

# Sailing to the Shelfbreak: Education and Science from the MIT/WHOI Joint Program Orientation Cruises

Glen Gawarkiewicz

Woods Hole Oceanographic Institution



# Outline

- Background
- Educational Benefits
- Shelfbreak Environment
- Research Highlights
- Future Opportunities

# Background

- Orientation cruise typically occurs last week of June for entering graduate students
- First opportunity for incoming students to meet each other and work together
- For many students, it is the first opportunity to go to sea
- Sponsored by the Academic Programs Office at WHOI and dedicated to Jake Peirson
- Cruise takes place on the SSV Corwith Cramer and the cruise is run by the Sea Education Association (since 1990)

# SSV Corwith Cramer



# Educational Benefits

## Bonding and building Camaraderie



# Educational Benefits Seamanship and Shipboard life



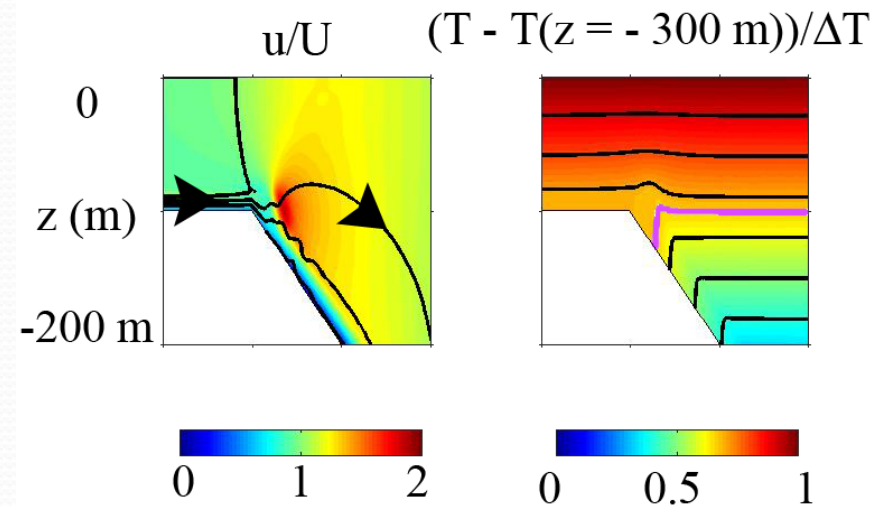
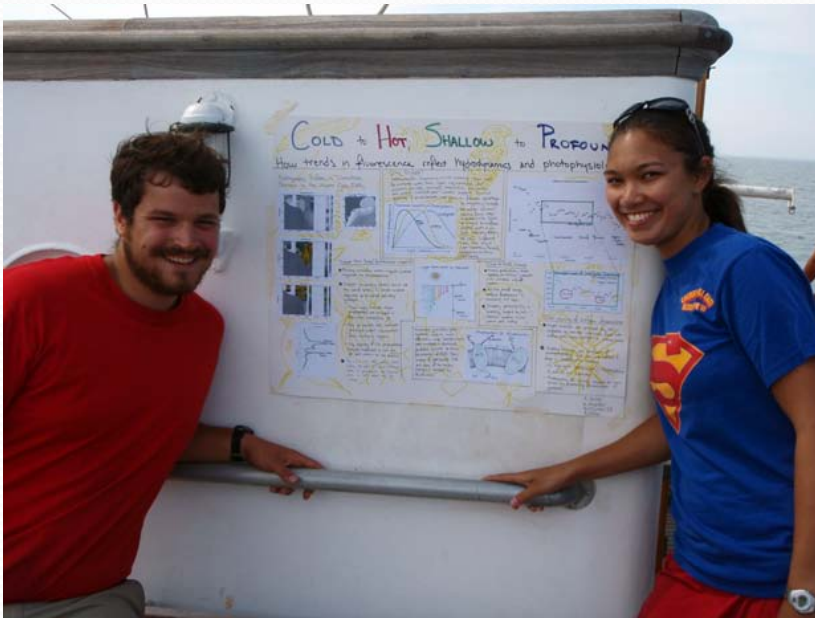
# Educational Benefits

