

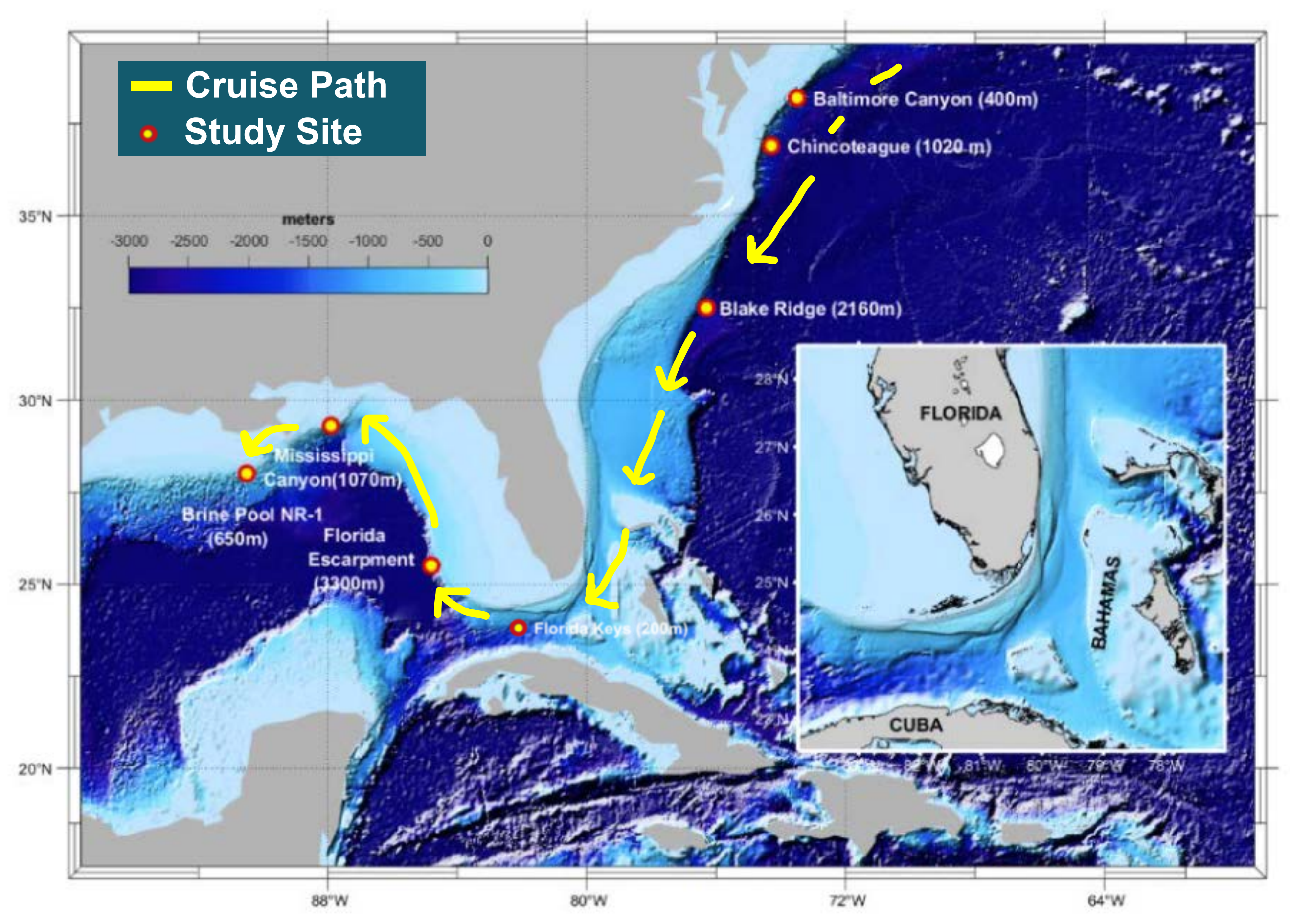
Distribution of meroplankton above methane seeps in the Gulf of Mexico (GoM) and Western Atlantic Margin (WAM)

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Introduction

Cold methane seeps on the Western Atlantic Margin (WAM) and in the Gulf of Mexico (GoM) are chemosynthetically productive ecosystems populated by shared species of chemosymbiotic Bathymodiolin mussels that host dense communities of endemic invertebrates. Whether cold-seep productivity affects planktonic diversity has been rarely examined and it is unclear whether the planktotrophic larvae of seep invertebrates remain in the food-poor deep-sea environment or distribute throughout the water column. Using the AUV Sentry's SyPRID collector, we examined meroplanktonic density and diversity above these cold seeps, with the specific aim of uncovering the distribution of larvae endemic to cold seeps.



