

Sediment oxygen consumption in the Pacific Arctic: Impacts of increased temperature and food supply on the benthic community and individual dominant organisms



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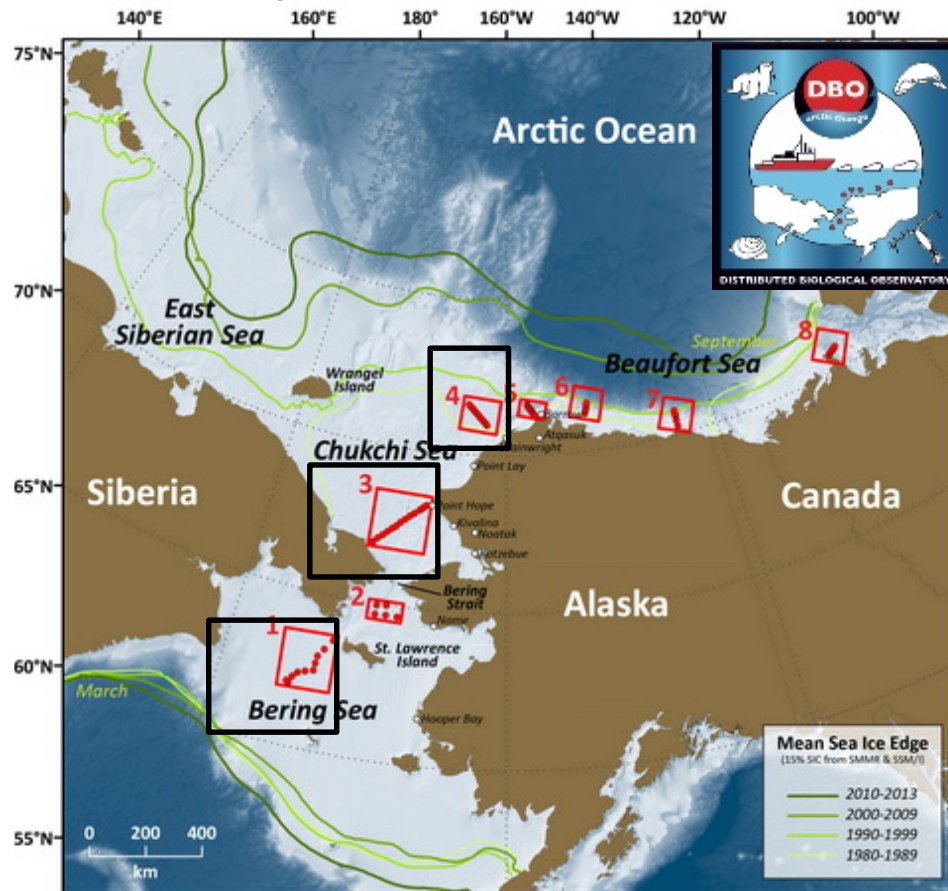
Distributed Biological Observatory

Linking Physics & Biology

Focus on three regions for the core experiments

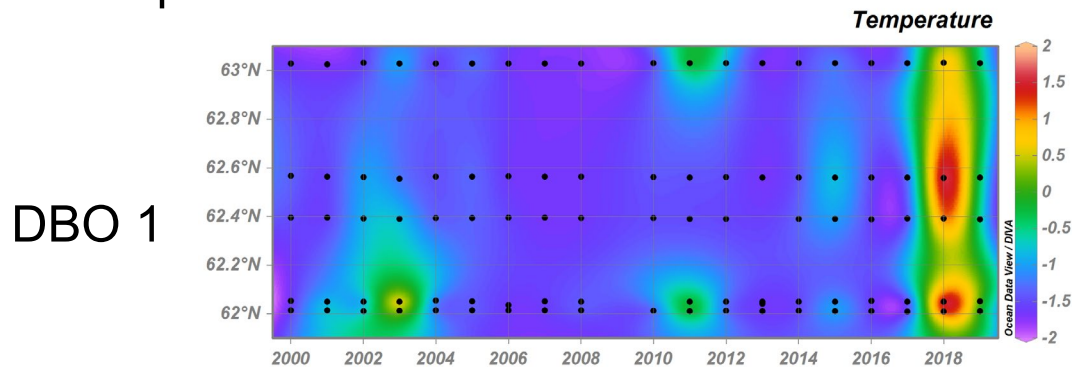
A particular focus in the DBO1 region in the northern Bering Sea because of abnormal years in 2018 and 2019

