Trophic Interactions and Relations with Background Fauna

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Questions Posed

- Progressing from the upper to the lower slope
  - Is there a change in the SEEP-Background Interaction?
    - Trophically?
    - Compositionally?
- Primary Tool
  - N, C, & S stable isotope analyses

Consideration of Interactions

1. Substrate

Colonization Filter Favoring Sessile Species

- a mosaic of carbonate hardbottom and sediment.

2. Geochemical

Colonization Filter Favoring Extremophiles

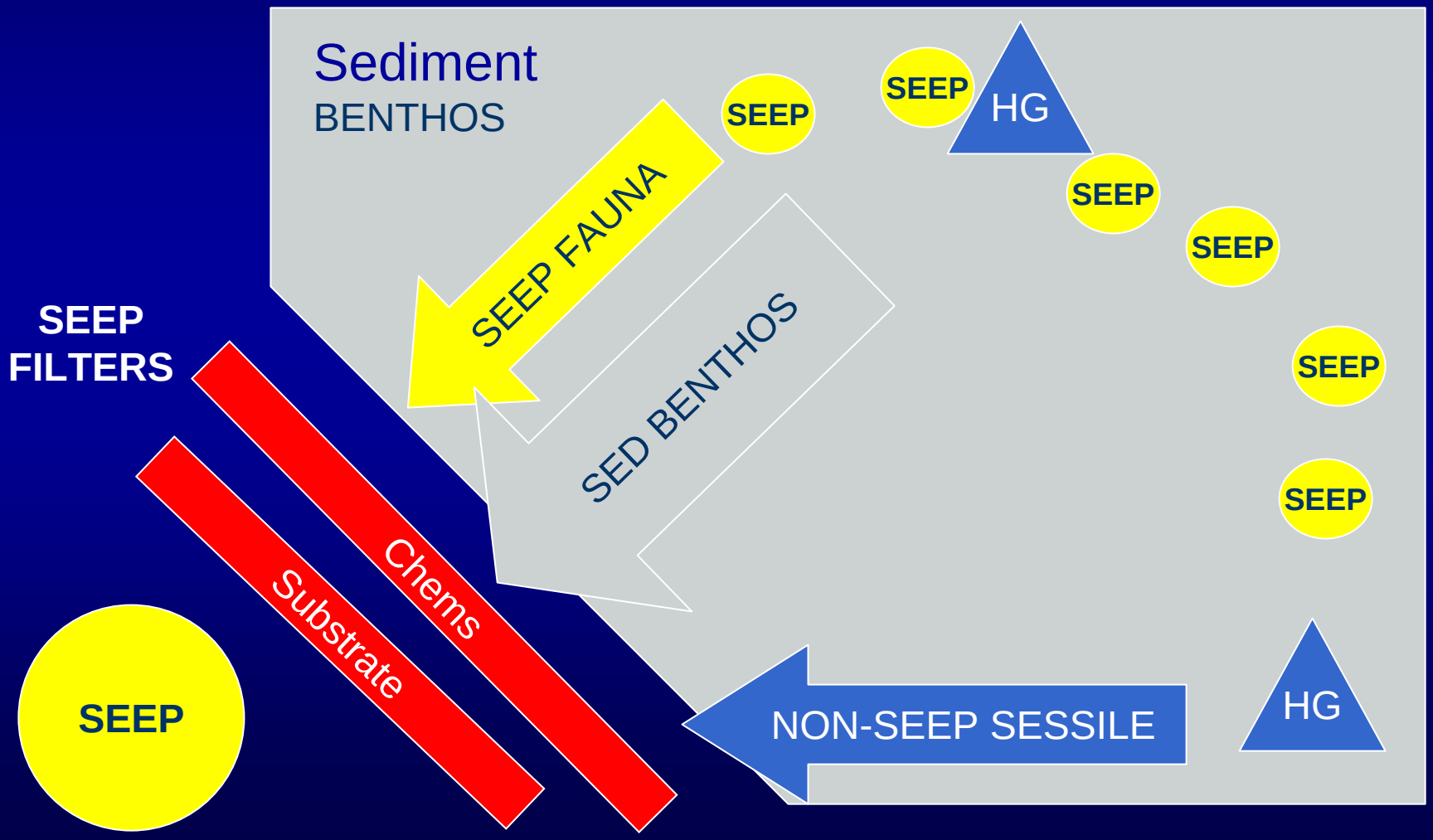
- Sulfidic sediment rather than hypoxic/anoxic
- High hydrocarbon concentration
- Brines