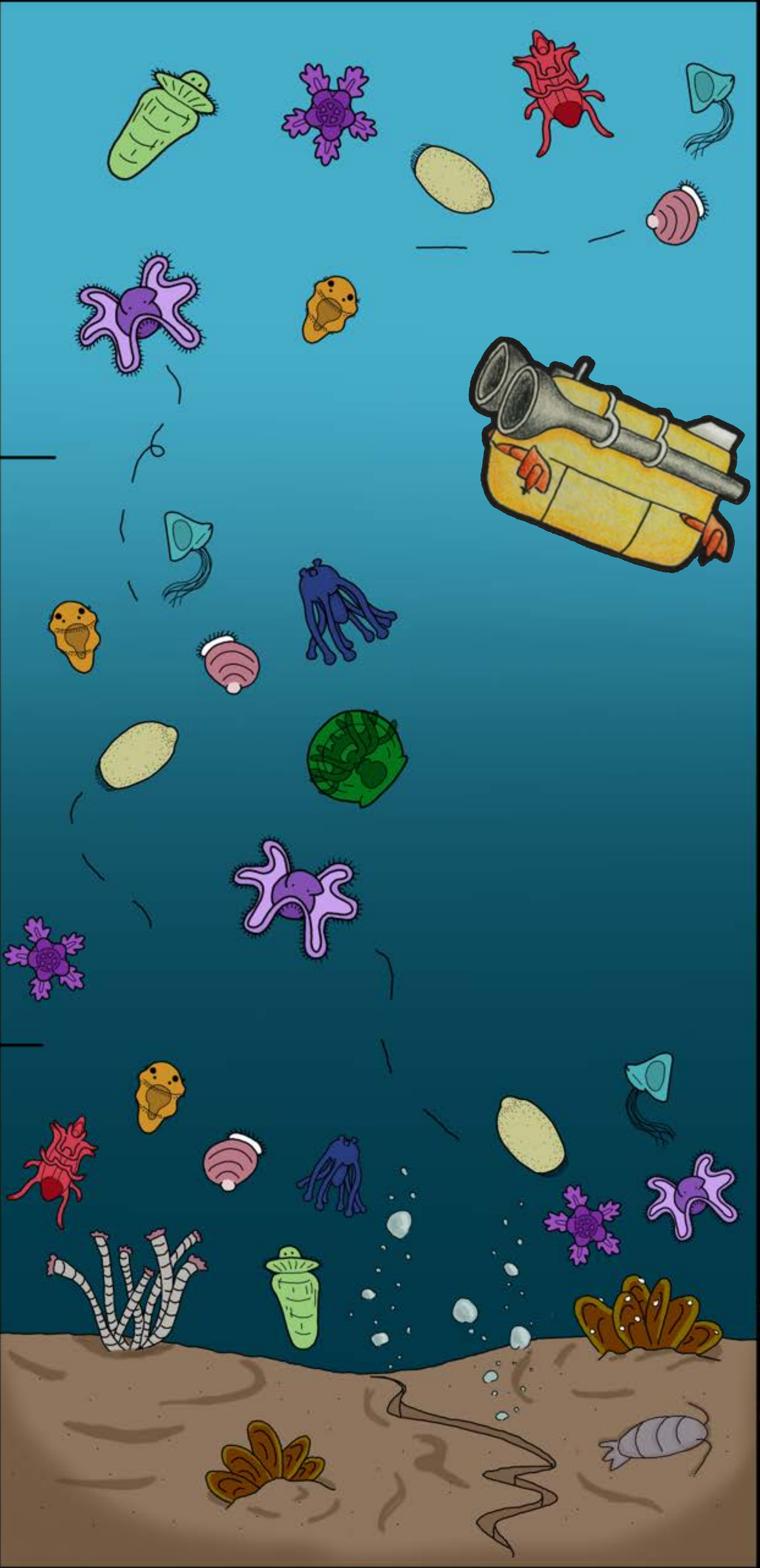
Study Sites

Gulf of Mexico
Brine Pool (650m)* Green Canyon-234 (500m) Bush Hill (500m) Mississippi Canyon (1070m) Florida Escarpment (3300m)
* Bush Hill and GC-234 are close in proximity to Brine Pool, so are not depicted on the map.
Western Atlantic Margin
Baltimore Canyon (400m) Chincoteague (1020m) Blake Ridge (2160m)
Boundary Site - Florida Keys

