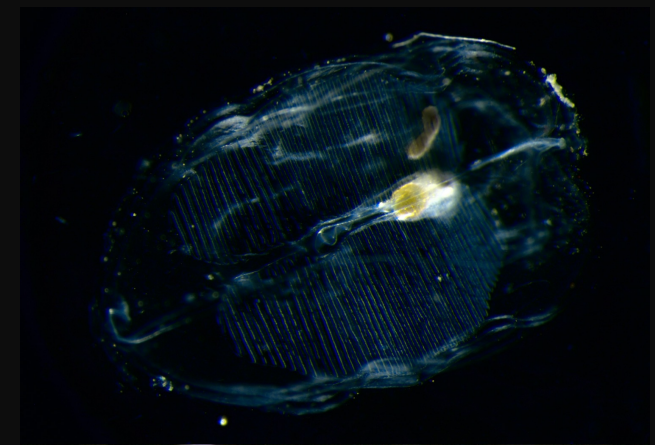


Two-decades of observations on pelagic tunicates and pelagic snails in the Northern Gulf of Alaska (NGA)

Emily Stidham¹, Dr. Russell Hopcroft¹

¹University of Alaska Fairbanks

eastidham@alaska.edu



Land Acknowledgement

I acknowledge I am working on the ancestral land of Troth Yeddha', home of the Lower Tanana people and the ancestral land of Qutekcak (Big Beach), the place name for Seward; home of the Sugpiat people. I also acknowledge that these lands on which we do our work are the unceded, ancestral lands of the Dené people and the Sugpiat (Alutiiq) people (respectively) who stewarded these lands for thousands of years and continue to steward these lands today. I thank you and respect your enduring relationship to your homelands.



Photo: R. Hopcroft
2000 µm

Oikopleura labradoriensis



Photo: R. Hopcroft

Limacina helicina



Jaspers et al., 2023

Oikopleura dioica



Photo: R. Hopcroft

Hopcroft/UAF/CoML

Fritillaria borealis

PELAGIC TUNICATES

- Larvaceans
- Doliolids
- Salps

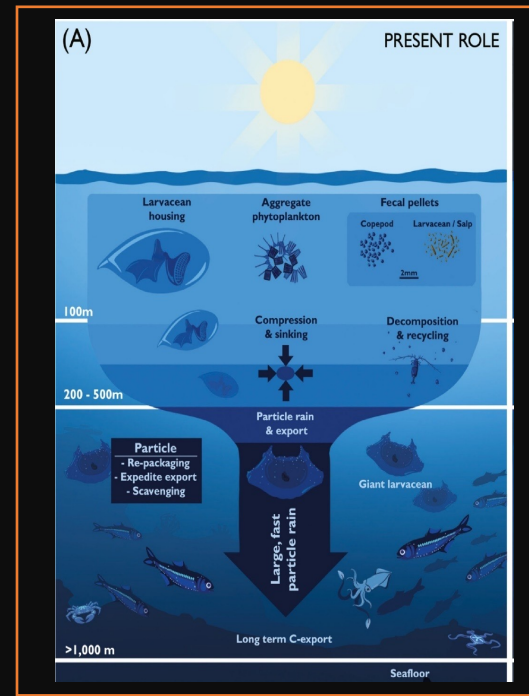
PELAGIC SNAILS

- Pteropods
 - Thecosomes
 - (Gymnosomes)