3. Biotic

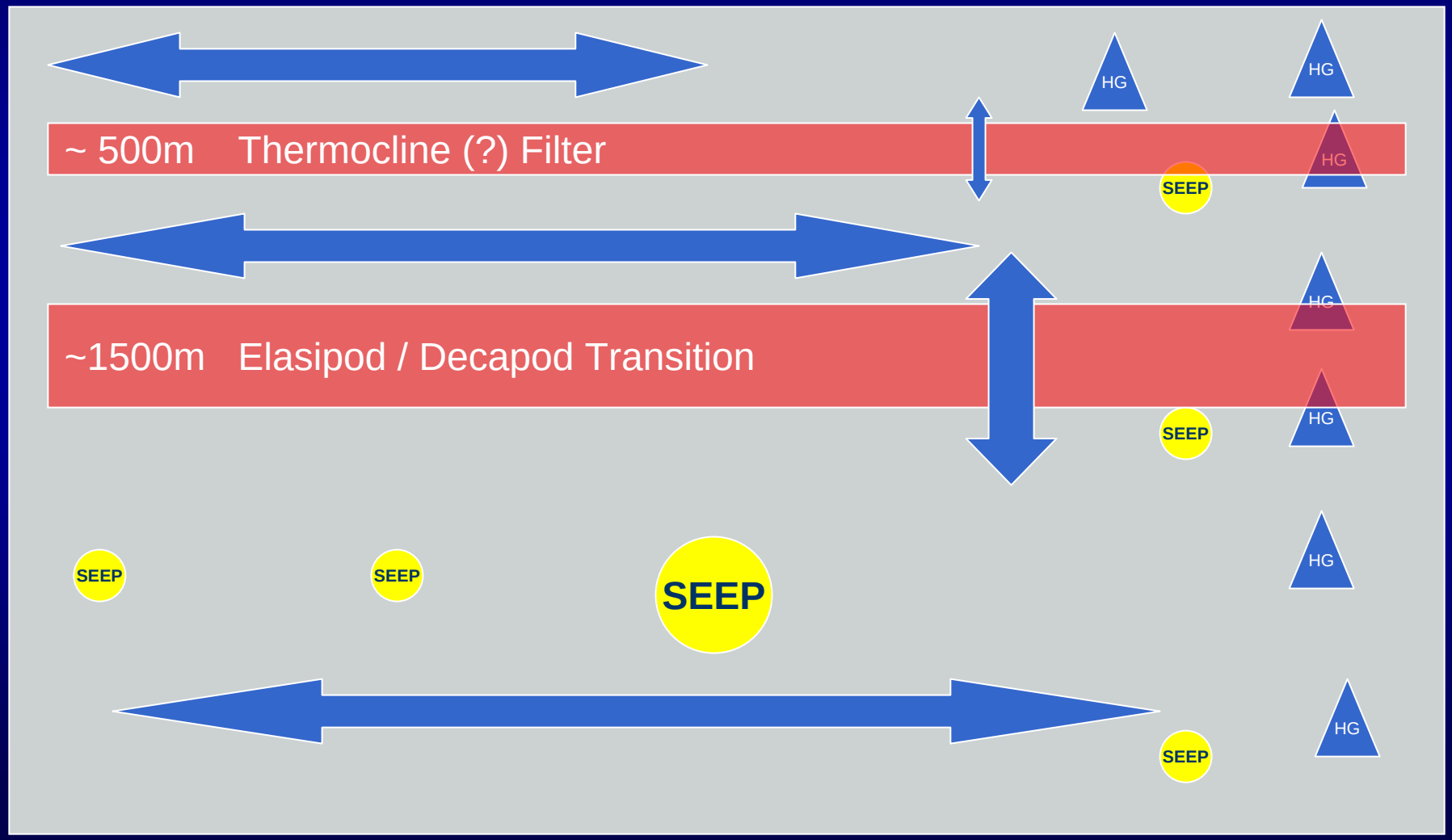
Multi-Component Large Trophic Resource

- Distinct species composition
