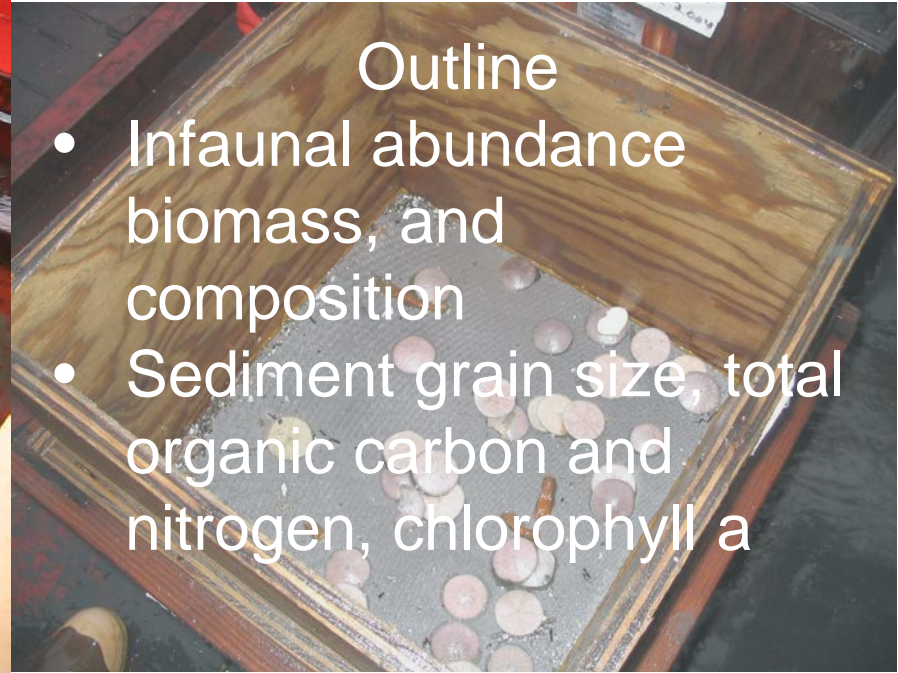


# DBO-Benthic sampling

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## Outline

- Infaunal abundance, biomass, and composition
- Sediment grain size, total organic carbon and nitrogen, chlorophyll a

# Distributed Biological Observatory: Linking Physics to Biology

Core standardized ship-based sampling:

- CTD
- Chlorophyll
- Nutrients
- Ice algae/**Phytoplankton** (size, biomass and composition)
- Zooplankton (size, biomass and composition)
- **Benthos (size, biomass and composition)**
- Seabird (standard transects, no additional shiptime)
- Marine mammal observations (no additional ship time)

“Change detection array” – same measurements every year, process information in near real time <6 mos; detect regime shifts in rapid changes

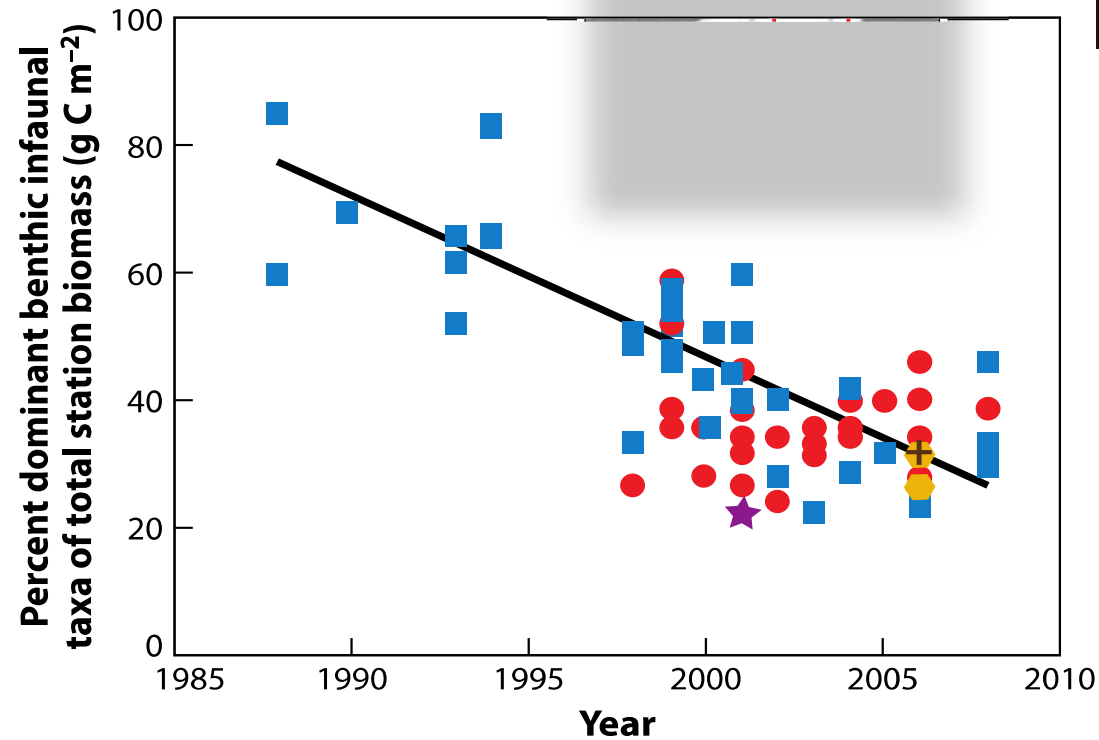
Second tier ship-based sampling:

