

COMIDA: Epibenthic Community Structure

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COMIDA is the Chukchi Offshore Monitoring In Development Area project. The overall goal of COMIDA is to initiate sampling to monitor anthropogenic chemicals associated with offshore oil and gas exploration and development and to monitor benthic biota in the area of potential or actual offshore drilling areas in the Chukchi Sea.

Objectives of the Benthic Component:

- 1) Produce base-line information for monitoring of epibenthic communities in the Chukchi Sea Offshore Drilling Area
- 2) Initiate monitoring to distinguish changes in benthic biota and anthropogenic chemicals due to oil and gas activities from those due to changes in climate or food web structure.

Questions initially asked with base-line epibenthic data:

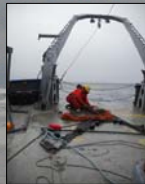
- 1) Are epibenthic communities distributed in patches?
 - Are all species evenly distributed throughout the study area?
- 2) Which species are most important in determining community structure as far as abundance and biomass?
- 3) What is the current population structure of the most important species?
 - Size frequency, abundance, biomass, and male to female sex ratio

Methods:

-Sampling was completed on a cruise aboard the *R/V Alpha Helix* (7/27/09 - 8/11/09)

- 1 beam trawl was deployed at 30 stations within the COMIDA study area (Fig. 1)
- Each trawl was (or adjusted to) 2.5 minutes at 1.5 knots
- Water depths ranged from 28m to 50m (mean of $42.3 \pm 0.85m$)

- Trawls were sorted on deck
- Dominant organism were counted and weighed
- Gastropods, echinoderms, and crabs were measured
- Crabs were sexed



Beam Trawl

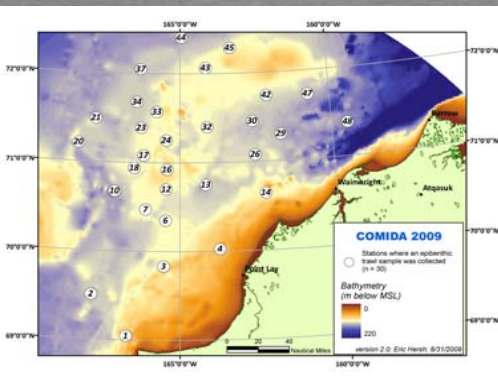


Figure 1. Map of COMIDA study area showing the trawling sites.

Preliminary Results:

49 genera (or higher) were sorted, counted, and weighed at each station for analyses of community structure. While the study area was fairly homogeneous (some genera were found at many different stations Fig.2), some sites were outliers (14, 4 and 10, Figs. 3 and 4). Two of the dominant organisms, *Echinarachnius* and ophiuroids were patchily distributed and were very abundant when they were present. In general, the MDS ordinations illustrate that there are three community types, based on abundance and biomass (Figs. 3 and 4).

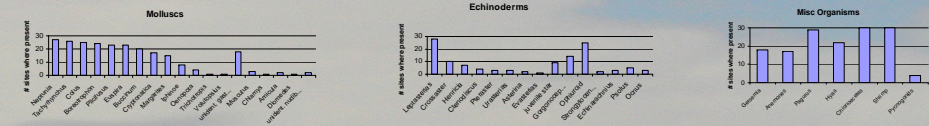


Figure 2. Frequency of occurrence of various genera and higher taxonomic groups at the thirty COMIDA stations.

Based on **abundance**, the three dominant organisms that determined most of the community structure for this area were *Echinarachnius*, ophiuroids, and *Chionoecetes* (Fig. 3).

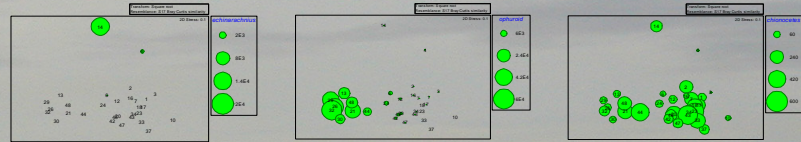


Figure 3. MDS ordination of COMIDA study stations with abundance of *Echinarachnius*, ophiuroids, and *Chionoecetes* bubbled.



2.5 minute trawl from Station 14. Net is full of *Echinarachnius*.

Based in **biomass**: The same three organisms that determined community structure for abundance also dominated in biomass (Fig. 4)

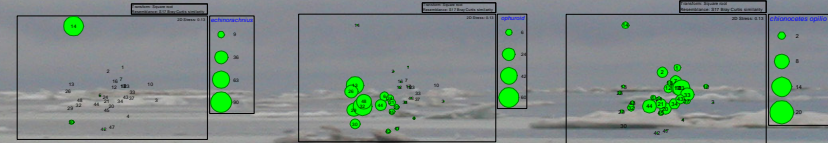


Figure 4. MDS ordination of COMIDA study stations with biomass of *Echinarachnius*, ophiuroids, and *Chionoecetes* bubbled.

Stations with similar dominant organisms generally did not appear to spatially group together (Fig. 5)

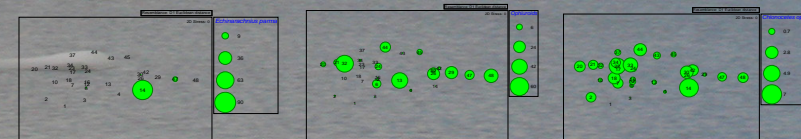


Figure 5. MDS ordination based on latitude and longitude of the station. Dominant organisms are bubbles in to show distribution of *Echinarachnius*, ophiuroids, and *Chionoecetes* within the study area

Size structure: The dominant crab, *Chionoecetes*, was very abundant in the study area, with greater numbers of males compared to females (n=2523 vs 1923). Females appeared to have a bimodal size distribution compared to males (Fig. 5).

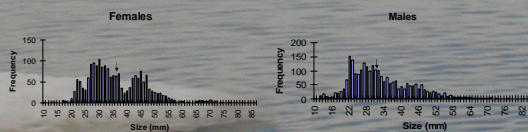


Figure 5. Size frequency of female and male *Chionoecetes* in the COMIDA study area. Arrows indicate means (females= 36.2 ± 0.23 s.e. and males= 33.0 ± 0.22 s.e.)



Trawl contents from Station 18 showing a dominance of *Chionoecetes*

Acknowledgments: Special thanks to Dick Prentki of the Minerals Management Service, the captain and crew of the *R/V Alpha Helix*, Eric Hersh for providing Figure 1, Brenda Norcross for supplying the beam trawl, and Nora Foster for taxonomic assistance.

Future questions to be asked with base-line epibenthic data:

- What is the inter-annual variation in the measured biological parameters?
- Does the community vary with any environmental parameters?
 - Depth, grain size, temperature, salinity