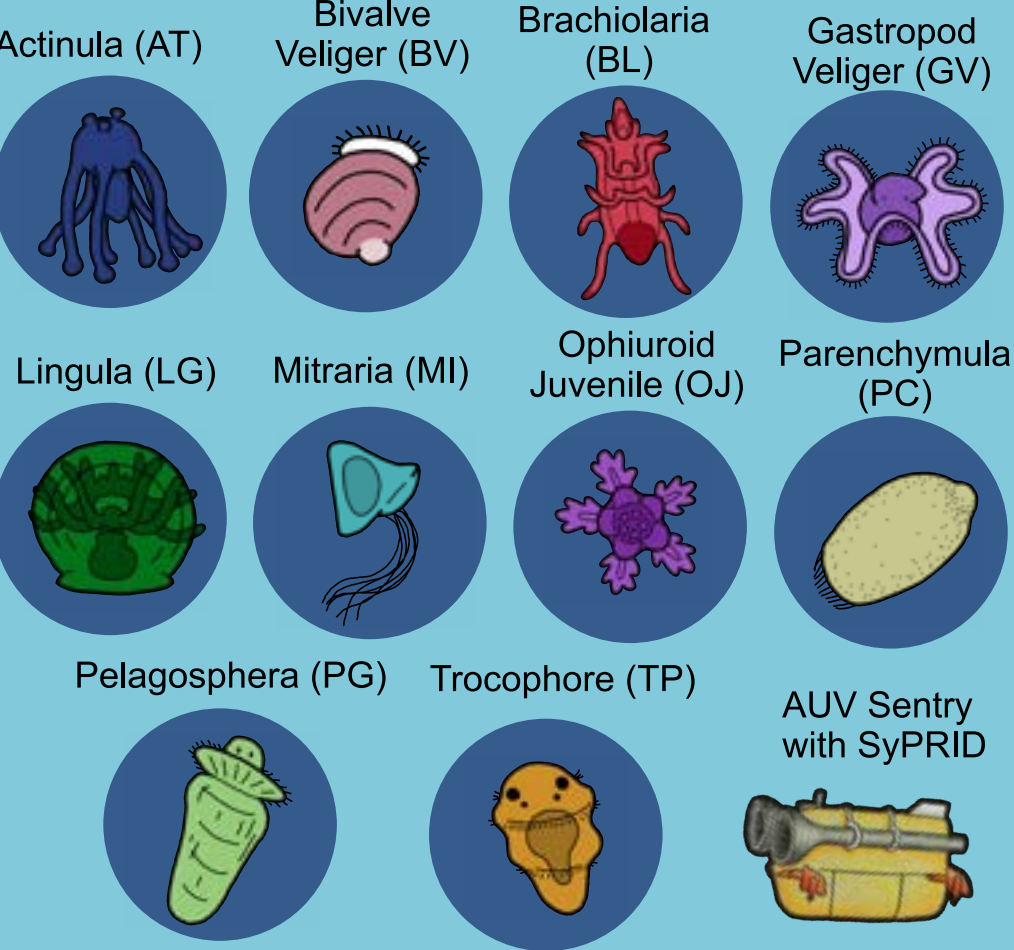
Thermocline

Mid Water Column

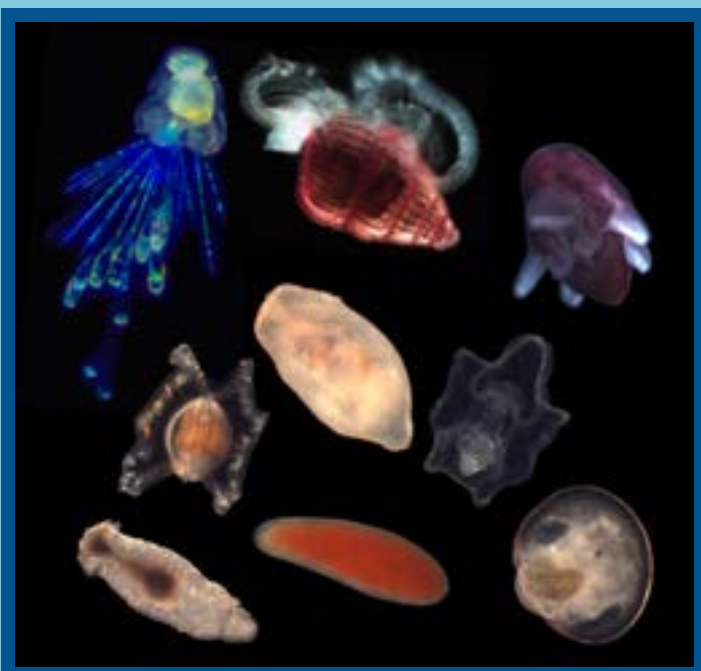
Demersal
(5 meters above bottom)