## Seagoing Observational Techniques



# Educational Benefits

## Student Research

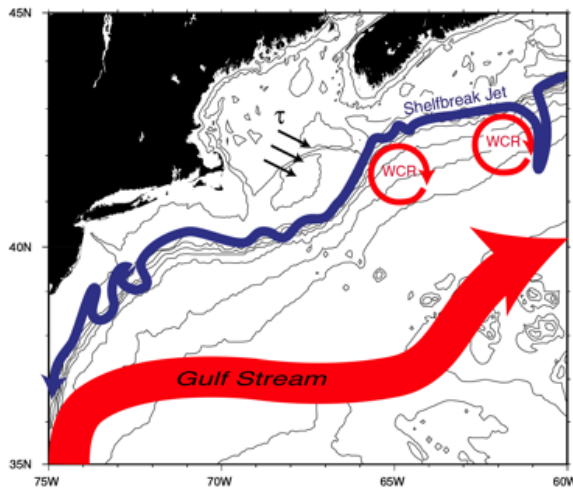


J. Benthuisen  
Shelfbreak frontogenesis and  
buoyancy transport over a sloping  
bottom



# Shelfbreak Environment

## Regional Circulation



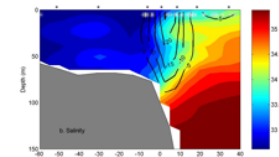
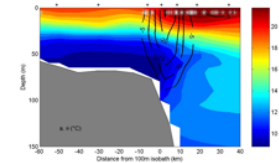
Shelfbreak Jet- Key circulation feature in NW Atlantic  
Continuous Feature from Labrador Sea to Cape Hatteras

## Frontal Structure and Jet

Alongshelf Jet near  
Shelfbreak

Cross-shelf scale  
is roughly 20 km

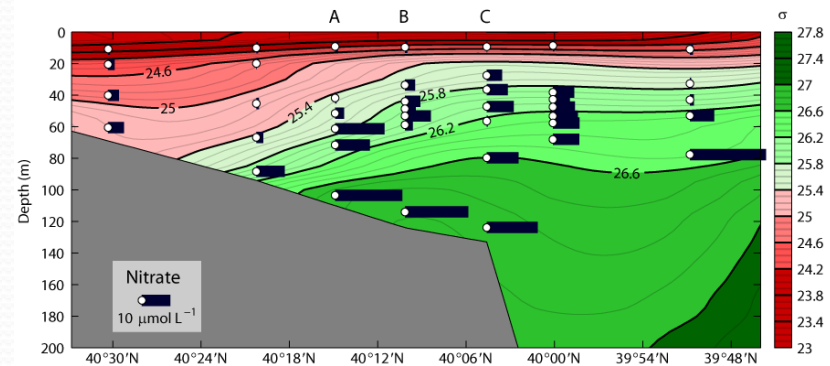
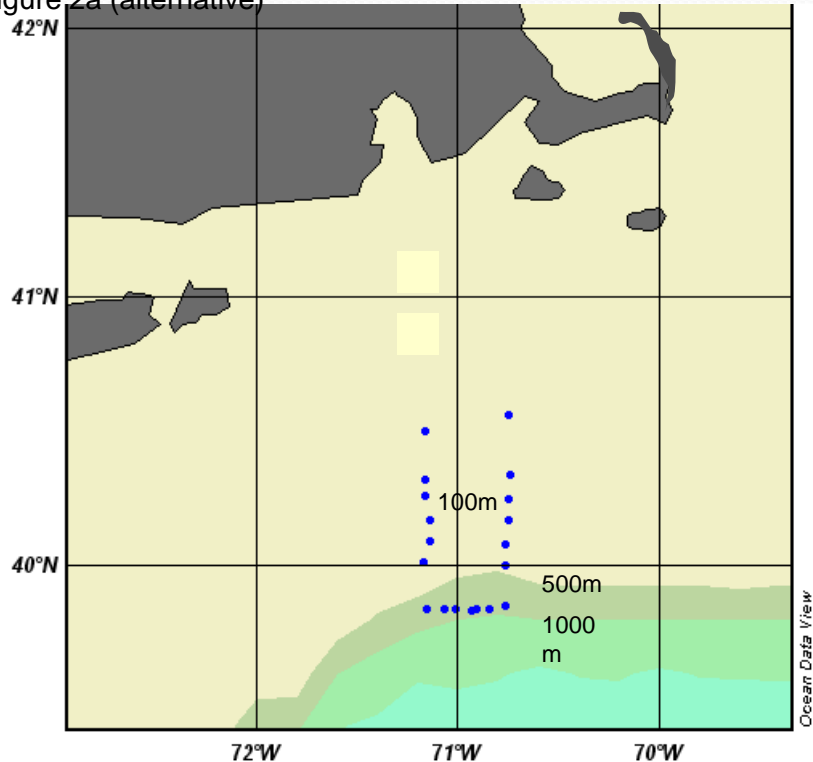
Offshore mean flow in  
Bottom Boundary  
Layer