- Fishery acoustics (less effort than standardized bottom trawling)
- Bottom trawling (every 3-5 years)

DBO occupations by national and international science programs

# DBO1: Regional decline in dominant bivalve (*N. radiata*), with potential shift to smaller bivalve (*E. tenuis*)

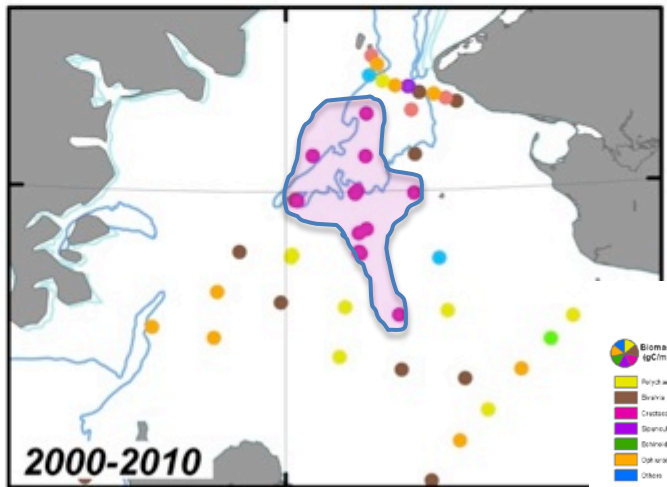
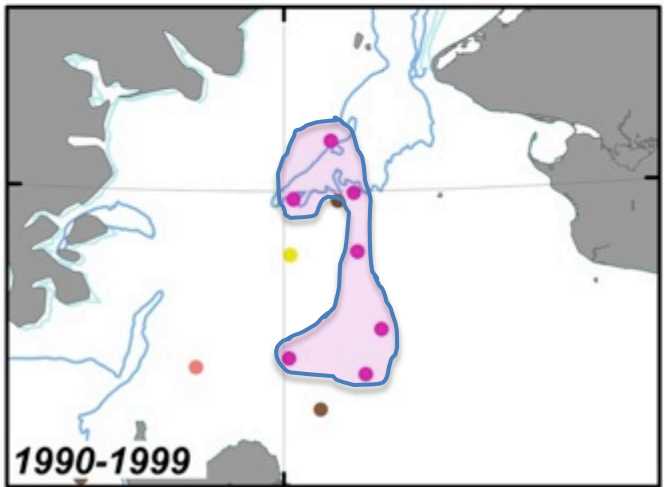
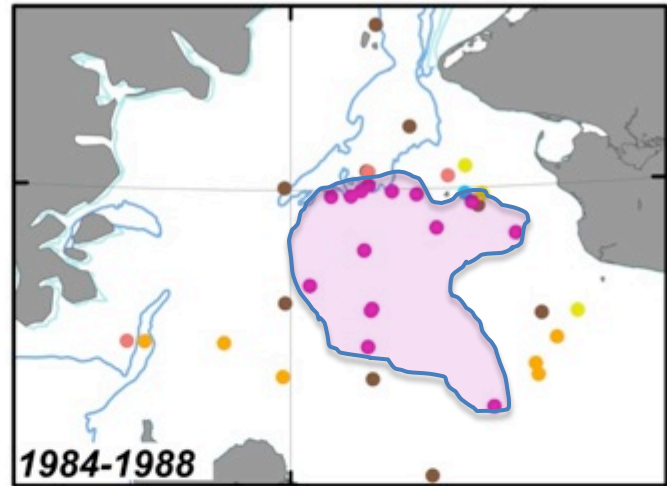
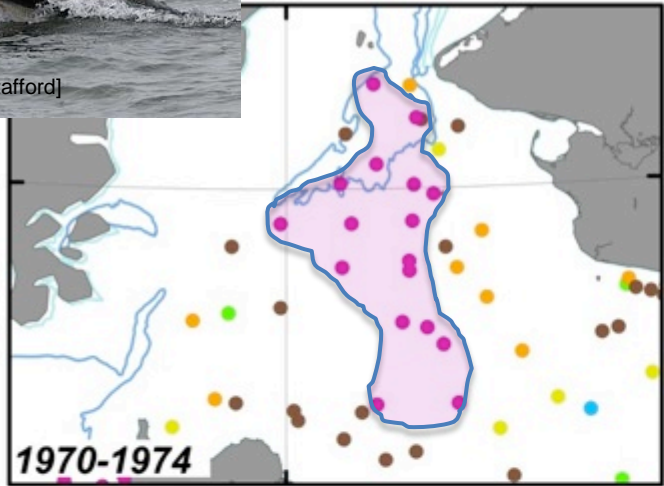
- Coincident decline in sediment community oxygen consumption indicative of reduced carbon supply to the benthos
- Impact on declining spectacled eider (diving seaduck) populations



