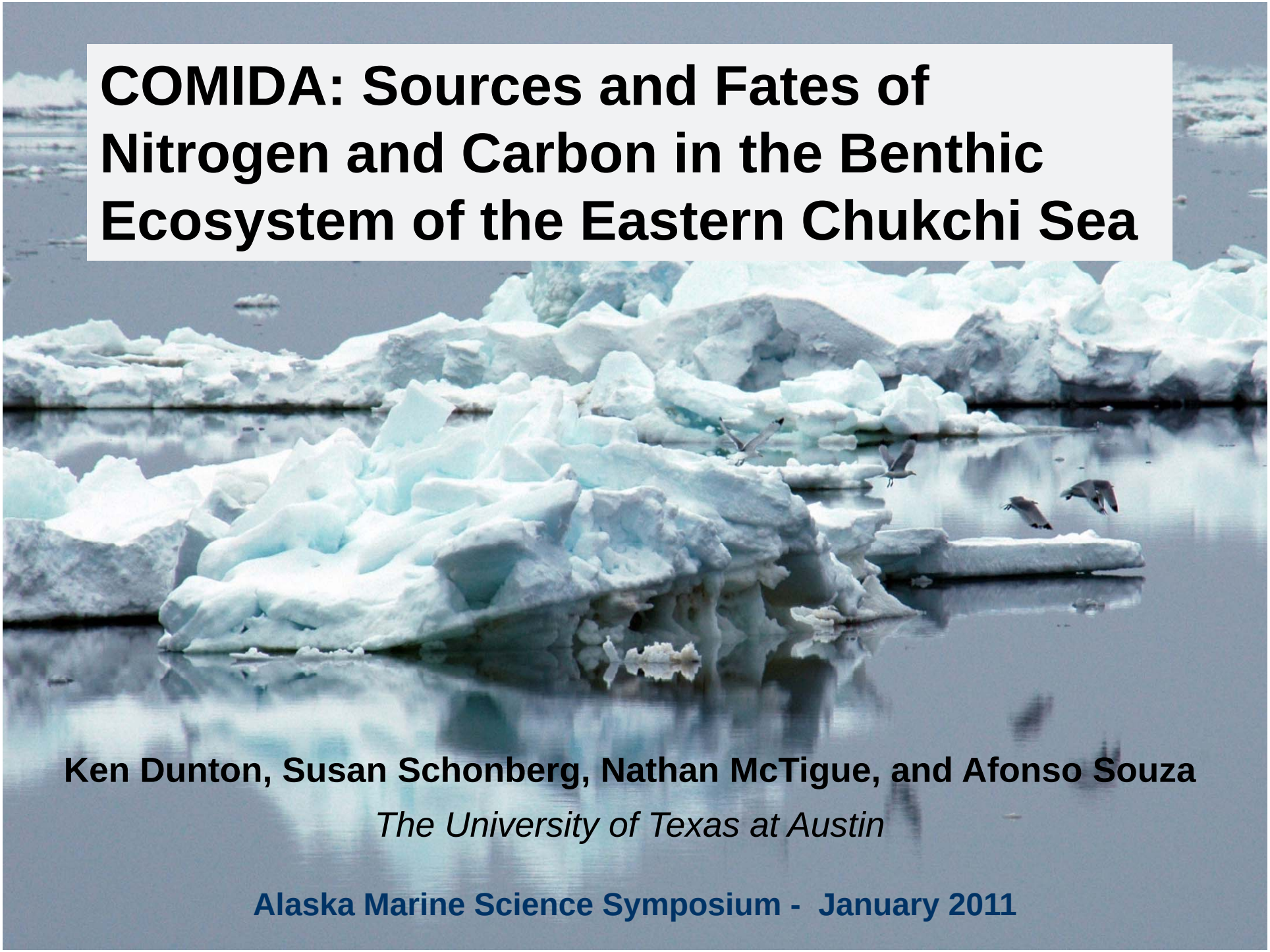

COMIDA: Sources and Fates of Nitrogen and Carbon in the Benthic Ecosystem of the Eastern Chukchi Sea

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The University of Texas at Austin

Alaska Marine Science Symposium - January 2011

Acknowledgements and Co-Authors

- Capt. John Seville & crew of the RV *Alpha Helix* and *Mauna Wave*

- BOEMRE and COR Dr. Dick Prentki (Alaska Region)