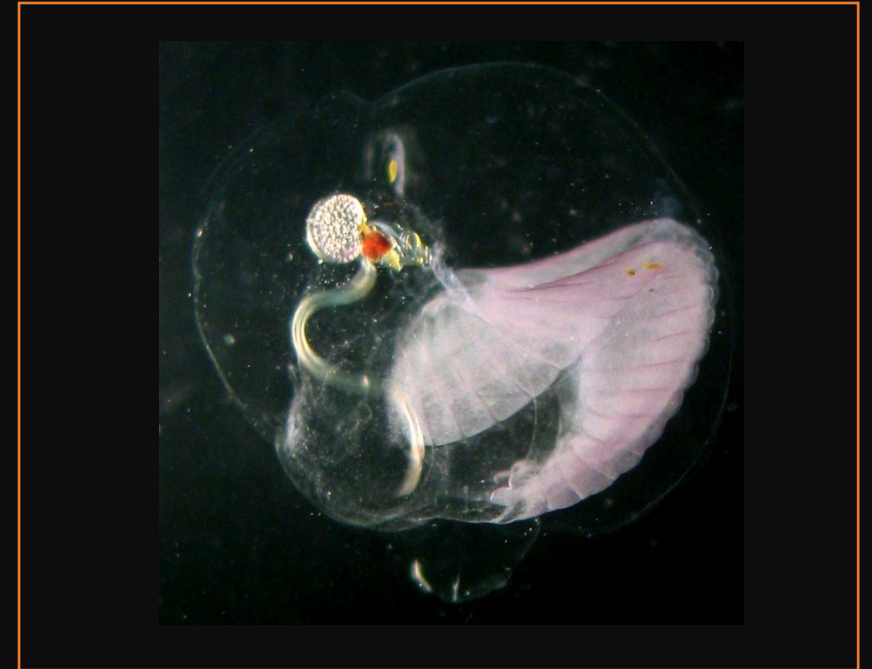
Mucus Net Feeders

Mucus-Net Feeders Ecological Roles

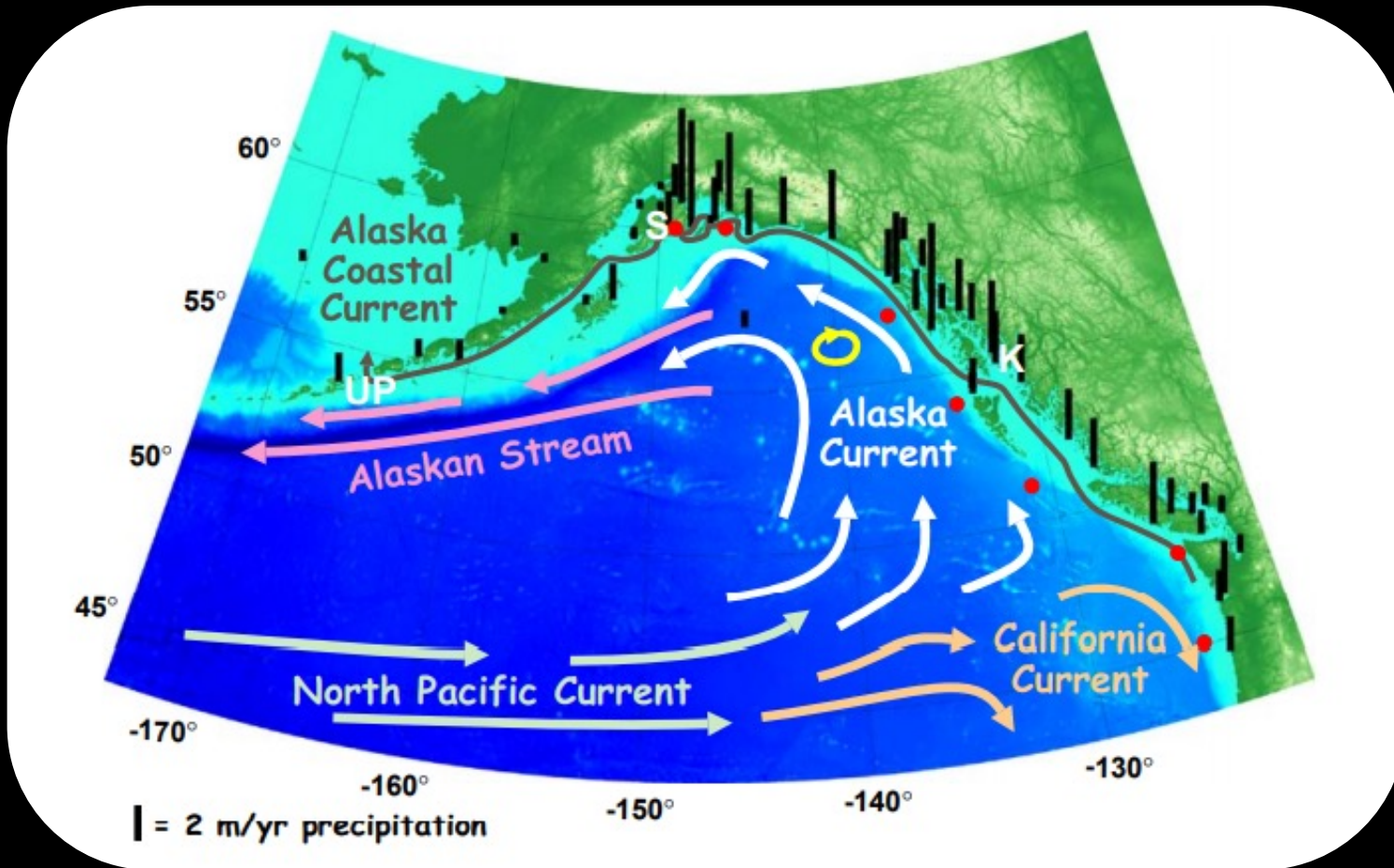
- Efficient grazers that “short-circuit” the microbial loop
- Major producers of marine snow - heavily contribute to the biological pump (fecal pellets, houses, shells)
- Can be up to 30% of community biomass
- Prey for important commercial fisheries and seabirds