- Very high standing stocks

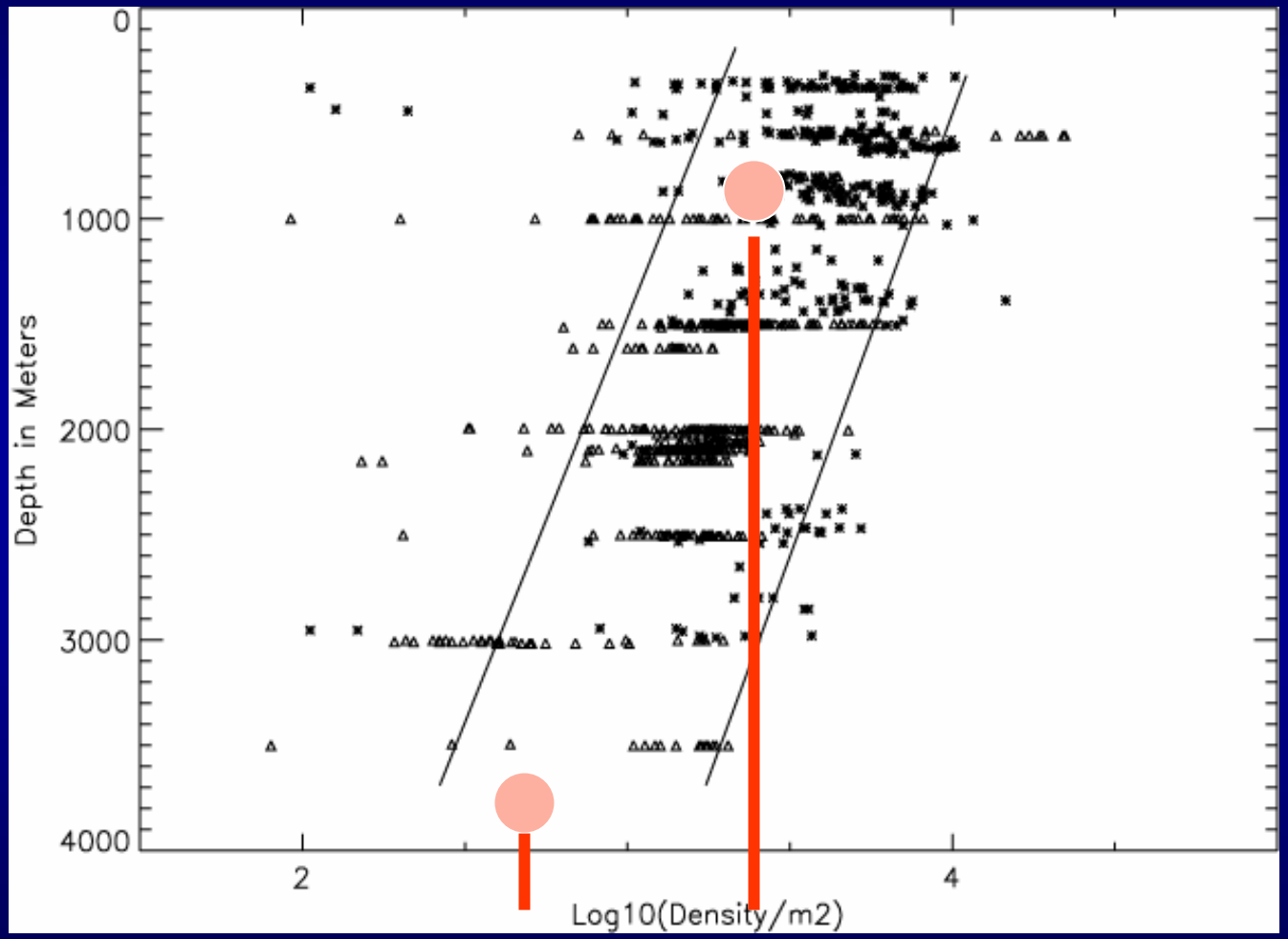
Pool of Potential Exploiters vs SEEP Filters