- Graduate students and scientists from CBL, FIT, UT-Austin, and UAF

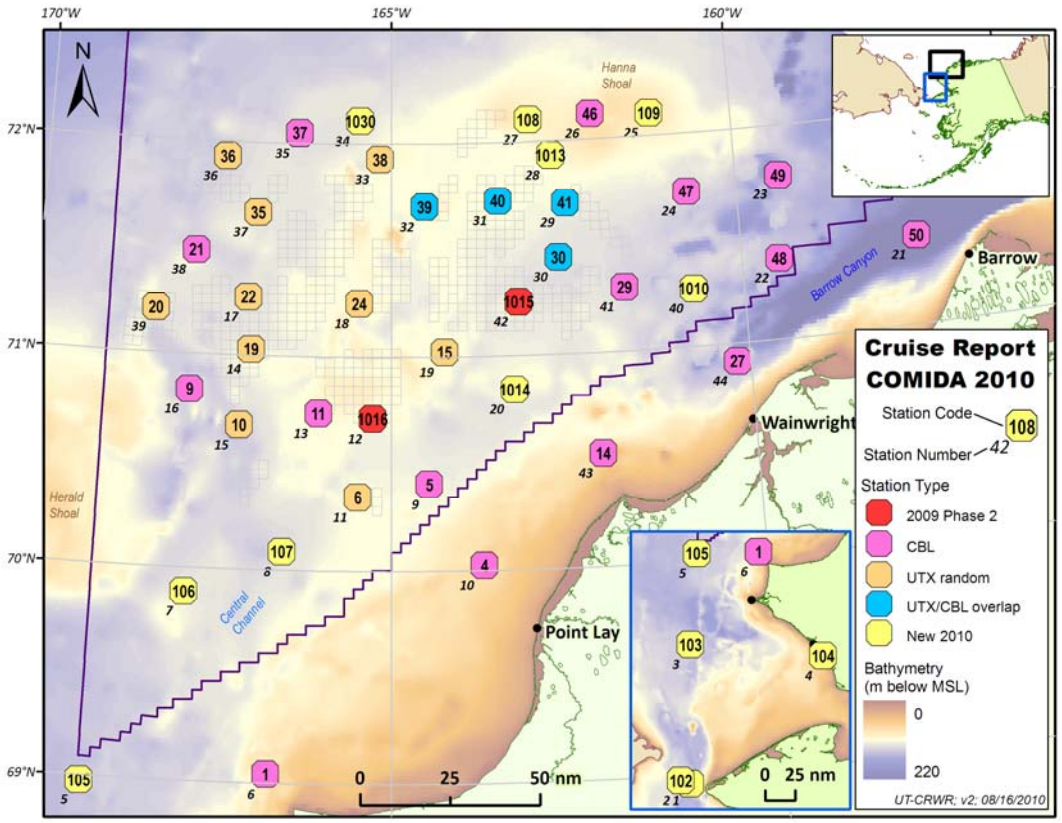
- Chief Scientist, CBL, Jackie Grebmeier

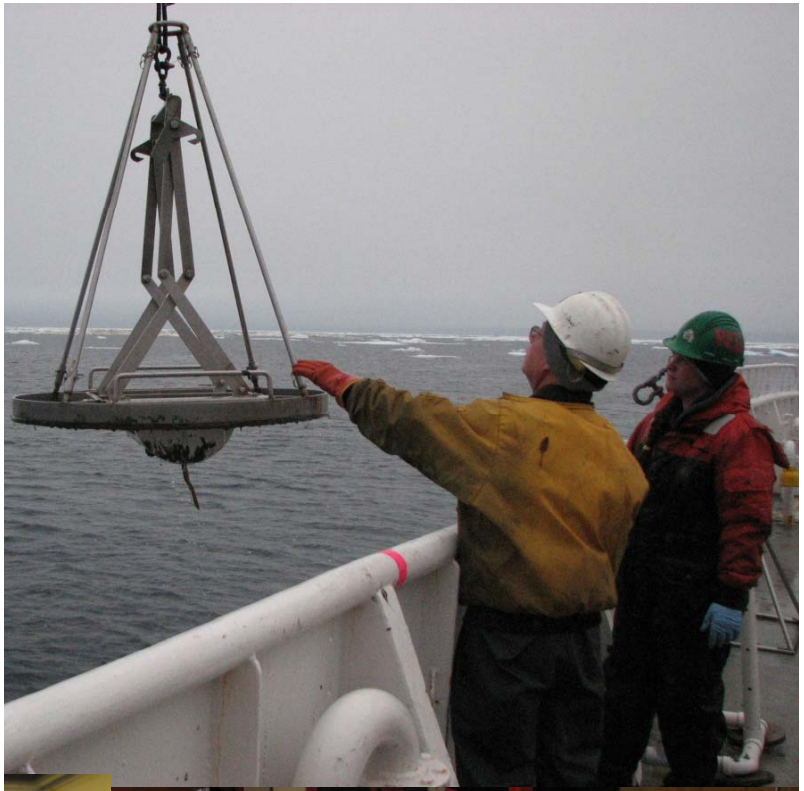
- Shell Alaska, CPAI, and Statoil, Pgm Mgr Michael Macrander

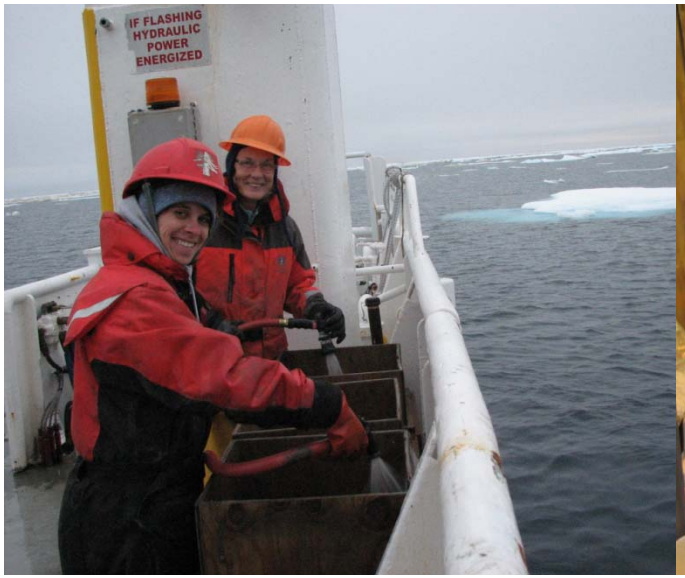
Objectives of this Component

- A quantitative assessment of the spatial variability in benthic faunal abundance and diversity throughout the entire study area (collaborative with Jackie Grebmeier)