Year	Region	Station
2018	DBO3	DBO3.6=SEC3
		DBO3.7=SEC2
		DBO3.8=SEC1=UTN5
	DBO4	DBO4.2N
		DBO4.4N
DBO4.5N		
2019	DBO1	SLIP2
		SLIP4
2018	DBO3	DBO3.6=SEC3
		DBO3.8=SEC1=UTN5
	DBO4	DBO4.2N
DBO4.4N		



Goals of Core Experiments

1. How does increasing temperature affect the sediment community oxygen consumption (SCOC)?

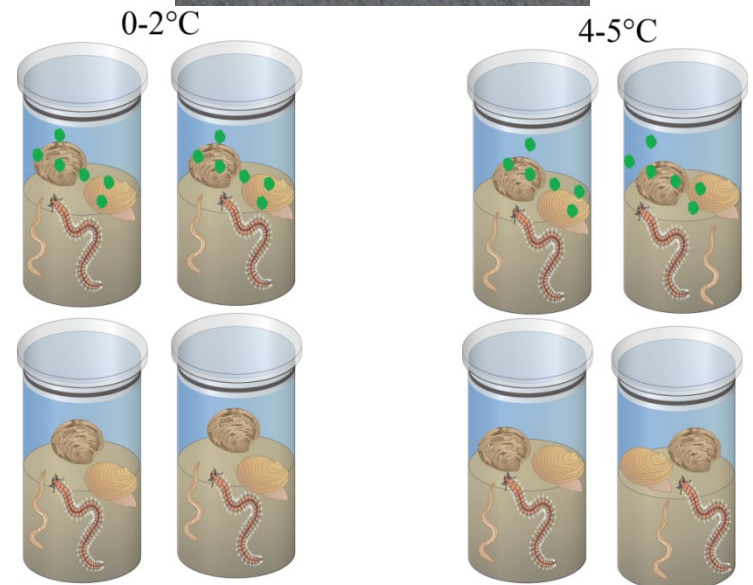
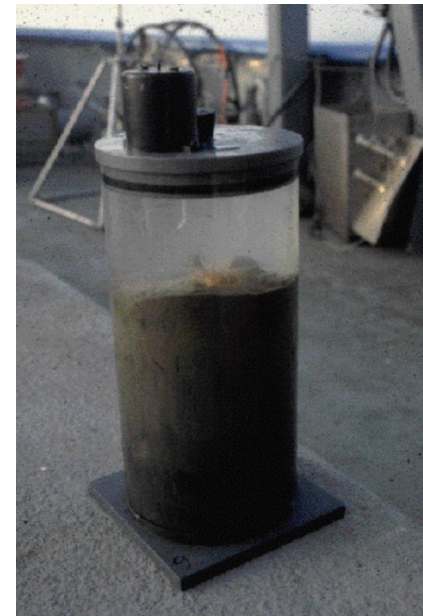