Meroplankton Key

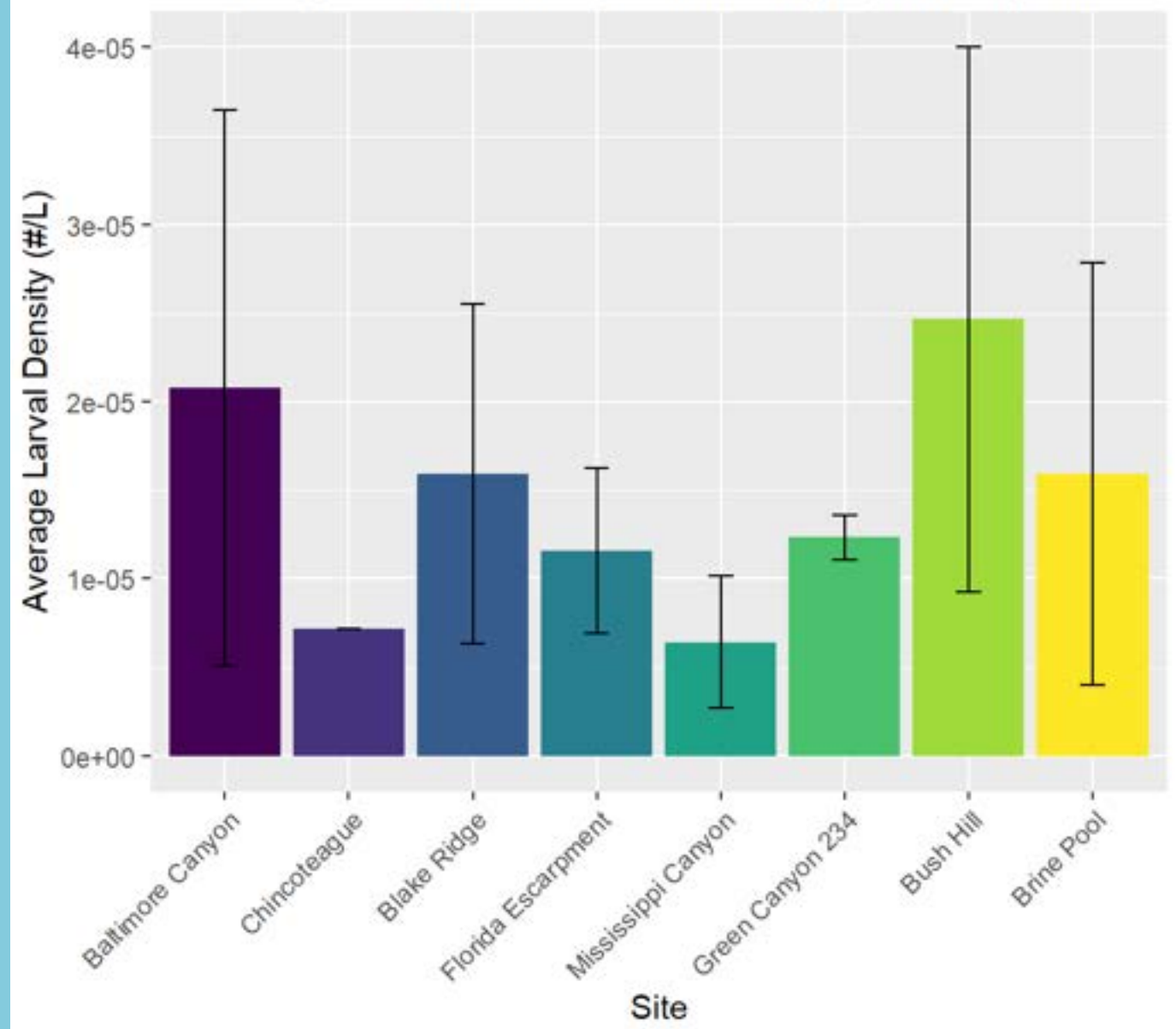


7050 Total larvae collected
168 Morphotypes
14 Phyla