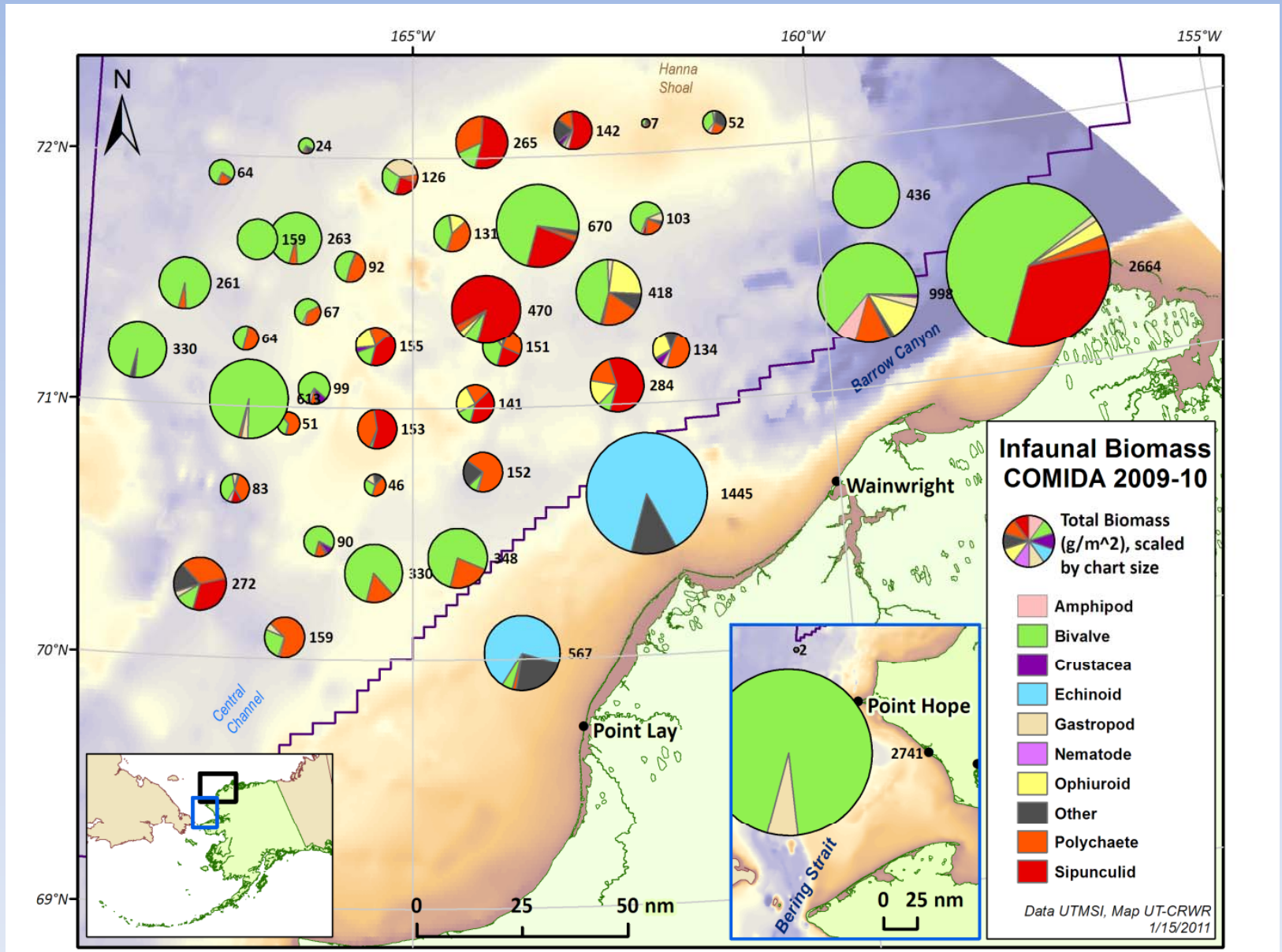
- Conduct a detailed analysis of trophic structure of the benthic community and identify the ultimate sources of carbon assimilated throughout the food web


170°W
165°W
160°W
72°N
71°N
70°N
69°N
N
Hanna Shoal
Herald Shoal
Barrow Canyon
Central Channel
Barrow
Wainwright
Point Lay
0 25 50 nm
0 25 nm
Cruise Report
COMIDA 2010
Station Code
Station Number
Station Type
2009 Phase 2
CBL
UTX random
UTX/CBL overlap
New 2010
Bathymetry
(m below MSL)
0
220
UT-CRWR; v2; 08/16/2010