Pool of Potential Exploiters vs NON-SEEP Filters



Bathymetric Trophic Contrast



MMS Gulf and Atlantic Macrofauna Archives

Exploiters of the Upper Slope

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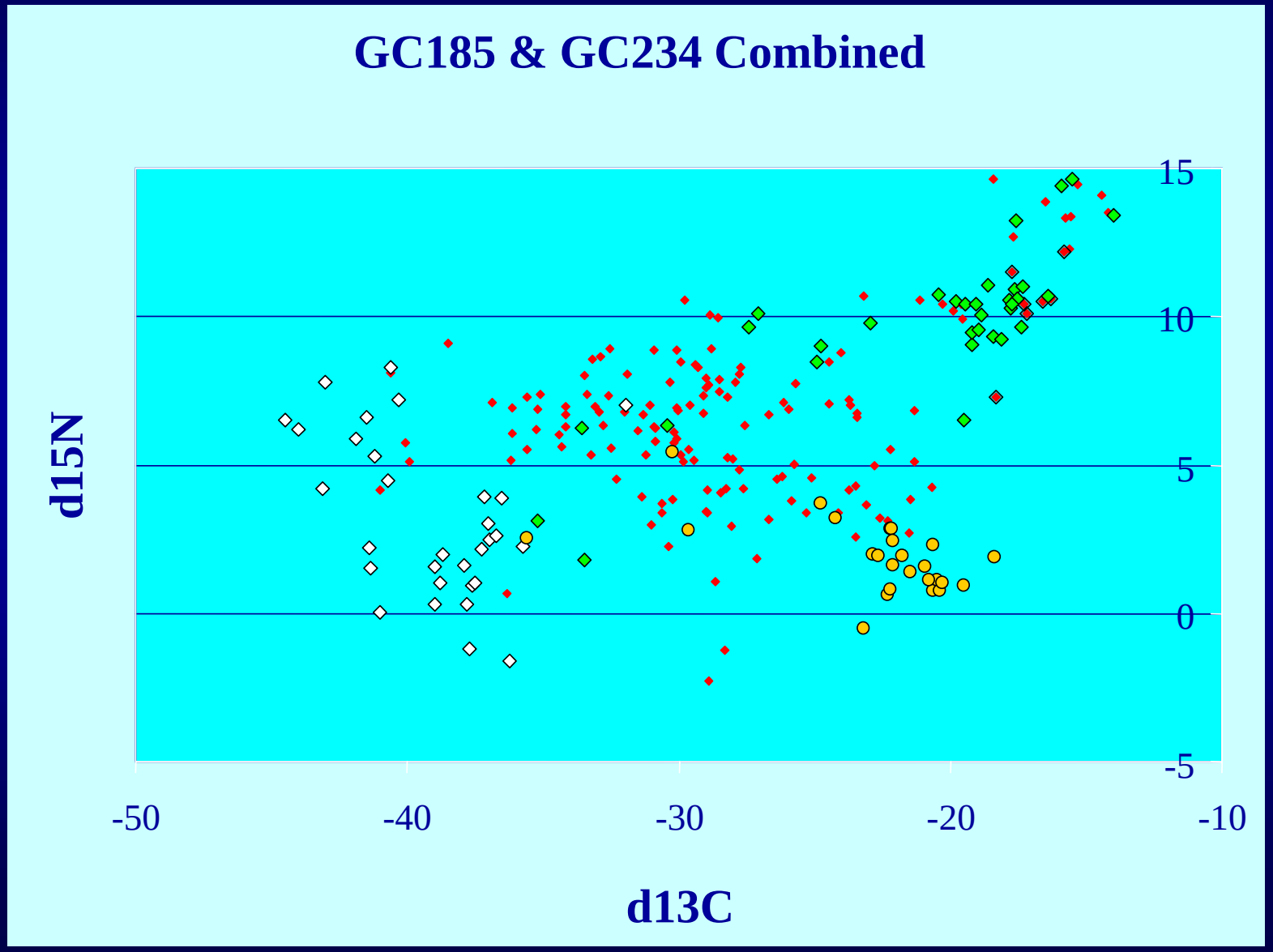