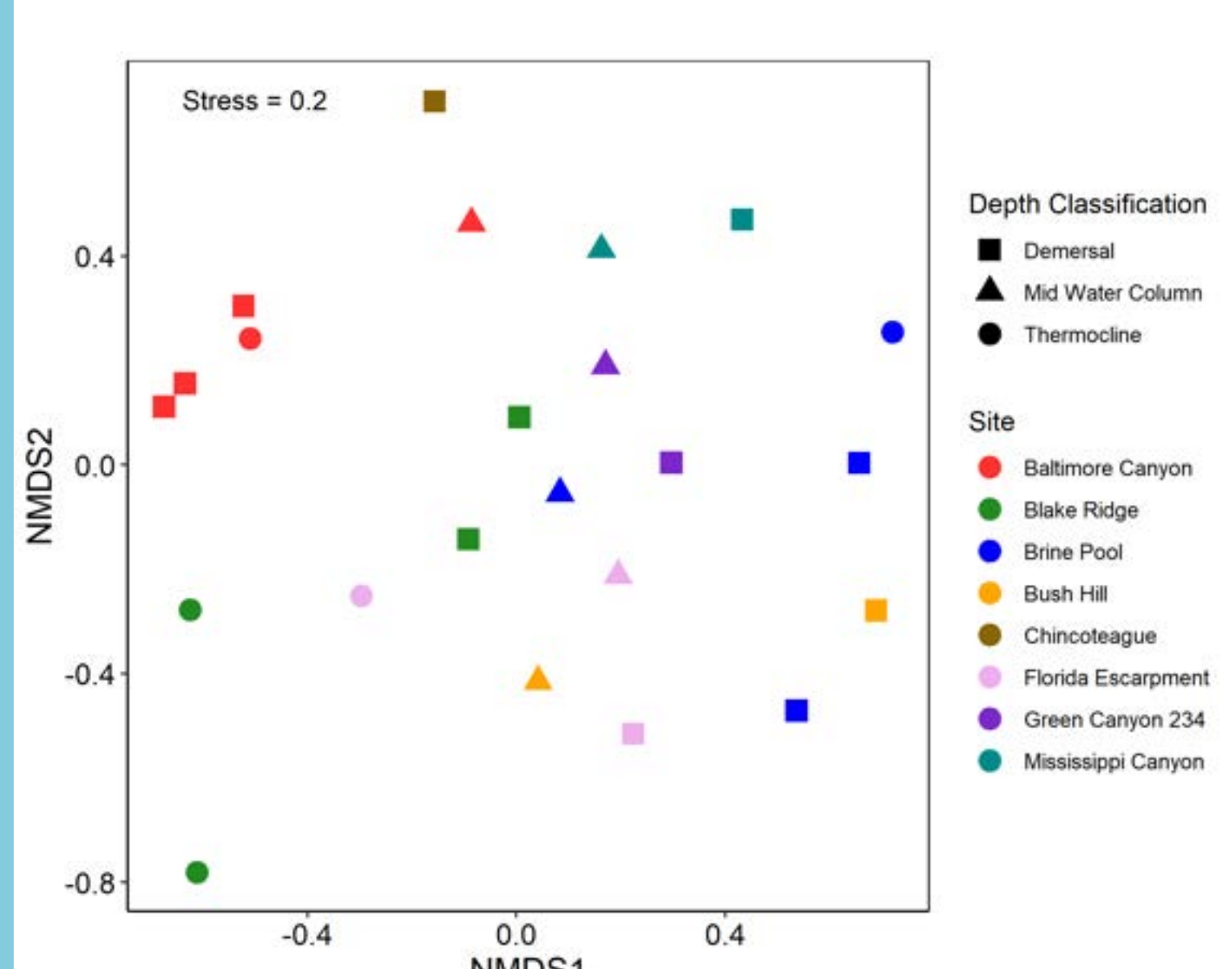
SyPRID filtered an average of 2,000m³ of water per sample
Collected an average of 0.0207 Larvae per m³