Jaspers et al. 2023



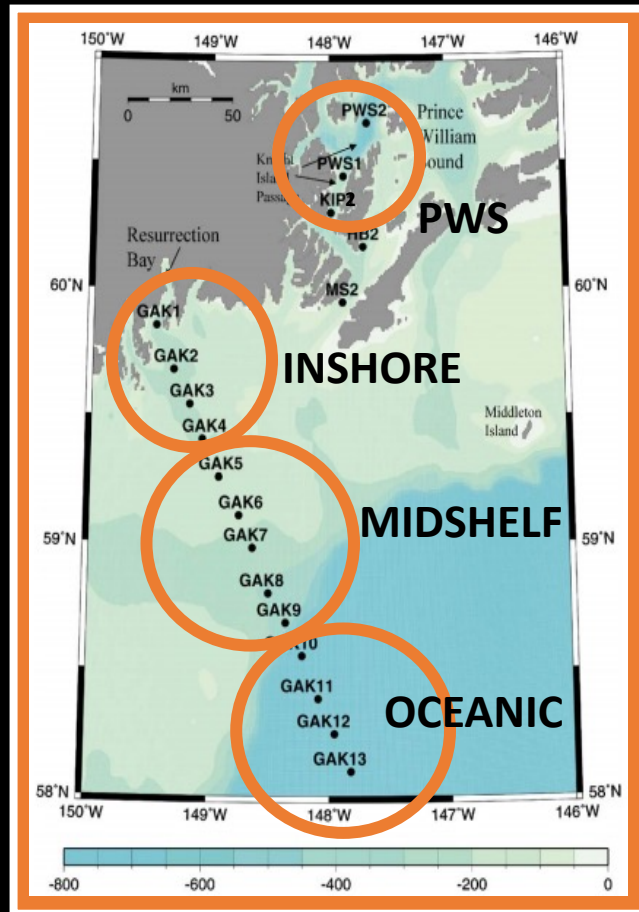
Northern Gulf of Alaska System



- Seasonal System
- Alaska Current
 - Strong part of physical variability
- Strong atmospheric forcing
 - Downwelling
 - Precipitation
 - Alaska Coastal Current
- HNLC Water
- NEWER CONCERN: Marine Heatwaves

