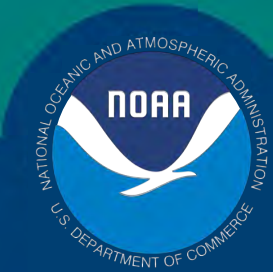


Science, Service, Stewardship



Ocean Acidification in Alaska: *Observing, forecasting, and projecting OA impacts in the Bering Sea*

Jessica N. Cross¹ and Darren Pilcher^{2,1}, Hongjie Wang^{2,1},
Natalie Monacci³, W. Christopher Long⁴, Elizabeth Siddon⁴,
Thomas Hurst⁴, Esther Kennedy⁵



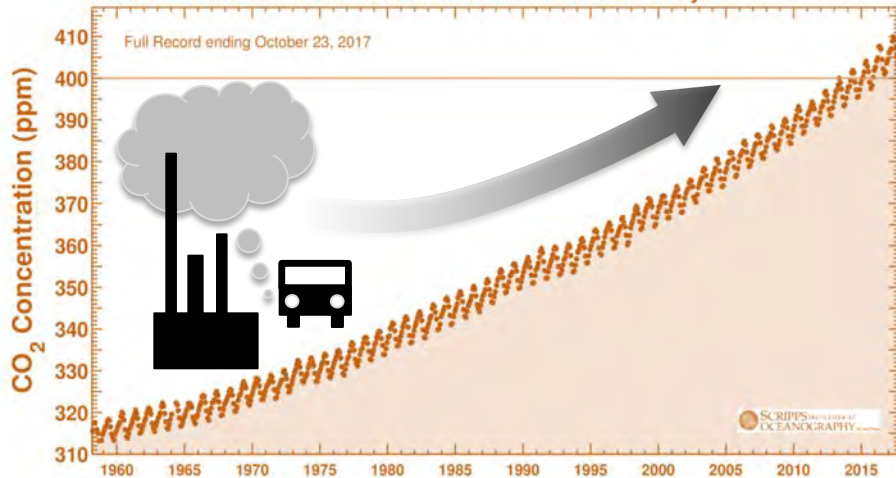
¹NOAA Pacific Marine Environmental Laboratory; ²UW Cooperative Institute for Climate, Oceans, and Ecosystem Science; ³UAF CFOS Ocean Acidification Research Center; ⁴NOAA NMFS Alaska Fisheries Science Center, ⁵University of California, Davis

NOAA

Latest CO₂ reading
October 23, 2017

403.84 ppm

Carbon dioxide concentration at Mauna Loa Observatory



22 TONS EVERY DAY

1/3 OF ALL CO₂ RELEASED IS
ABSORBED BY THE OCEAN.