Larval Density Varied by Site and Collection



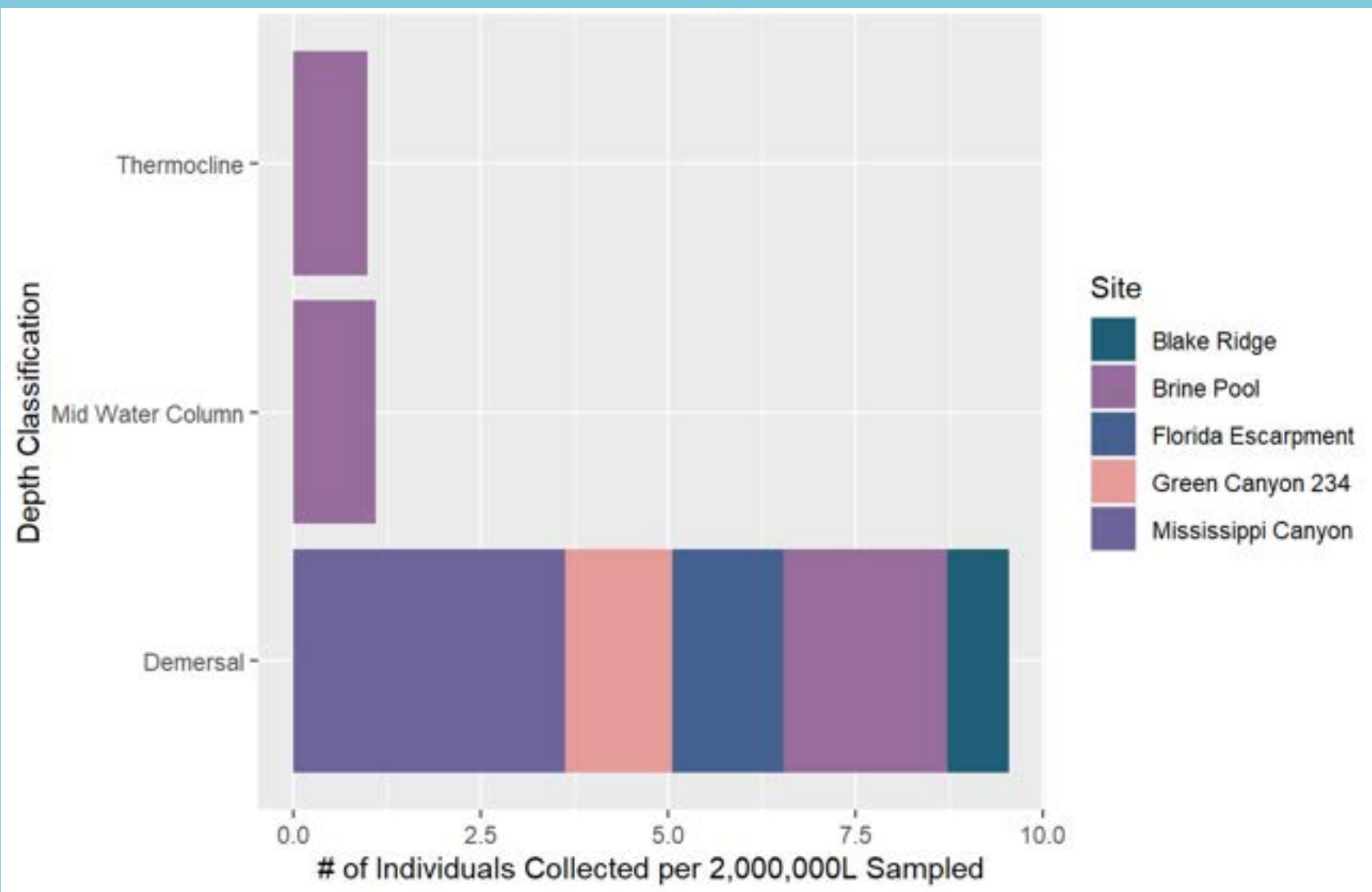
Average larval density collected by SyPRID. Average larval density was calculated by dividing average # of larvae collected by the average flow rate at each site. Ordered by geographic order from the northern WAM to western GOM sites.

Weak Similarities Between Larval Communities



NMDS plot comparing community composition by site and depth classification. Using Bray-Curtis similarity, no groups had a dissimilarity value less than 0.3. Stress value - 0.2

Gigantidas childressi Larvae Present at Multiple Depth Classes and Most Common Demersally



Vertical distribution of *Gigantidas childressi* (BV_20) in the Gulf of Mexico and the Western Atlantic Margin.