2. How does food availability affect the SCOC?

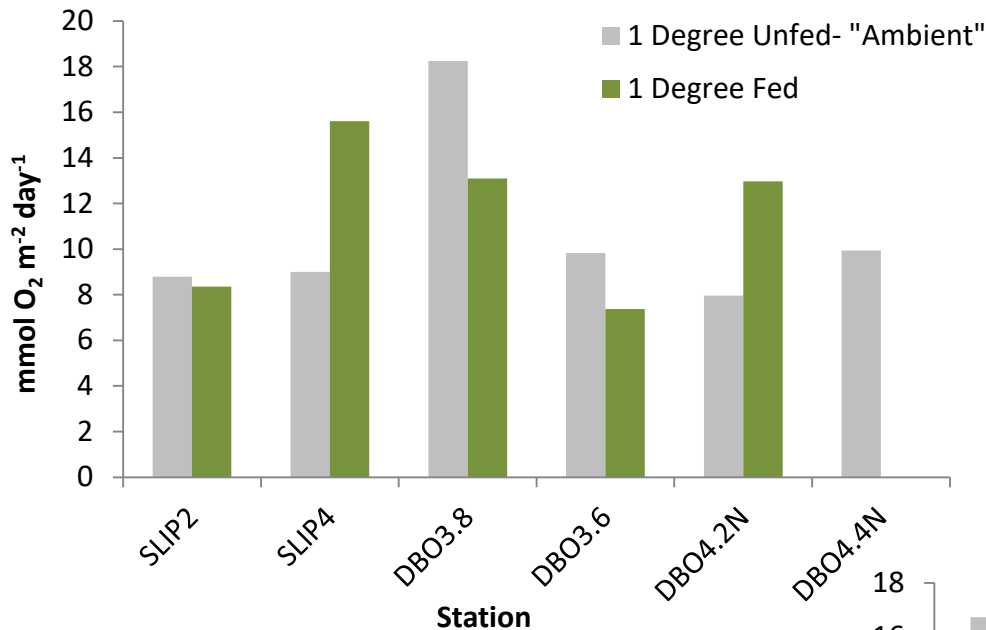
3. What is the contribution of the dominant organism in each of the regions to the overall SCOC?

Conducted experiments in 2018 and 2019 aboard the USCGC Healy. Samples were also collected in July aboard the Sir Wilfrid Laurier in 2018 and 2019.