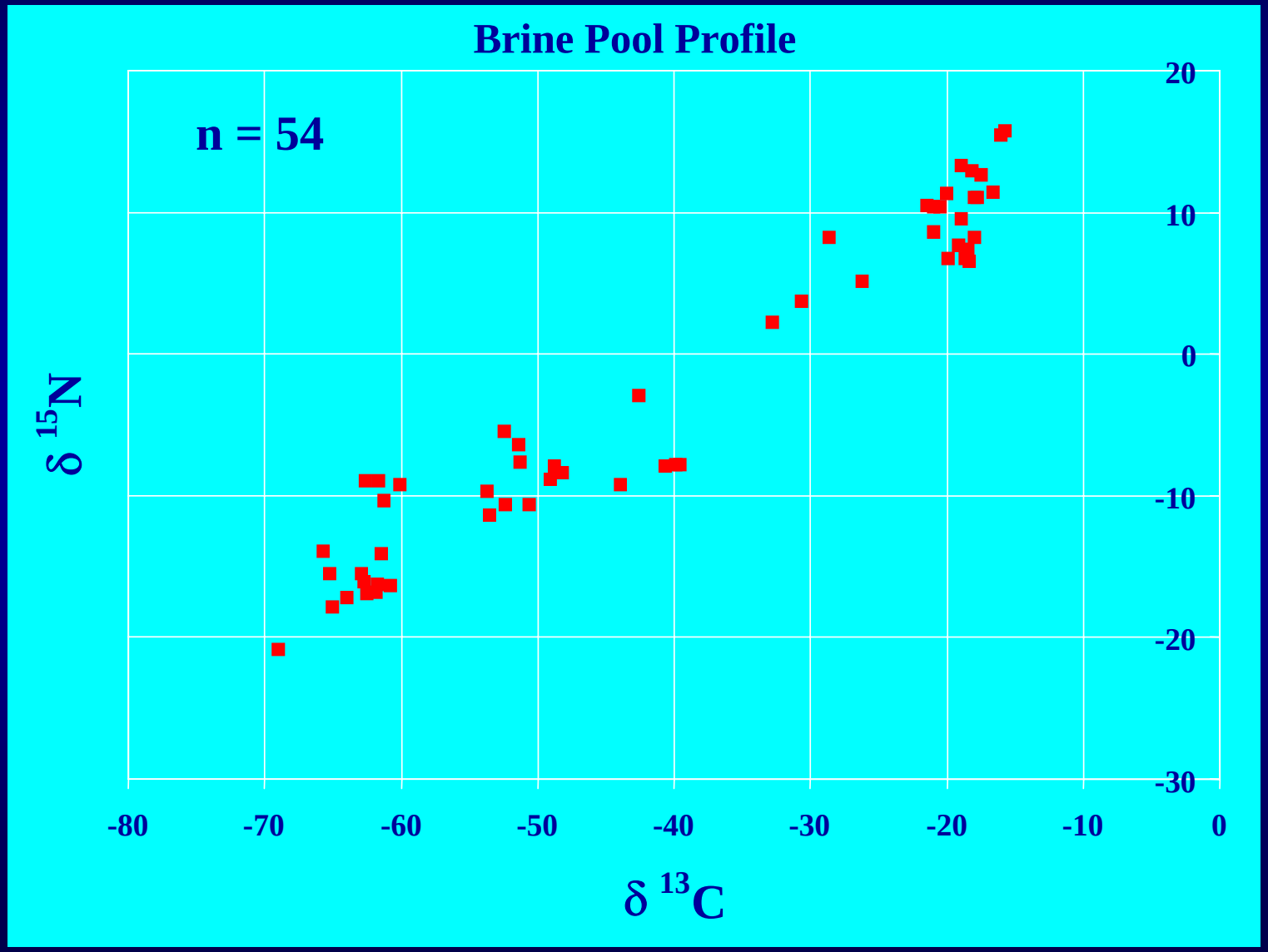
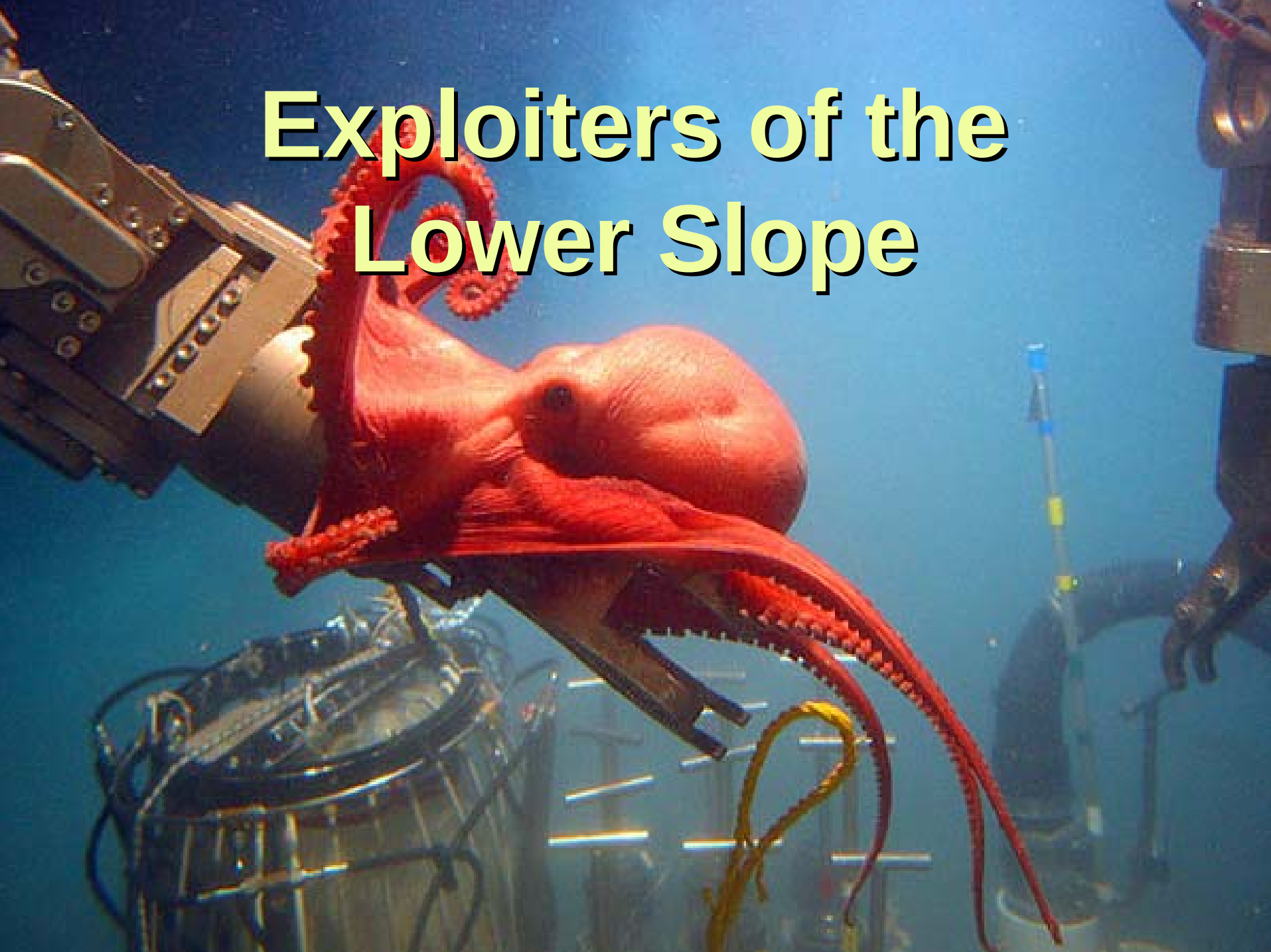
Upper-Slope Isotopic Scattter