Visual and Genetic Identification of Cold Seep Larvae

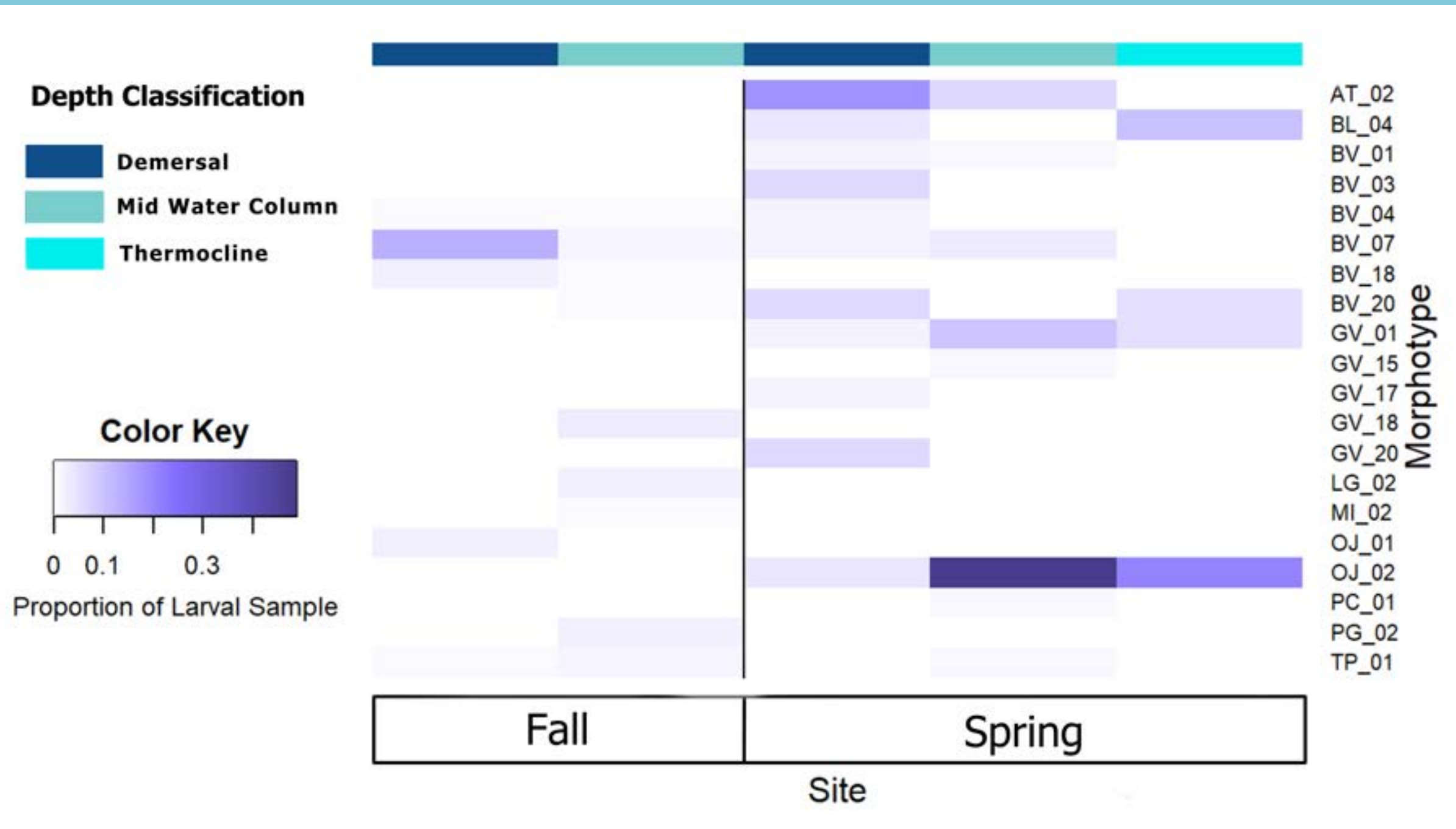
Gigantidas childressi
Mussel larvae are distinguishable by their "egg" shape. Bathymodiolin larvae are characteristically pink.

Bathymodiolus brooksi
These larvae were noticeably more "ruby red" than *G. childressi*.

Identified GV morphotypes from the family Neretidae visually and confirmed via DNA barcoding, but found none of the target neretid: *Thalassonerita naticoides*.

