activities between, however I understand the limited time.
- N/C
- It's OK!
- None
- Instead of paperwork issue a CD/joy stick with information and PowerPoint presentations on them. Do a workshop for High school teachers only!
- Gave me some new ideas for labs.
- New ideas relative to today for science.
- Maybe a little shorter day (by one hour).
- None, except have more prizes.
- More hands-on in small groups. More time working on computer.
- It was great.
- More hands- on activities.
- Can't think of anything.
- No.
- Make it 3 days instead of just 2 days.

3. Will this experience enable you to improve student learning at your school and/or district? If so, how?

- I will share this knowledge and resource with: Biology undergrads, Pre- service Biology teachers, and High school and College educators.
- Yes, the website we visited will be very valuable to my students' understanding.
- Yes Æ inquiry, spatial, graphing analysis, and communications.
- Yes, it will get us outside and more connected to what's happening on the planet now.
- Yes, they live in mid state and most know nothing about the marine environment. This will be a change in information and very interesting.
- At the minimum I will incorporate several labs/ activities of the FLEXE/GLOBE programs especially in Environmental Science. I may do more in the future. I will also distribute to Marine Biology teachers.
- Yes! It will be a great way to motivate my students.
- Yes, I have a lot of information to share with the other teachers in my school that they will share with

their students.

- Yes, this experience gave me information that I can use in my classroom to enhance my student's understanding of the deep sea.
- I believe it will be a great motivational tool.
- Yes, it will give my students' current technology and research and hopefully encourage science fields for them.
- Yes, it gives students additional resources which are not available elsewhere.
- Yes, once I get through learning Ocean Science, I think it will all fall into place. I'm sort of burnt out/overwhelmed.
- Yes
- Yes, my students will enjoy the labs.
- Yes, new ideas and labs.
- Yes, through inquiry, thought provoking activities for students to learn about the sea and unknown areas to them.
- Definitely. It adds a whole new dimension to my classes.
- I will be prepared with curriculum related materials for my students.
- This will be the first year to offer Marine/Aquatic science in our district therefore I feel more prepared through this workshop.
- All will fit into my marine courses this year.
- Definitely, teaching in demo lasts longer.
- Yes, it will fit perfectly into my plans.

Number of students you anticipate you will reach with content from the workshop.

175,125, ~60/yr, 120, 75, 300+, 75, 150-180,150+, 12,110, 35, ~100/sem., 130/yr, 100+, 60, 30, 150, 150

Demographics

Your Position	Administrator 1	Teacher 23	Other		
What you teach	Math & Science 4	Science 17	Math	Other 2	
Grade Level	K-5	6-8 11	9-12 14	Other 2	
Years of teaching	0-5 5	6-10 4	11-15 5	Other 30, 29,40, 24,35,32,>15,40	
Your Ethnicity	African American 1	Asian American	Caucasian 22	Hispanic	Other