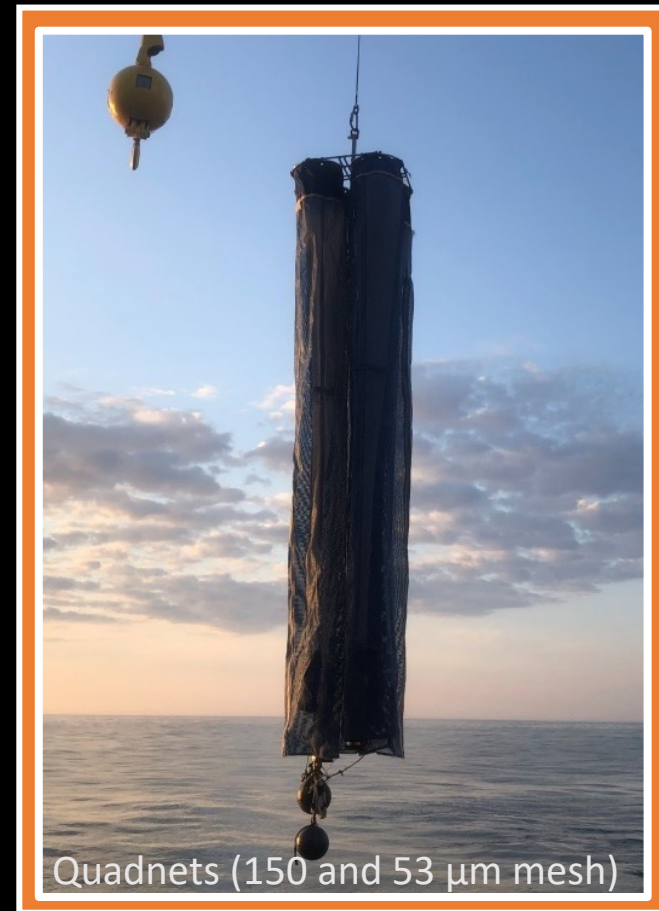
Methods

- Collections were done in the upper 100 m, every May and September since 2001



Coyle and Pinchuk 2005

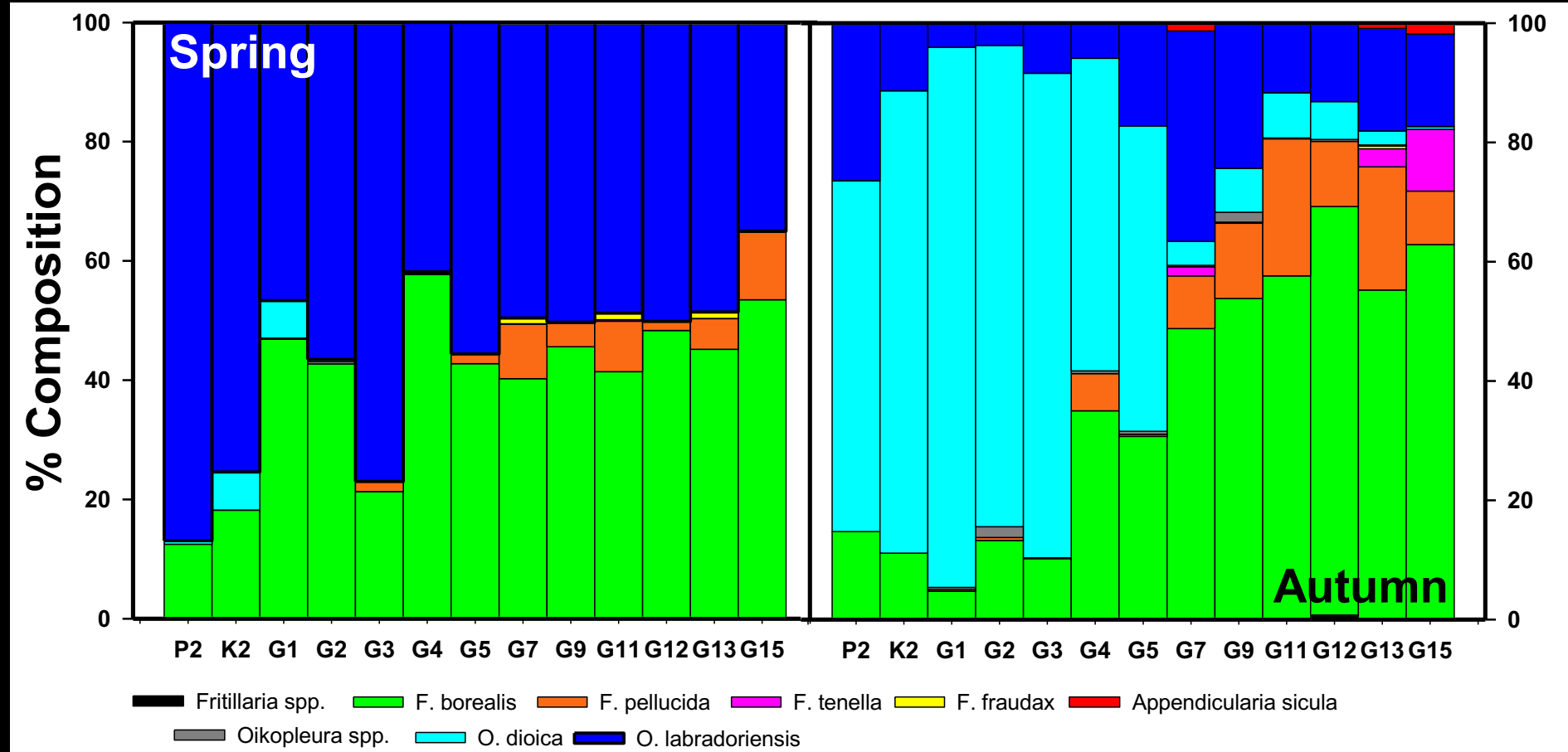
370
samples



Quadnets (150 and 53 μm mesh)