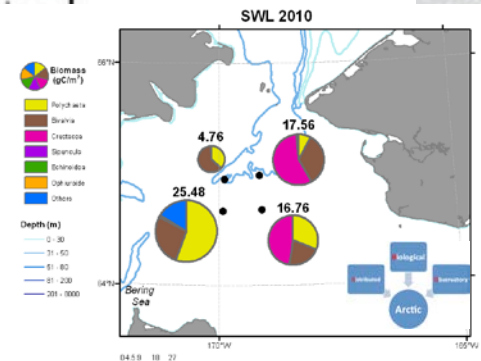
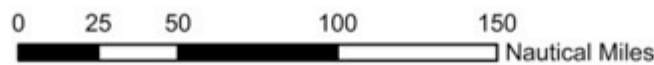
- Nuculanidae (*Nuculana radiata*)\*
- Nuculidae (*Ennucula tenuis*)
- ★ Tellinidae (*Macoma calcarea*)
- ◆ Maldanidae
- ⊕ Sipunculidae

\* Linear regression:  
 $y = -2.5359x + 5,118.8$   
 $r^2 = 0.64509; p < 0.0001$

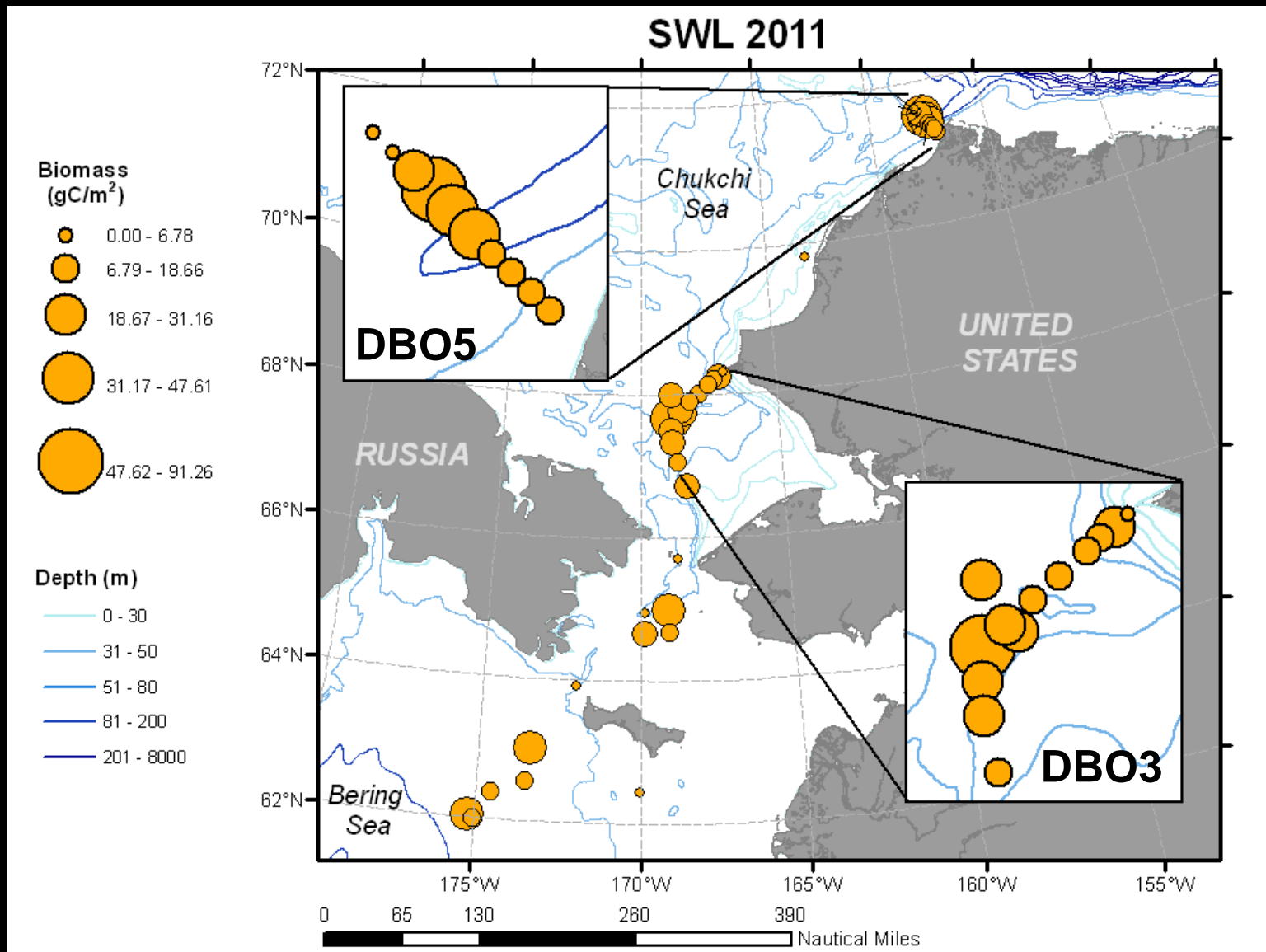
# DBO 2: “Footprint” of ampeliscid amphipod prey contracting spatially