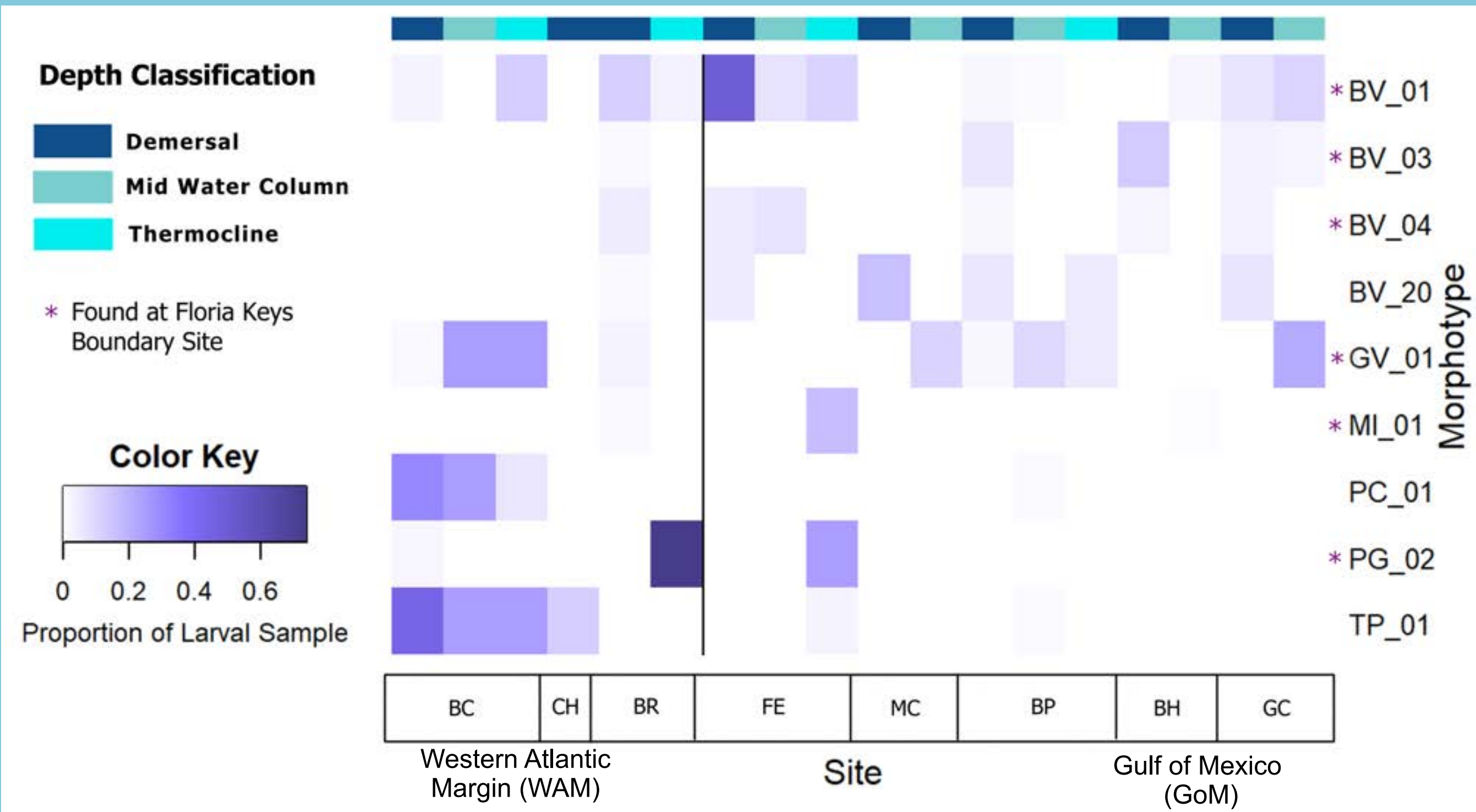
Neretid from TN391

Increased Larval Diversity in Spring



Heat map of the proportion of larval samples for morphotypes that were found at Brine Pool on the Fall 2020 EN658 cruise and the Spring 2021 TN391 cruise. The vertical line separates the two seasons; Fall (left) and Spring (right). Each column represents a discrete SyPRID sample, with the color representing the depth classification

9 Morphotypes Found in both GoM and WAM



Heat map of the proportion of larval samples for morphotypes that were found in both seep regions by site and depth classification. (*) Highlights morphotypes also found at the boundary site, Florida Keys, between the two sites. The vertical line separates the two seep regions; Gulf of Mexico (left), and Western Atlantic Margin (right).

Conclusions

Meroplanktonic Community Analysis:

Meroplankton communities at our study sites are highly variable by site and depth, and at least one site's community hosts seasonal differences.

Presence of shared morphotypes at different sites and between seep regions suggests some connectedness among cold-seep communities.

Cold-Seep Target Species:

Presence of larvae in multiple depth classes suggests planktotrophic larvae of cold seep animals may enter the upper water column to feed.

To learn more about this project, the data behind it, or to see this poster online: scan this QR code!



Acknowledgements

We thank co-PIs Dave Eggleston and Roy He (NC State); the scientists aboard EN658 and TN391 research cruises from WWU, OIMB, and NCState; the Sentry team (WHOI); the crews of R/V Thomas G. Thompson and R/V Endeavor; and NSF for funding this research. NSF Award #1851286.