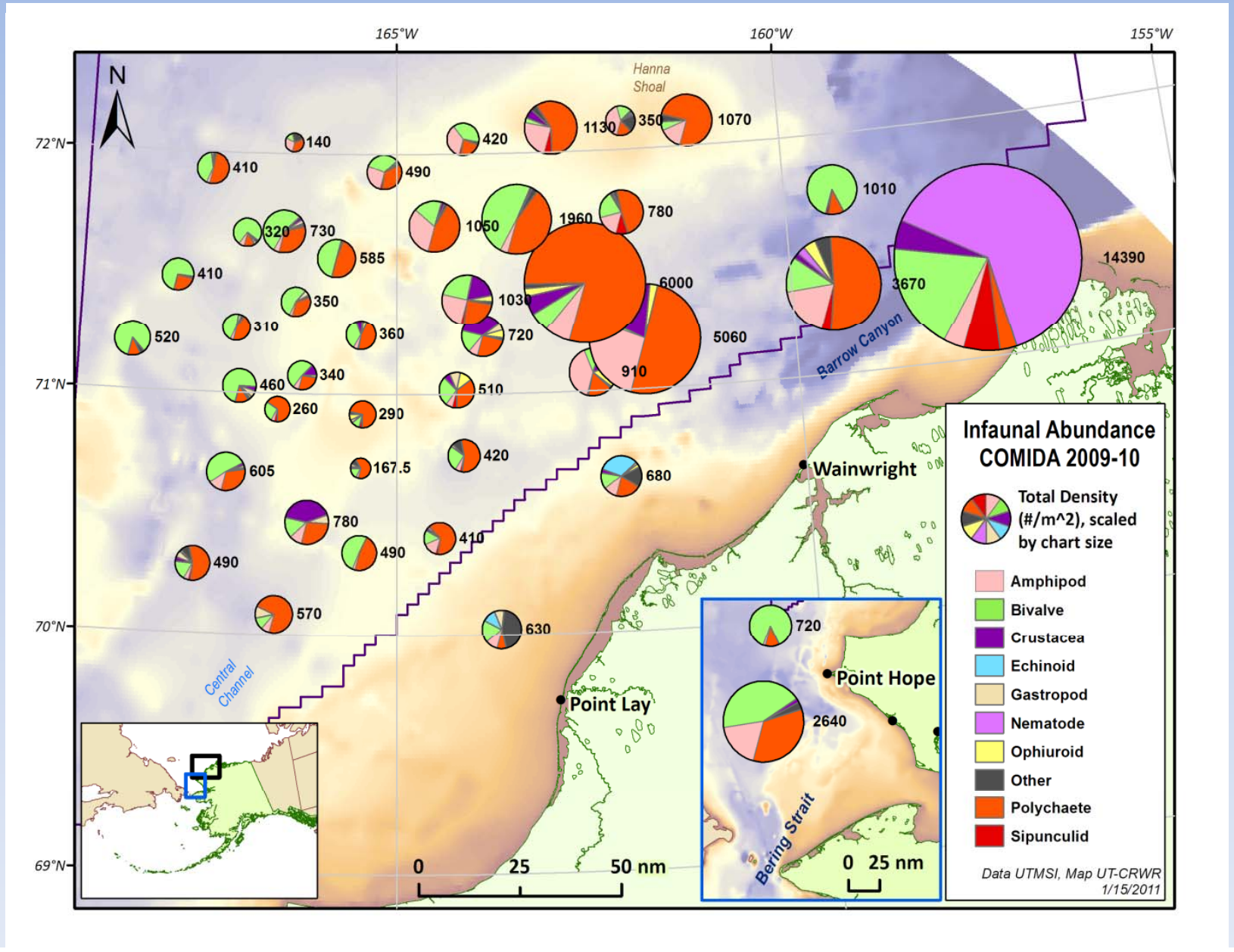



IF FLASHING
HYDRAULIC
POWER
ENERGIZED

Infaunal Biomass Is Dominated by Bivalves, Sipunculids, and Polychaetes



Infaunal Abundance Is Dominated by Polychaetes, Bivalves, and Crustaceans



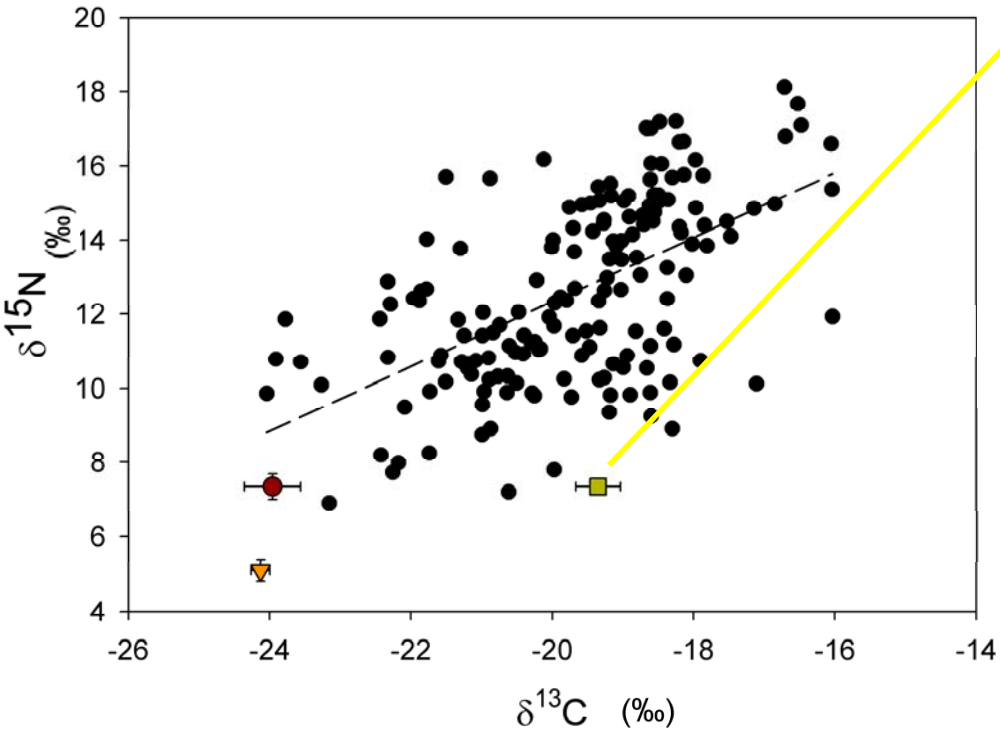
Benthic Invertebrate δ ^{15}N Values

[McTigue, Schonberg, Dunton]