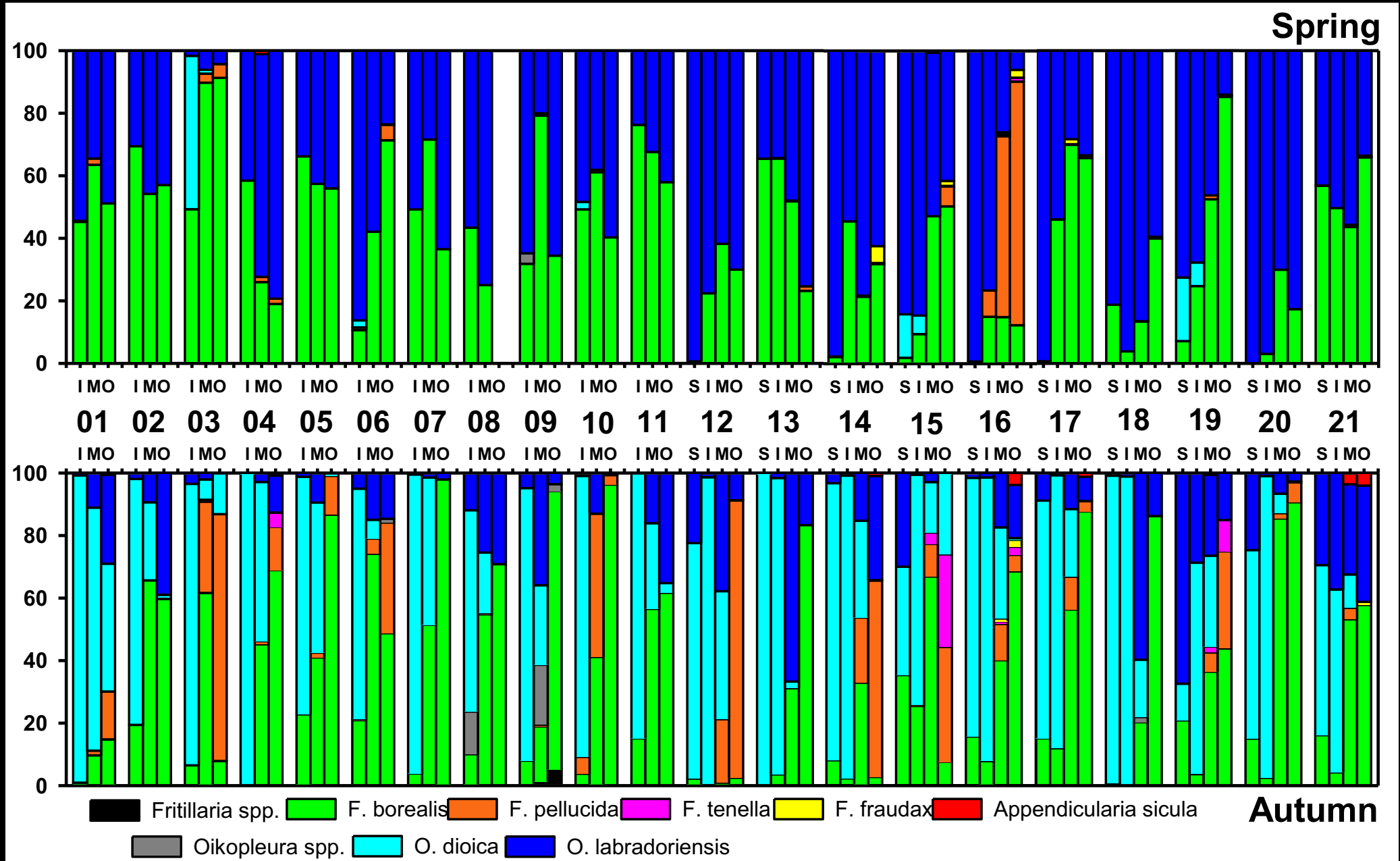
Photo: J. Questel

Larvacean Species Composition



- Larvacean community composition is a good demonstration of the strong seasonality of the northern Gulf of Alaska
- Warm water taxa are predominantly at the oceanic stations with higher abundances in Autumn