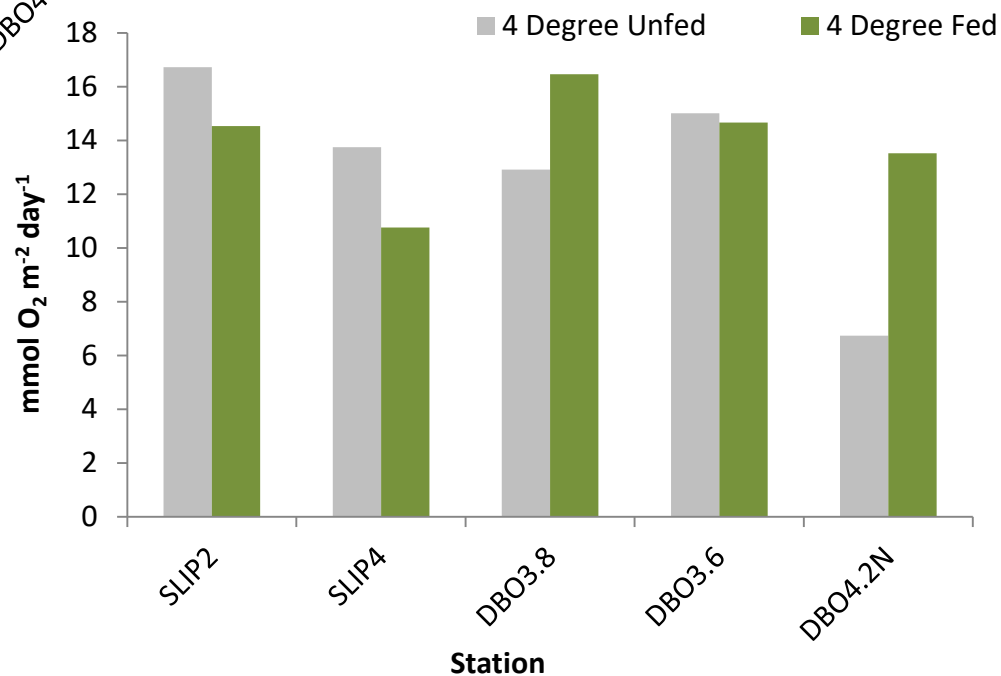
Core Experimental Setup: 2019



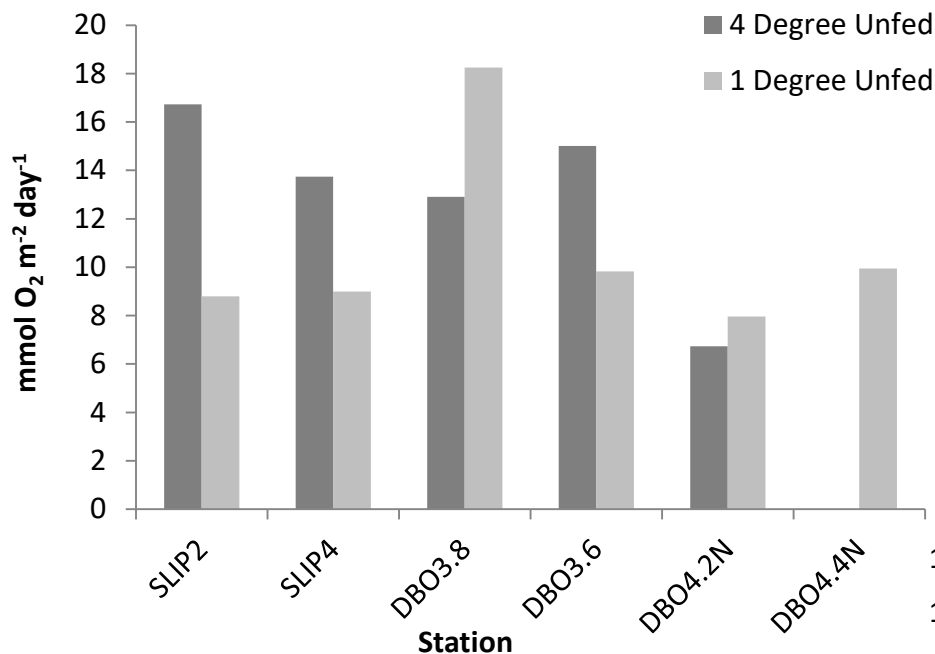
Preliminary Core Results: 2019 Food



No significant difference between feeding and non feeding in either temperature.



Preliminary Core Results: 2019 Temperature



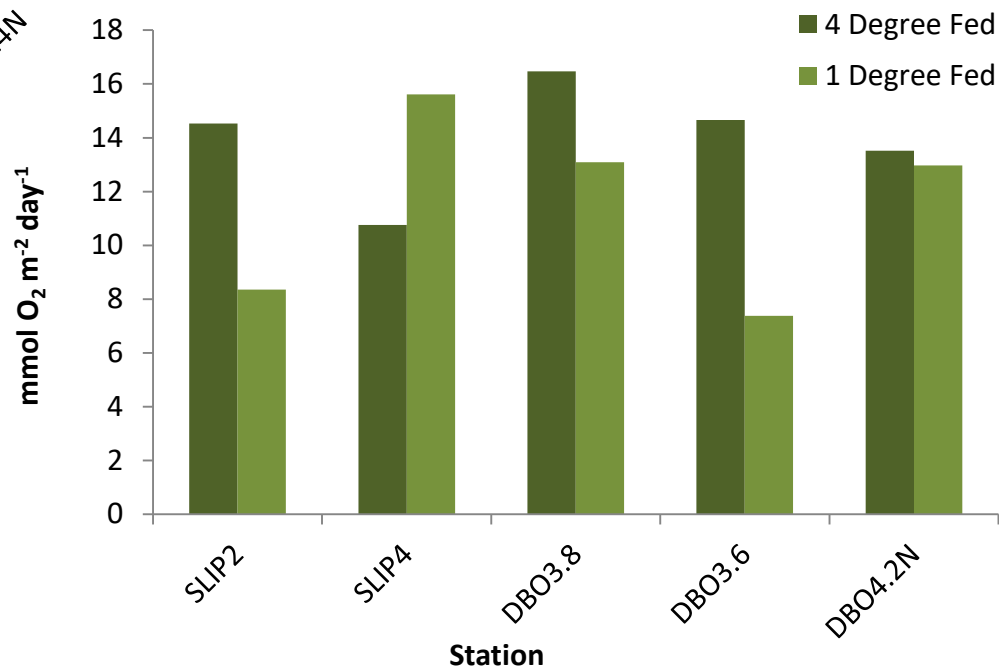
There was no significant difference between the two temperatures.