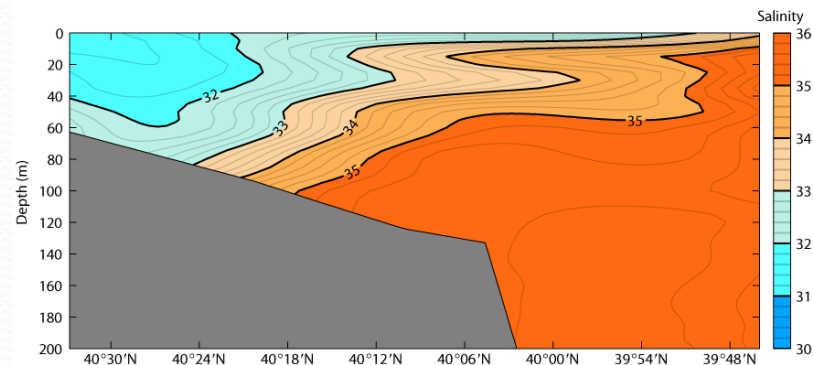
Climatology  
(C. Linder)

# Research- Repeat Hydrography

Figure 2a (alternative)

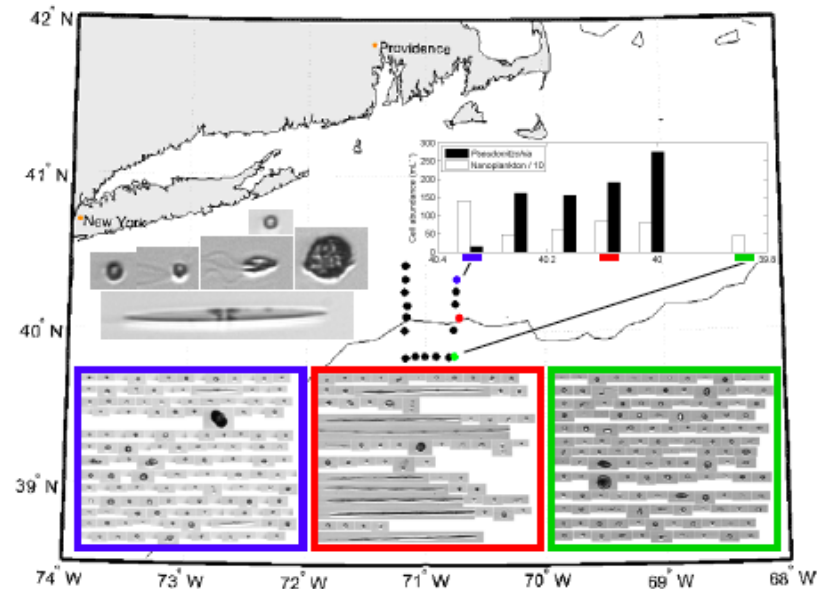


Nitrate



Salinity

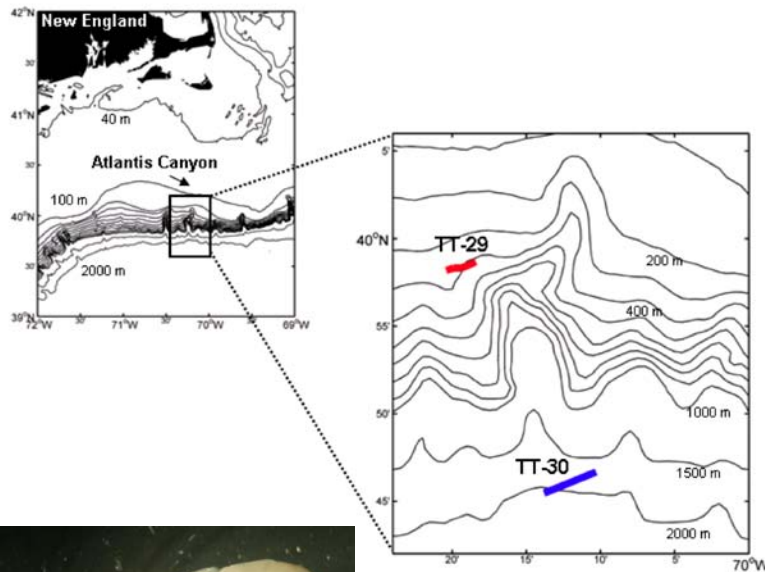
# Research- Phytoplankton Assemblages



H. Sosik and Rob Olson  
Flow Cytometer , June 2007

# Research- Zooplankton Distributions in Canyons

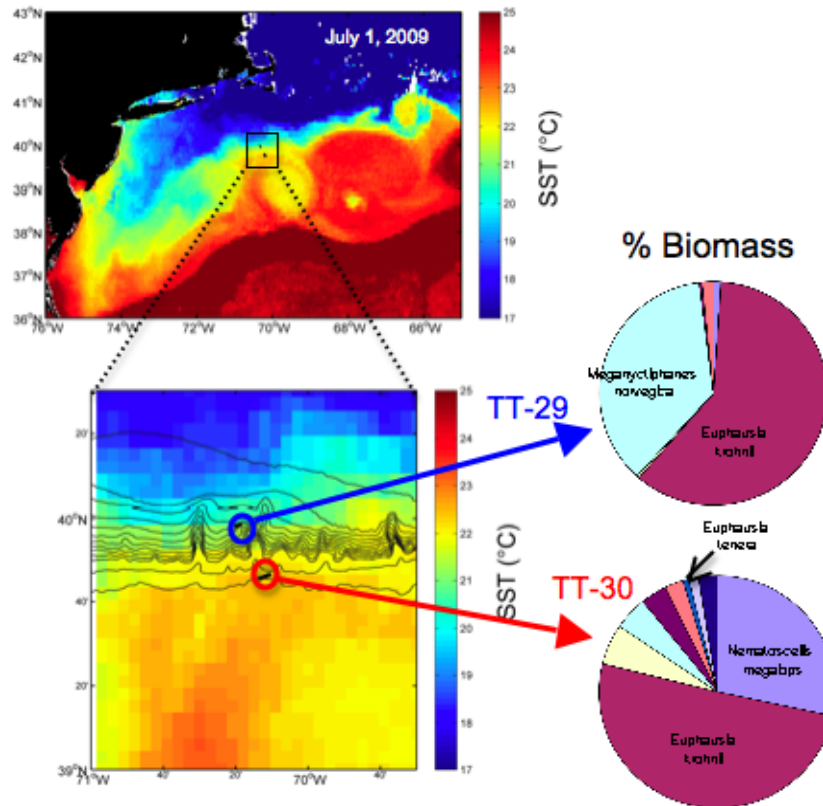
## Shelf Break Canyon Euphausiids



- Observations have been reported of dense aggregations of euphausiids (i.e., krill) in New England shelf break canyons
- Such aggregations likely are a key prey source for commercial fishes and marine mammals
- The regularity of these aggregations and the bio-physical processes underlying them are unclear
- Our goal is to work with SEA and the JP-SEA cruise to establish a time series of net sampling to characterize inter-annual variability in the zooplankton community in Atlantis Canyon
- In July 2009, the first year of this partnership, the students, scientists, and crew conducted 2 Tucker Trawls (under sail!) at the head and mouth of the canyon, 25 km apart