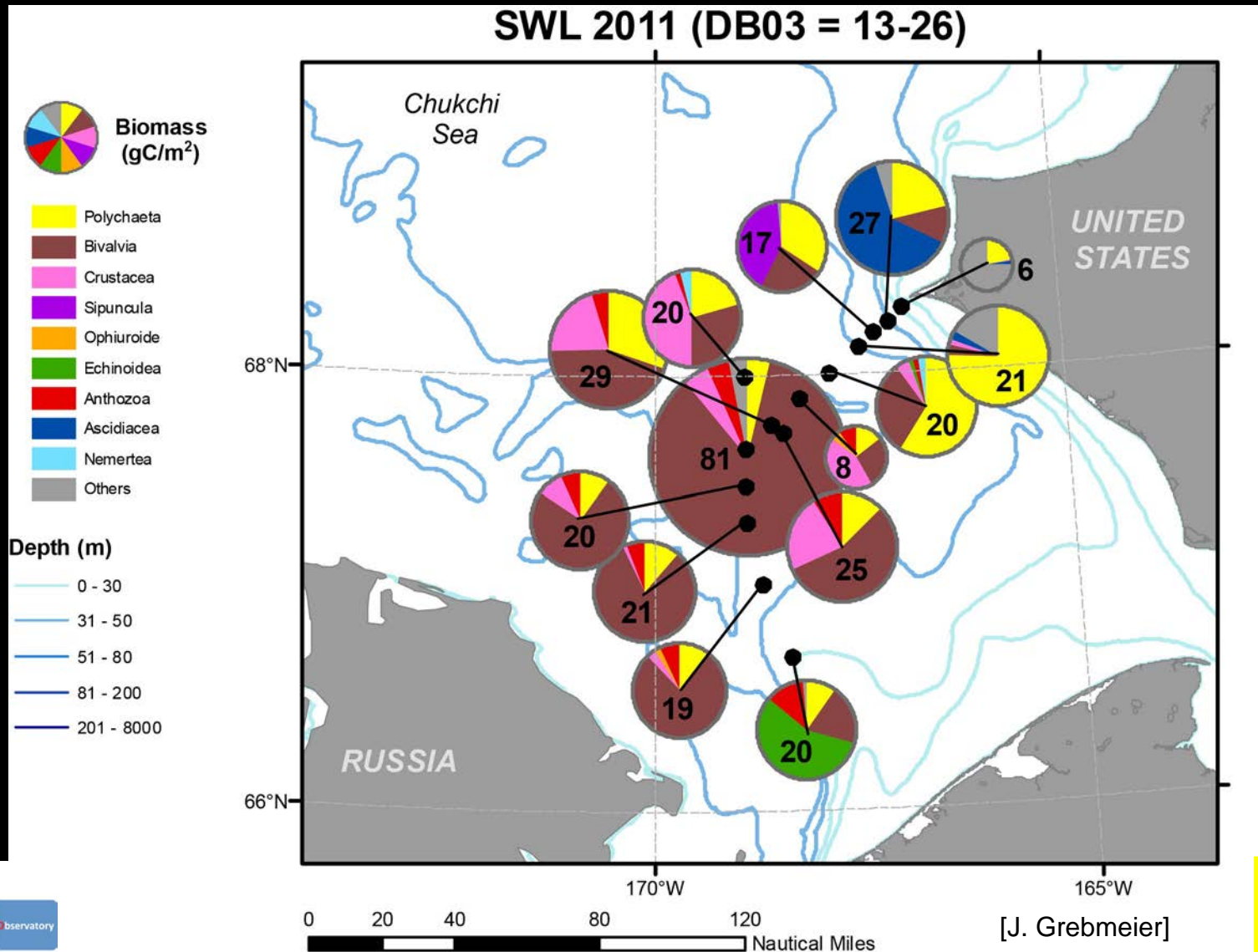
- Dominant Taxa by Biomass (gC)**
- Amphipoda
  - Anthozoa
  - Ascidian
  - Bivalve
  - Echinoidea
  - Foraminifera