However,

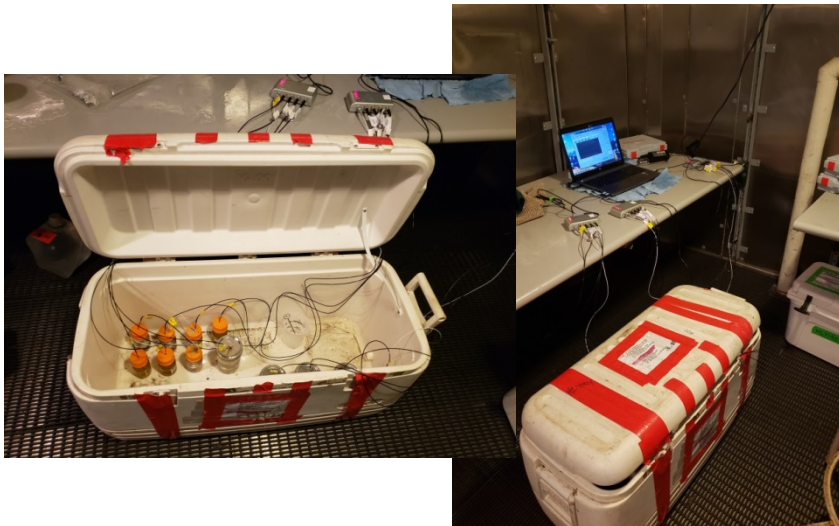
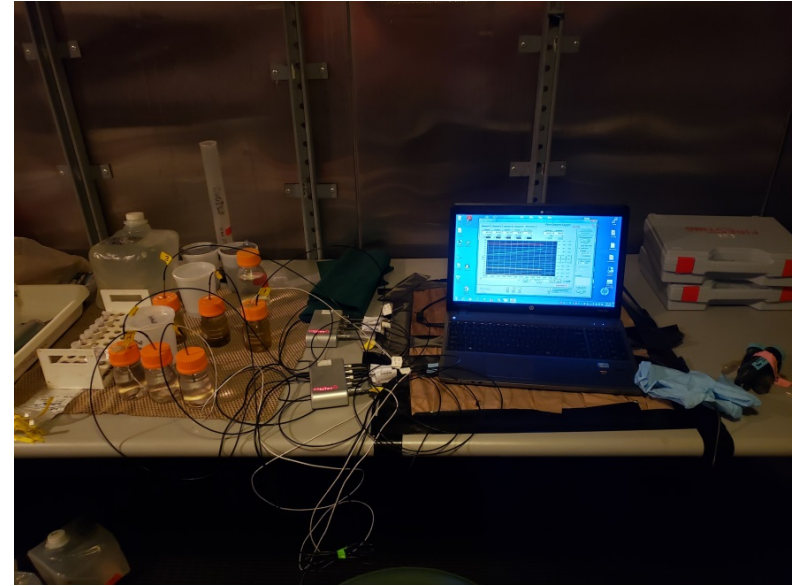
Sorting for the community structure to correct for organisms that were living in the core is almost complete.

Ex: HLY1801core
without a *Serripes* vs. with *Serripes*
11.051 vs. 37.681
mmol O₂ m⁻² day⁻¹







So what is the impact and contribution of individuals?