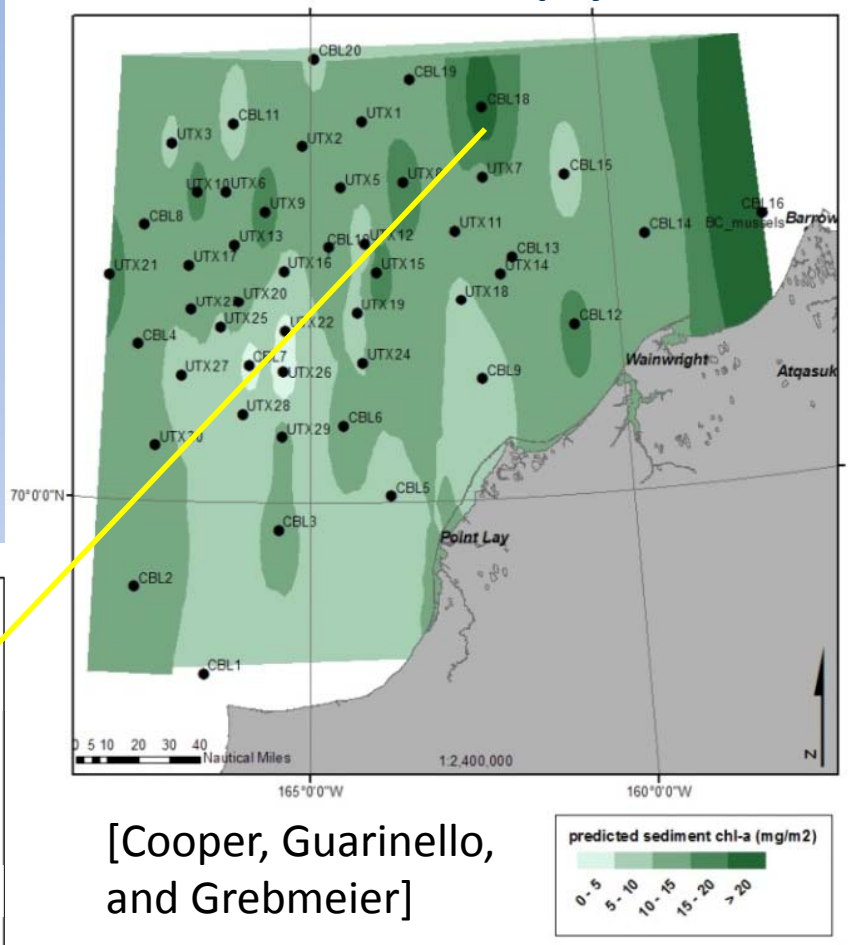
Samples of trawl biota: thanks to Konar, Norcross and LGL fisheries teams

Food Web Structure

Bi-plot of $\delta^{13}C$ vs $\delta^{15}N$ values for 172 species reveals wide degree of scatter ($r^2 = 0.32$) suggesting multiple carbon sources