  - Isopoda
  - Other
  - Polychaeta
  - Sipunculida



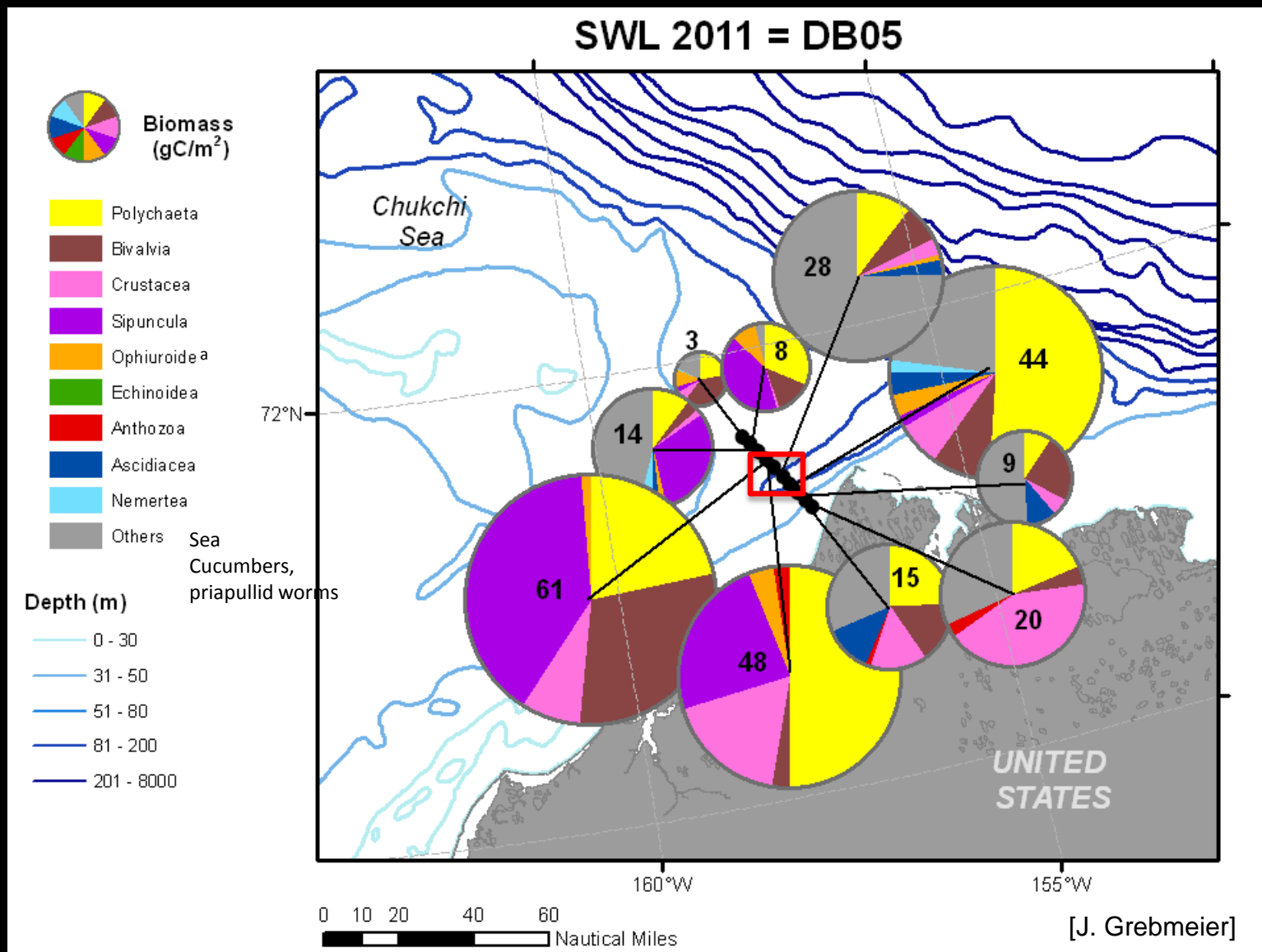
# SWL 2011 Benthic Biomass (gC/m<sup>2</sup>)-DBO 3 & 5