Brine Pool Obvious Trophic Mixing



Exploiters of the Lower Slope



Three Scale Look

W/IN SEEP

Submersible
ROV
Pickup
Traps

NEAR
<100m

Submersible
ROV
Pickup
Traps

REGION
~ 5 – 10km

Trawling
Traps

Three Scale Look

Otter Trawling Results-I

- Otter Trawl R/V Gyre March 2003
  - 1000m 33 (5 sp.)fish; 10 (2sp.) shrimp; 15 (3 sp.) crabs; 9 (2 sp.); seastars2 (1 sp.) holothuroid
  - 1500m 20 (2 sp.) holothuroids; 2 (2 sp.) shrimp; 1 crab
  - 2500m 35 (5 sp.) holothuroids; 7 (3 sp.) fish; 6 (5 sp.) shrimp
    - <u>140 Useful Specimens</u>
    - <u>Good Detritus Good Pred/Scav</u>

Beam Trawl GC-852

1572 – 1702m 3 Hauls

30 Umbellula

25 (4 sp.) holothuroids

10 (2 sp.) sponges

~9 “other,” no fish, 2 stars, 2 crabs

<u>74 useful specimens</u>

<u>Good Detritus, Poor Pred/Scav</u>

Beam Trawl AT-340

2200m – 2372m 3 hauls

78 (6 sp.) holothuroids 4

21 Umbellula

19 (4 sp.) seastars

4 sponges

~ 5 “other,” 2 fish, 1 crab

<u>127 Useful Specimens</u>

<u>Good</u> <u>Detritus, Poor Pred/Scav</u>

Beam Trawl AC-818

2850m – 2940m 2 hauls

- 21 (3) holothuroids
- 11 (2 sp) sponges
- 2 seastars
- ~ 7 “other,” 2 octopi, 2 fish
- <u>41 Useful Specimens</u>
- <u>Good Detritus, Poor Pred/Scav</u>

2006 Conclusion Far Sampling

- Beam trawling with 5–10km of large topographic features has produced adequate sampling of detritus feeders (mobile & Sessile) but inadequate predators and scavengers at 3 blocks.
- Otter trawling can produce a more even sampling but is more difficult.
- Isotopic analyses will begin with detritus feeders.

2006 Conclusion Near/In Sampling

- Short-duration dives have very limited non-seep collecting capability.
- Traps do work but with a more limited catch than at upper-slope depths.

PLANS 2007

- Use long-duration ROV dives to increase in and near sampling.
- Use ROV-deployed small traps in and near seeps.
- Free deploy larger traps off seeps.
- If 2nd vessel w/ trawl capabilities available
  - Otter trawl at three best sampled blocks to increase predator/scavenger samples.