# Research- Zooplankton distributions in canyons

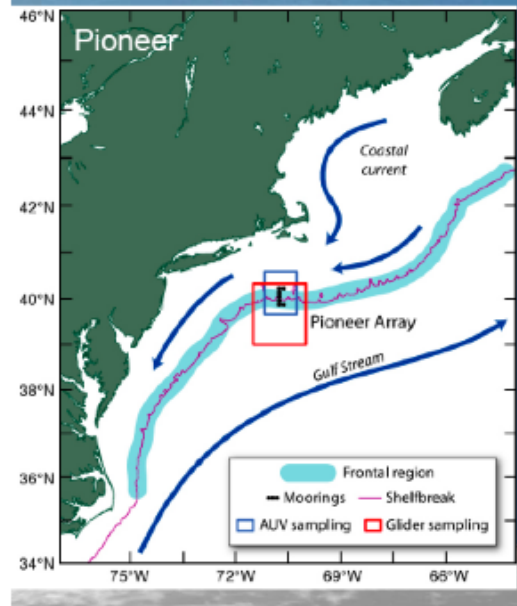
## SEA Canyon Samples



- Euphausiids were the dominant taxon sampled in both trawls, and were present at high abundance/biomass
- Interesting variability in community composition over the scale of the canyon
- Head of the canyon sample was characterized by a cold-water community, including abundant *Meganyctiphanes norvegica*, a large species thought to be an important prey item in the food web
- At the mouth of the canyon, *M. norvegica* was absent and the sub-tropical species *Euphausia tenera* was present. Abundant jellyfish were also sampled
- Overall, this has been a very successful collaboration, resulting in interesting data that have also guided the design of upcoming field work

# Future Opportunities- OOI Pioneer Array

- Prototypical shelfbreak system (buoyancy-driven current)
- Links to climate forcing (NAO)



# Thanks to

- Jim Yoder, Jim Price, Marsha Gomes, WHOI
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- Captains and crew of the SSV Corwith Cramer
- Donors for the Jake Peirson Cruise Fund