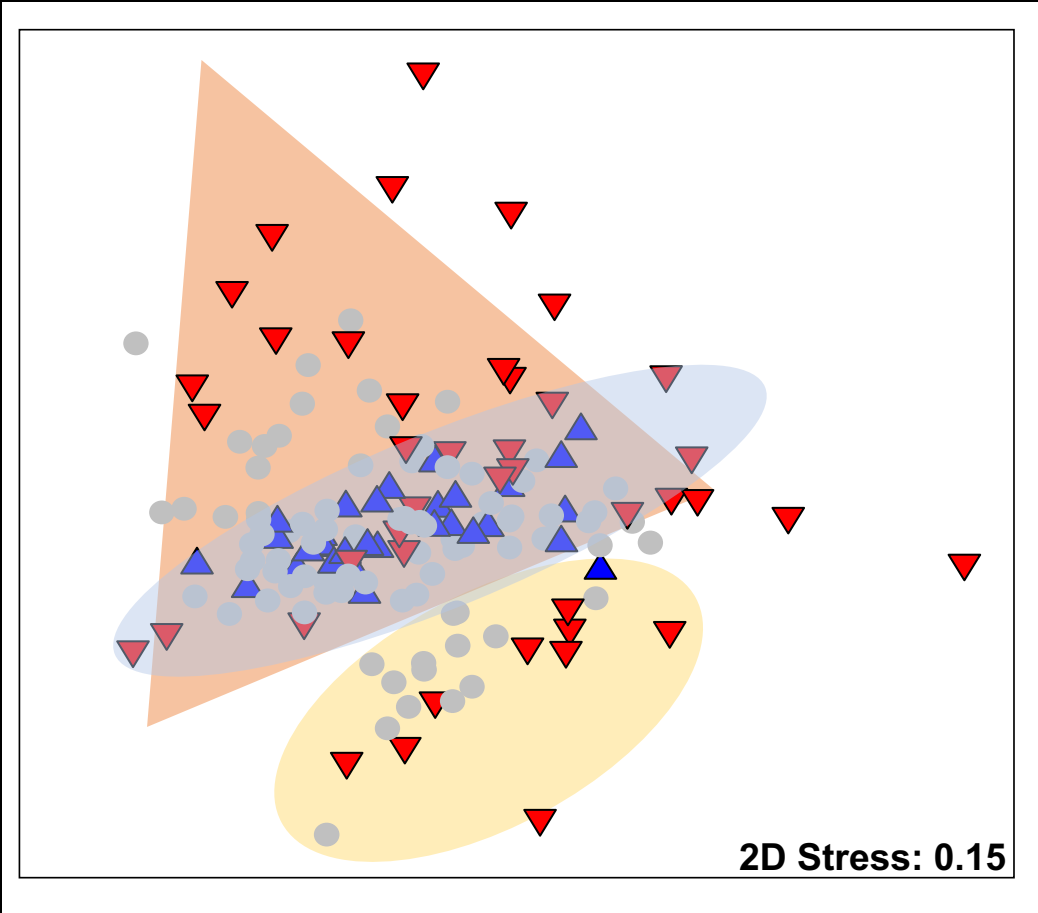
Larvacean Species Composition



Bray-Curtis Similarity of Larvacean Community

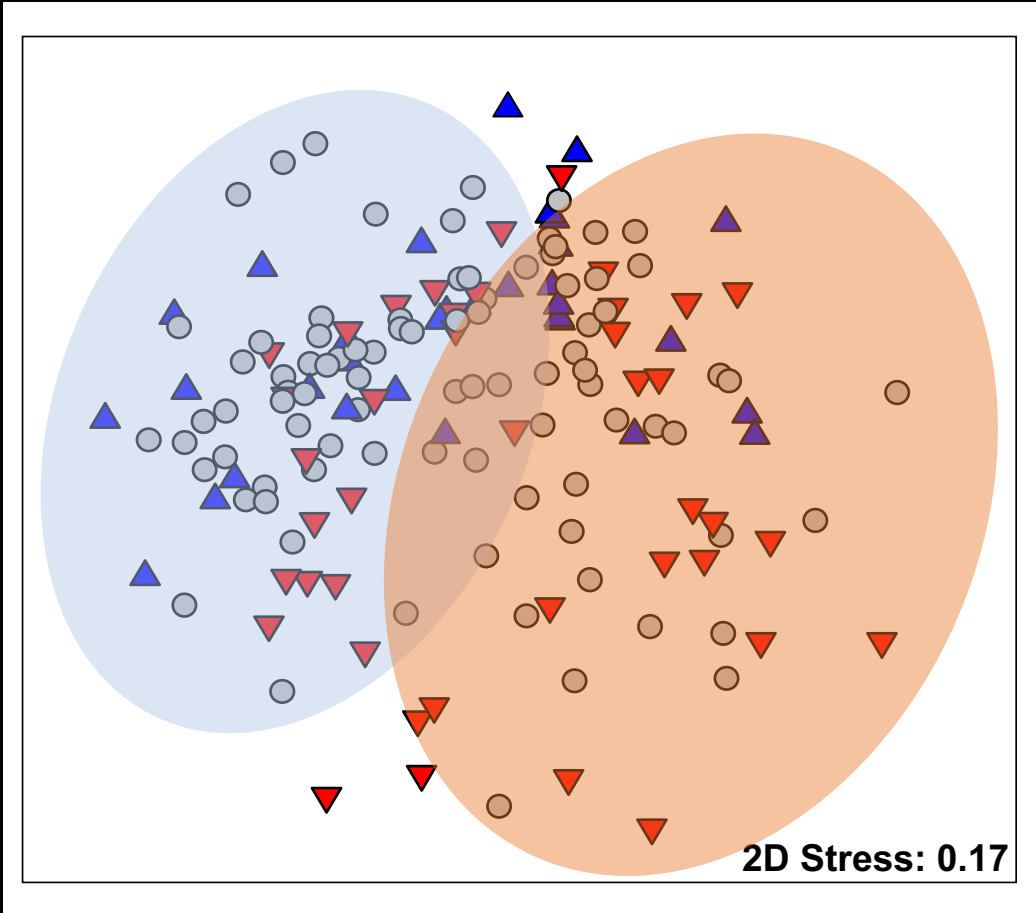
Spring nMDS

$R^2 = 0.187$



Autumn nMDS

$R^2 = 0.284$



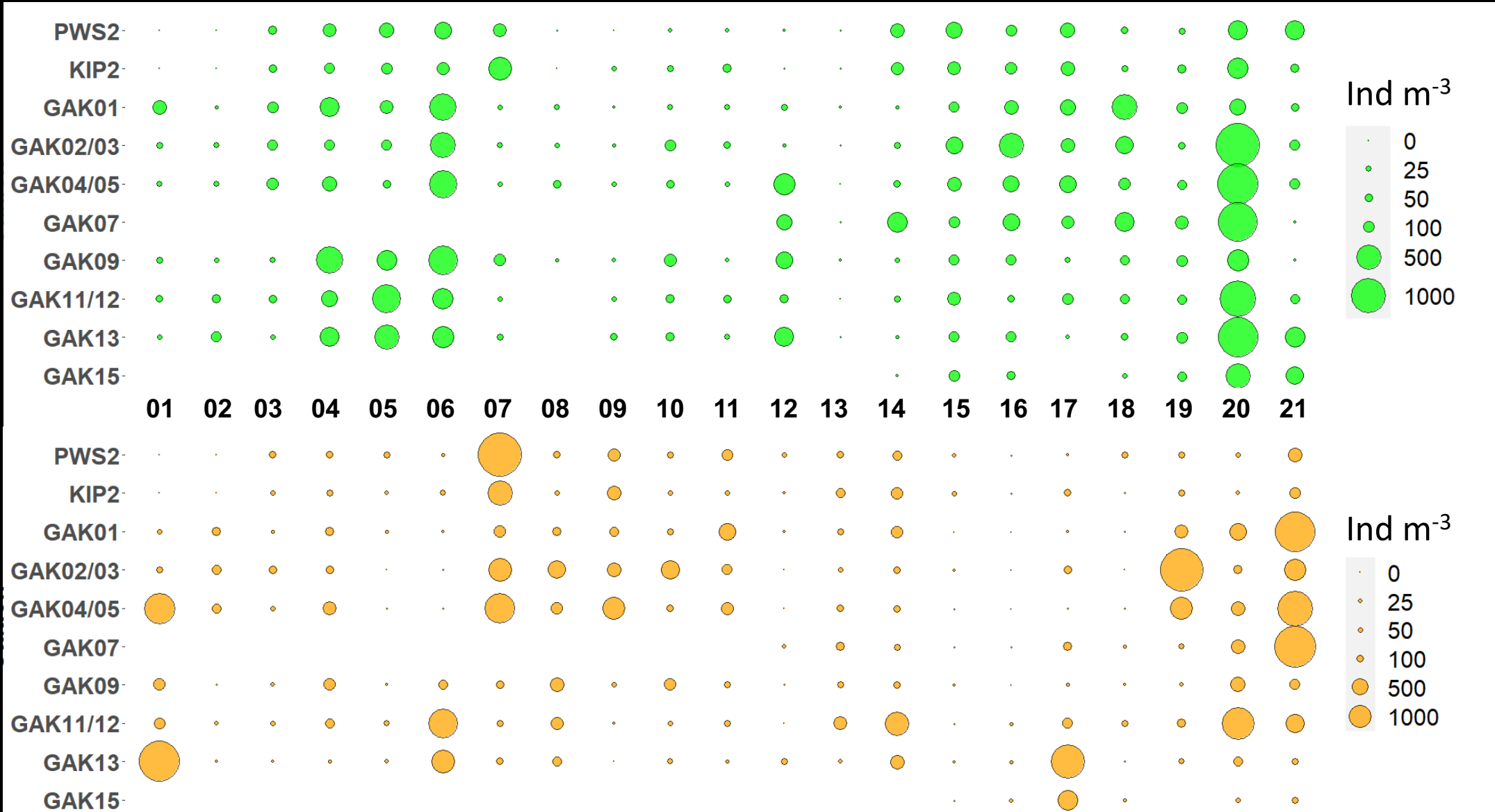
- Year**
- 2001
 - ▲ 2002
 - ▼ 2003
 - 2004
 - 2005