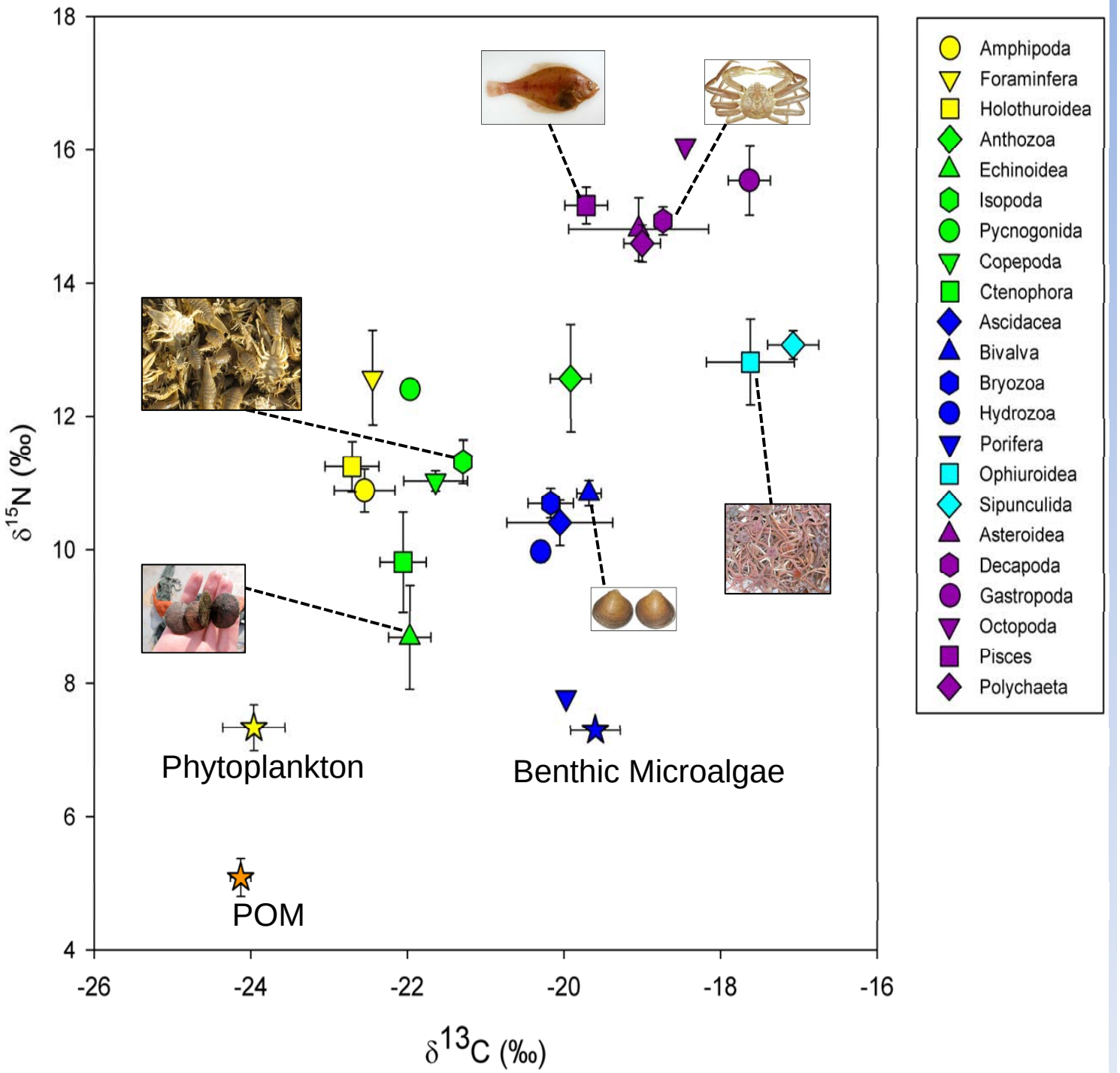
COMIDA09
Sediment Chlorophyll *a*



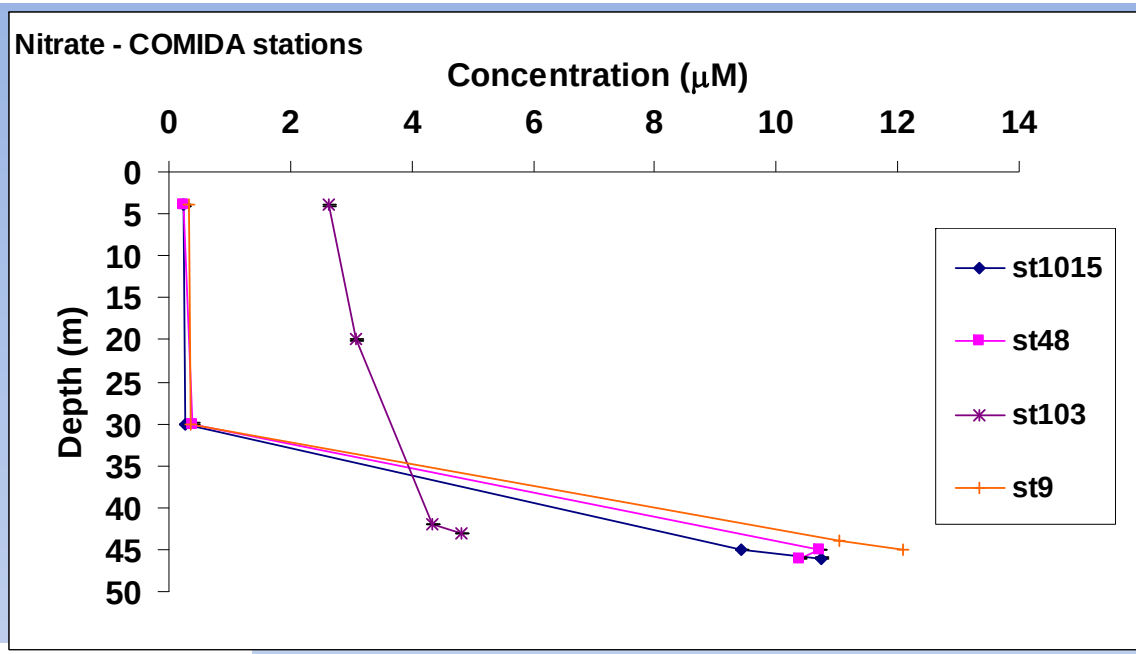
[Cooper, Guarinello, and Grebmeier]

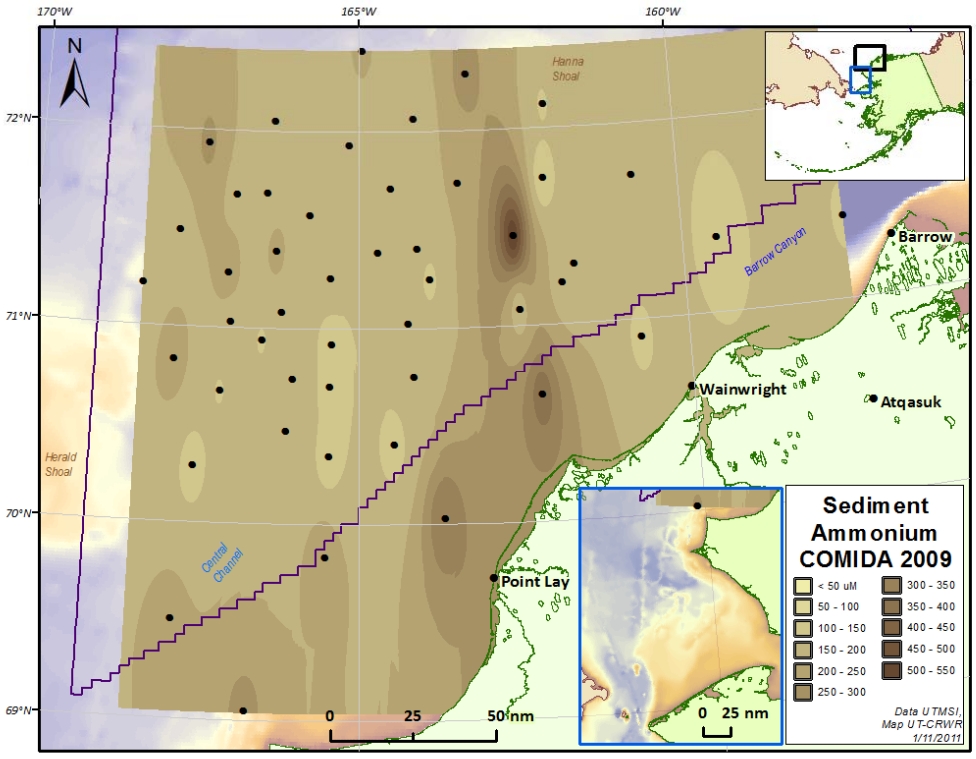
Evidence for Consumer Assimilation of Different Ultimate Carbon Sources?

How are these benthic microalgal populations linked to the timing of ice retreat and loss of ice algae?