# DBO 3-So Chukchi Sea Benthic macroinfaunal biomass-July 2011 (2012 in progress)



# DBO 5-Barrow Canyon benthic macroinfaunal biomass-July 2011 (2012-HLY1201 in prog)



# Barrow Canyon

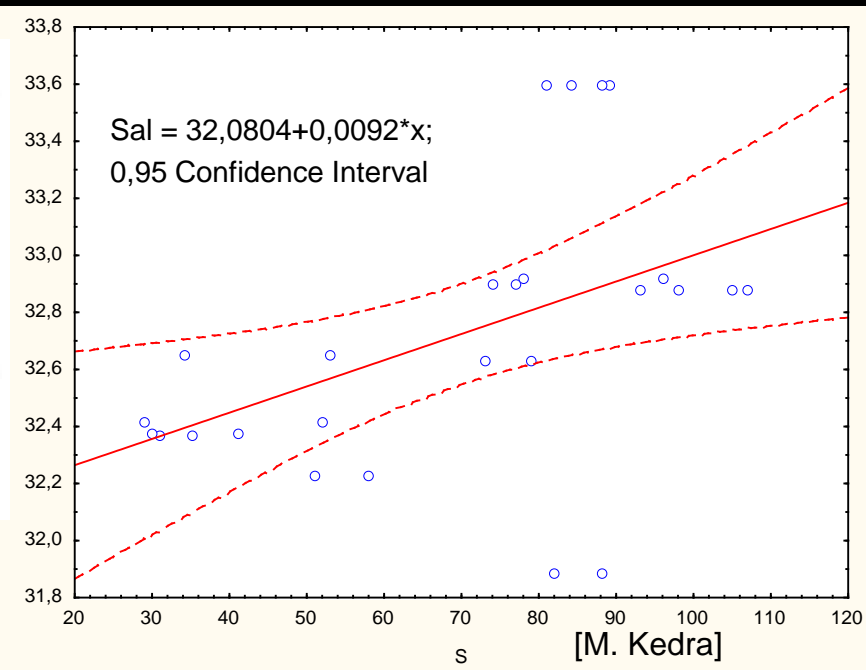
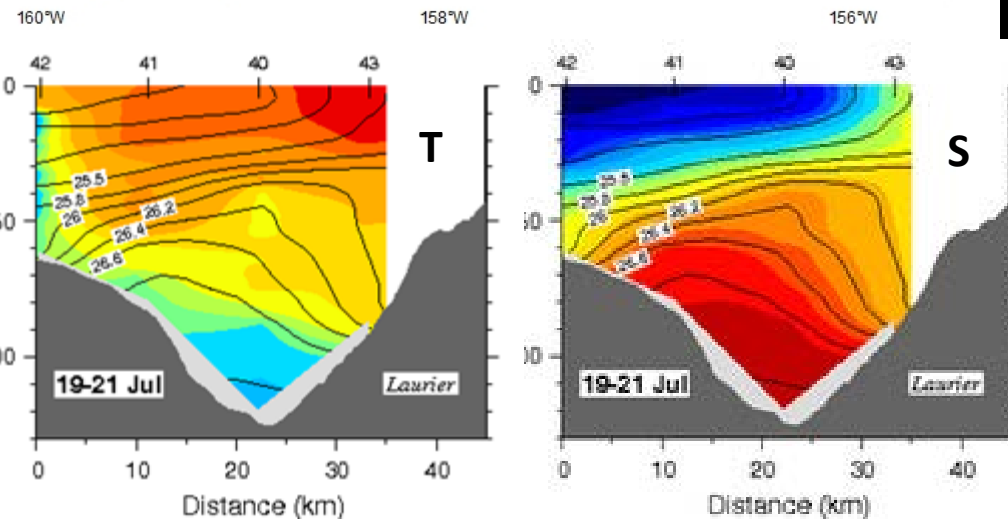
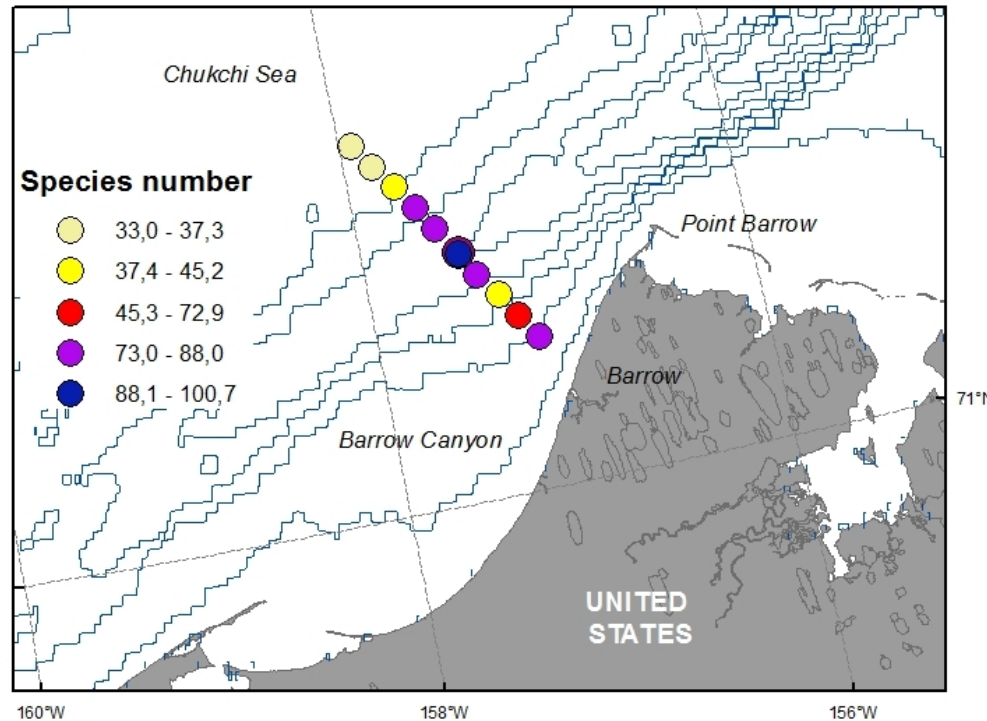
Spearman correlations:

Species richness & bot. sal.: 0.55\*

Species richness & chl a: 0.59\*

Species richness & TOC : 0.4\*

Similar correlations found  
for abundance and biomass



[http://www.arctic.noaa.gov/dbo\\_cruise\\_data\\_2010\\_pilot\\_study.html](http://www.arctic.noaa.gov/dbo_cruise_data_2010_pilot_study.html) C30)