 - 2006
 - ▲ 2007
 - ▲ 2008
 - ▲ 2009
 - ▼ 2010
 - 2011
 - 2012
 - ▲ 2013
 - 2014
 - ▼ 2015
 - ▼ 2016
 - 2017
 - 2018
 - ▼ 2019
 - 2020
 - 2021

Pteropods Abundance



Spring

Stations

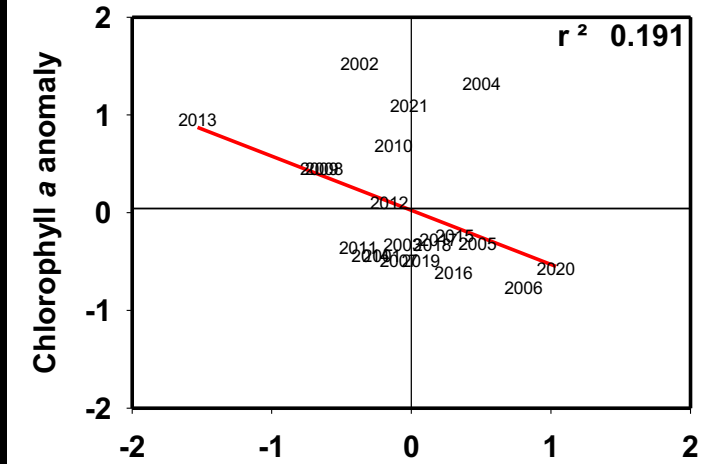
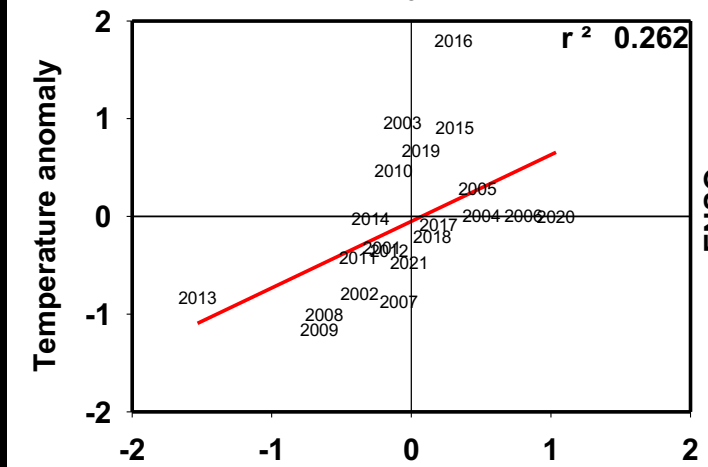
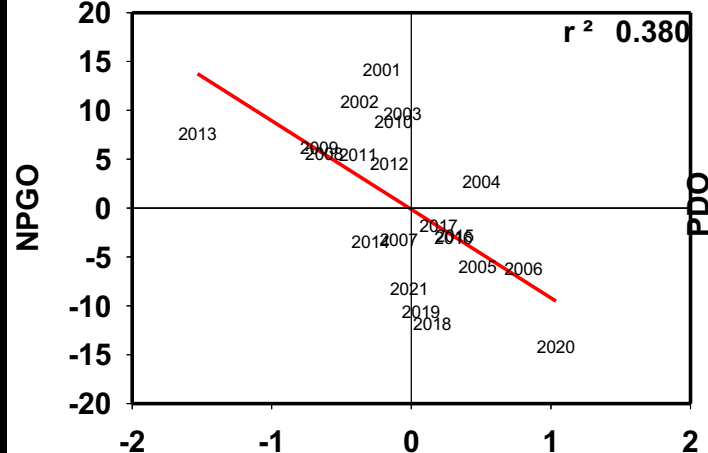