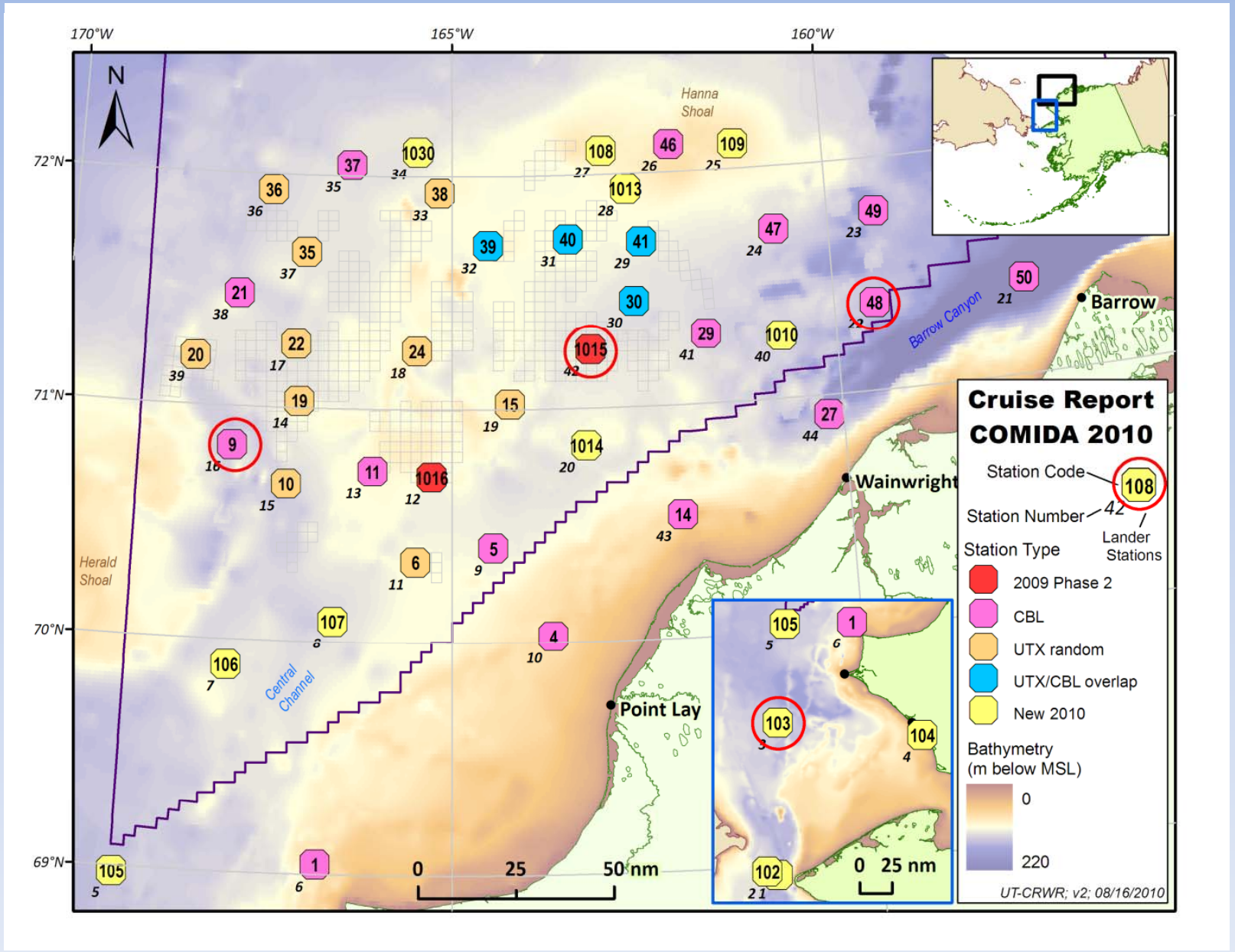


What are the sources of inorganic-N? Are the benthic microalgae a sink for sediment derived nutrients?