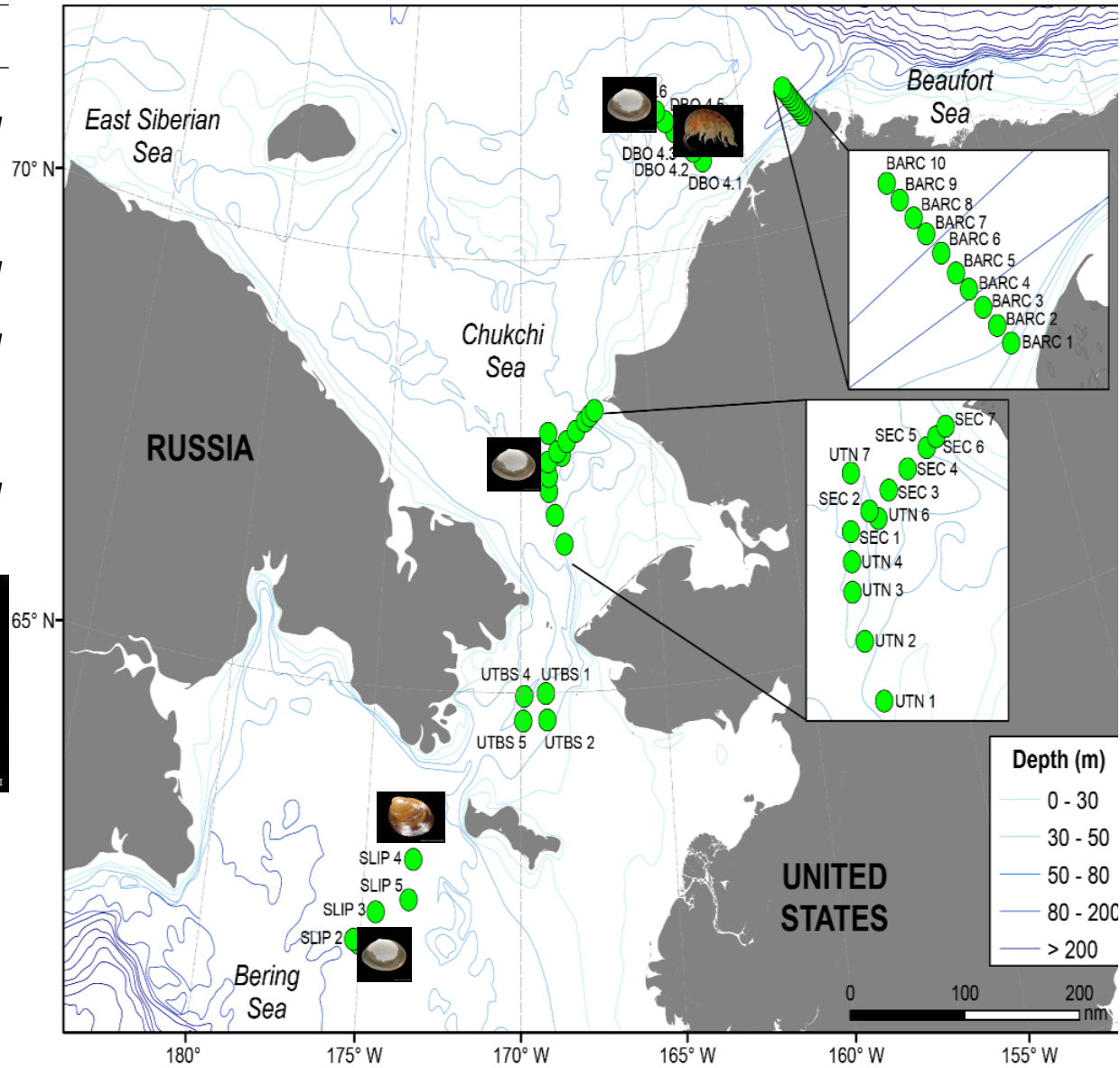


Individual Respirations: Setup and Equipment



Dominant Organisms: 2019

Station	Organism
 SLIP2	<i>Macoma calcarea</i>
 SLIP4	<i>Ennucula tenuis</i>
 DBO3.8	<i>Macoma calcarea</i>
 DBO3.6	<i>Macoma calcarea</i>
 DBO4.2N	<i>Ampeliscidae</i>
 DBO4.4N	<i>Macoma calcarea</i>



Individual Respiration Contribution Example 2018 Data

Example from HLY1801 DBO 3.8:

Core = 13.26 mmol O₂ m⁻² day⁻¹

Individual (*Macoma calcaria*) = 0.105 mmol O₂ m⁻² day⁻¹



0.8% of total

Future Experiments

Temperature experiments for both cores and individuals will be repeated in August of 2020 (no food experiment repeat) at the same stations in DBO1 and DBO3 for comparisons to 2018 and 2019.

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