Pre-2012 PWS data from the 150 μm nets

Autumn

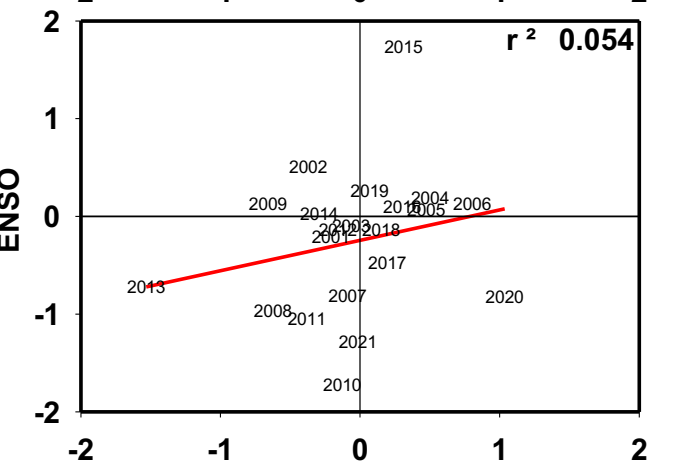
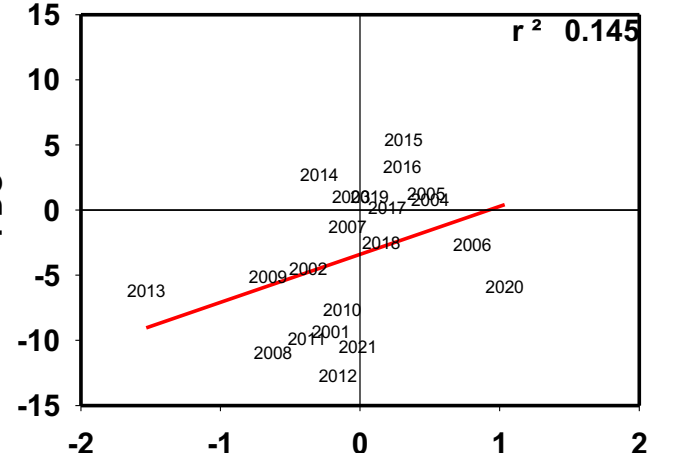
Pteropods vs Environmental Variables

Species	Spring	Autumn
<i>L. helicina</i>	0.400	0.187



Spring

L. helicina anomaly



L. helicina anomaly

Autumn

Conclusions

- Cross-shelf gradients and strong seasonal signal in community at the species level
- New species occurrence records for previously unreported species were created for the NGA and even the greater subarctic Pacific
- Connections have been established between community composition, heatwaves, and decadal oscillations (climate indices)
- Highly resolved time-series will be crucial to understanding how these communities and their seasonal patterns may be altered in a changing ocean

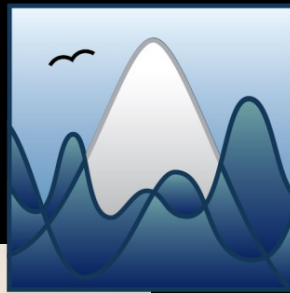


Thank You!

Crew on the R/V *Sikuliaq*
Crew on the R/V *Tiglax*

Dr. Russell Hopcroft
Dr. Jennifer Questel
Caitlin Smoot
Hannah Kepner
Alex Poje
Elizabeth Stockmar
Cheryl Hopcroft

Dr. Seth Danielson
Dr. Gwenn Hennon



NGA LTER



UAF Graduate School
Degree Completion Award

Norwegian Polar Institute



Graduate School



College of
Fisheries and
Ocean Sciences