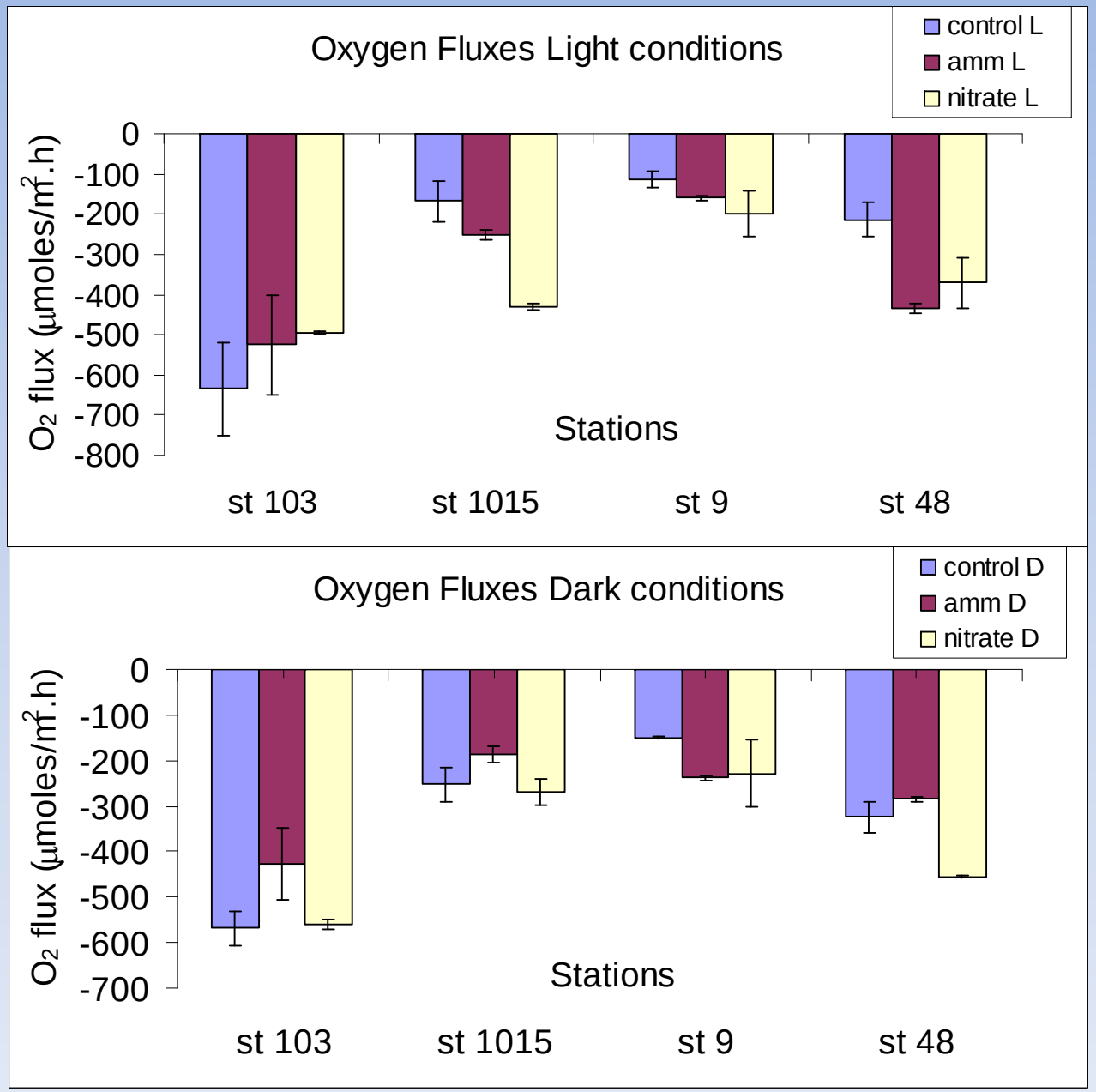




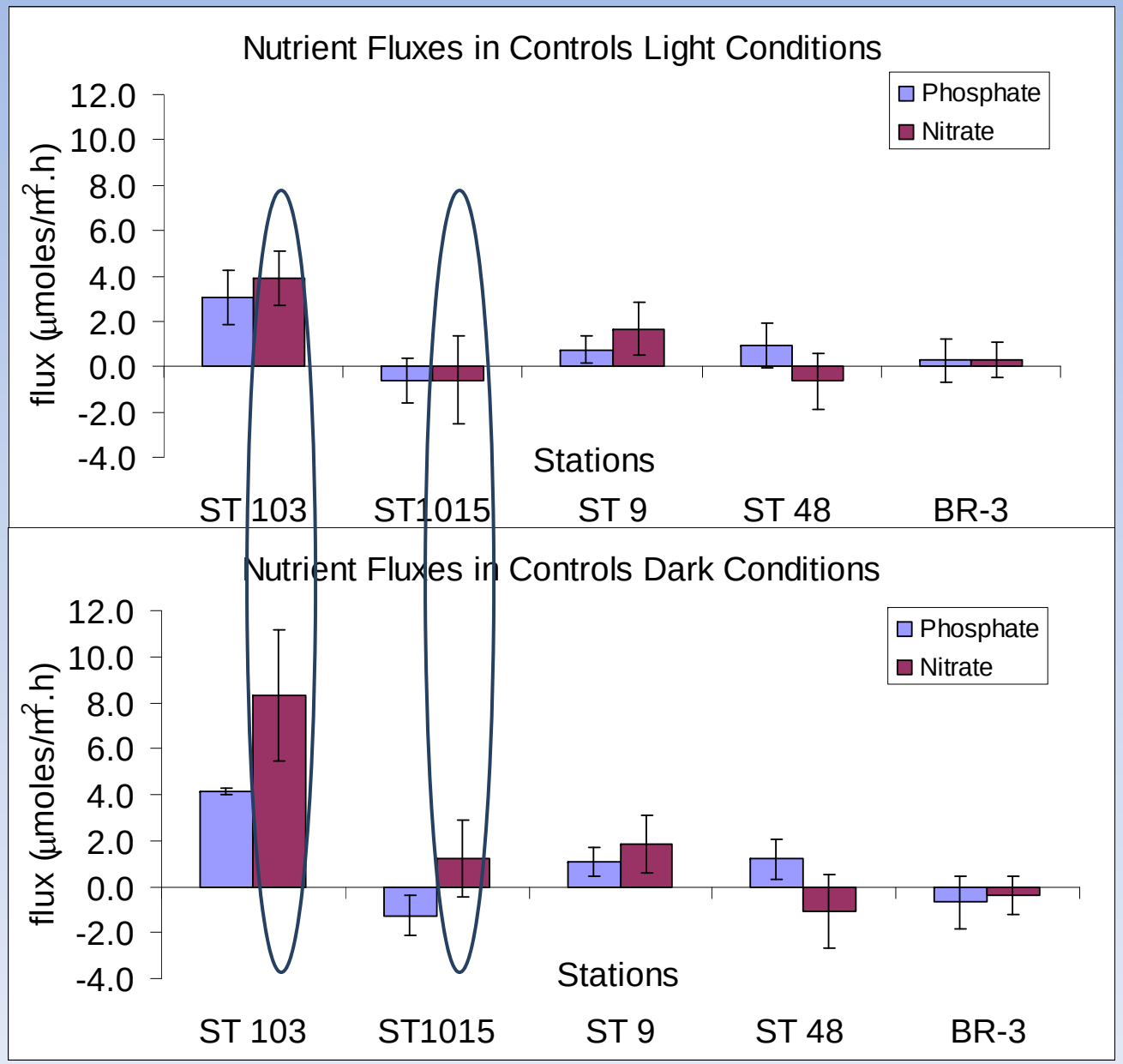
Measurements of N-Fluxes and Processes



As Expected, Sediment Respiration Rates are High in the Chukchi



Uptake of Nitrate by Benthic Microalgae at the Sediment-Water Interface Possibly Apparent at Two Stations



Summary

- Observed high diversity and spatial variability for infaunal community structure and biomass, with clear dominance by selected groups, likely related to sediment characteristics.
- Benthic biota occupy up to five trophic levels, with clear dependence on POC, but also evidence that the food web is subsidized by contributions from sediment microalgae.
- Nitrogen fluxes at the sediment water interface are a potential mechanism of importance in fueling benthic microalgal production in relatively clear shelf waters.

UT Graduate Students McTigue and Hersh