ALASKAN
COASTAL
WATERS ARE
NATURALLY
HIGH IN CO₂



Photo: Lou Dematteis

CO₂



• **Direct effects**

• **Cumulative effects**

Foodweb effects

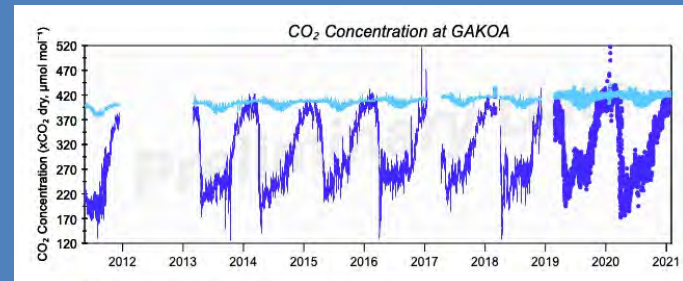
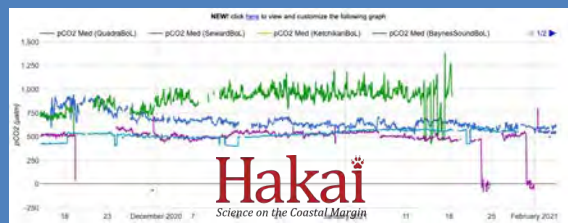
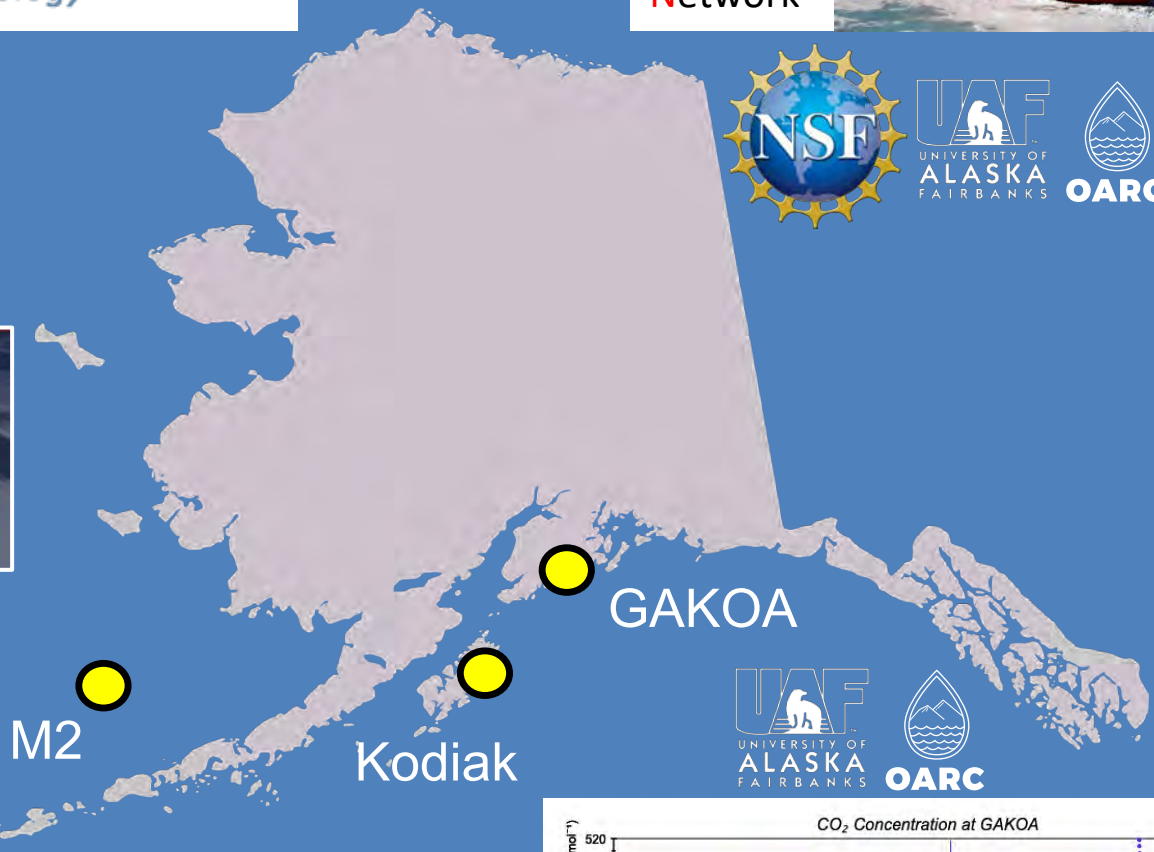
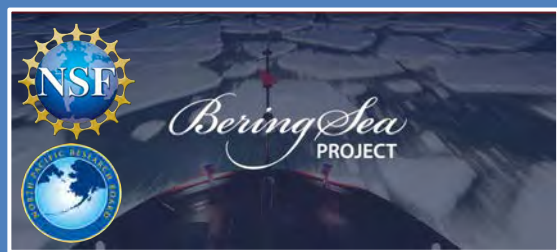
Sensory effects



reduc.



Distributed Biological Observatory
Linking Physics & Biology



So what can we do?

LOCAL ACTION REQUIRES
LOCALIZED DATA



Setting Local Priorities: Arctic Region

EARLIEST EXPOSURE TO SUSTAINED ACIDIFICATION



Charlie Wright, USFWS



Daniel Yang, Scripps
Caitlin Meadows

Setting Local Priorities: Arctic Region

EARLIEST EXPOSURE TO SUSTAINED ACIDIFICATION



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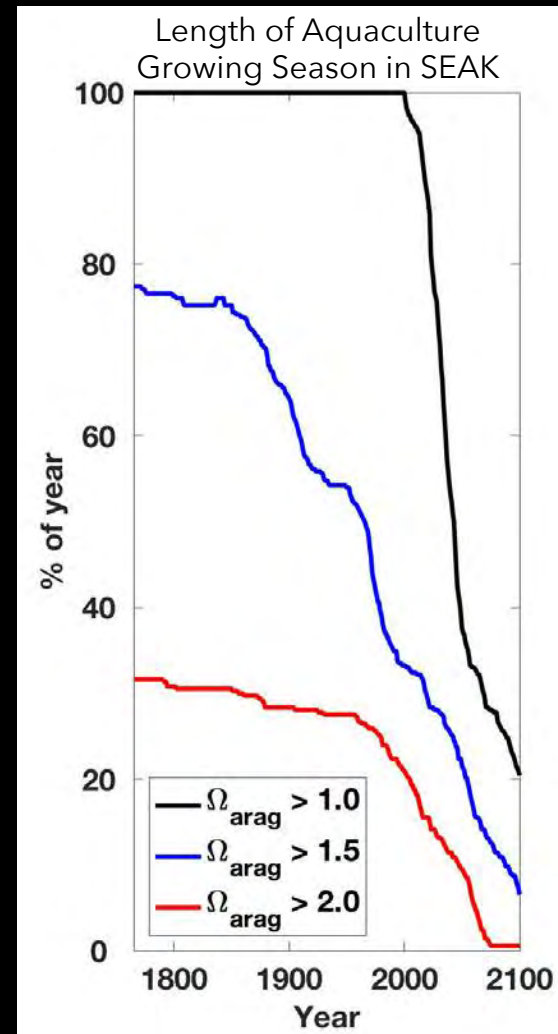
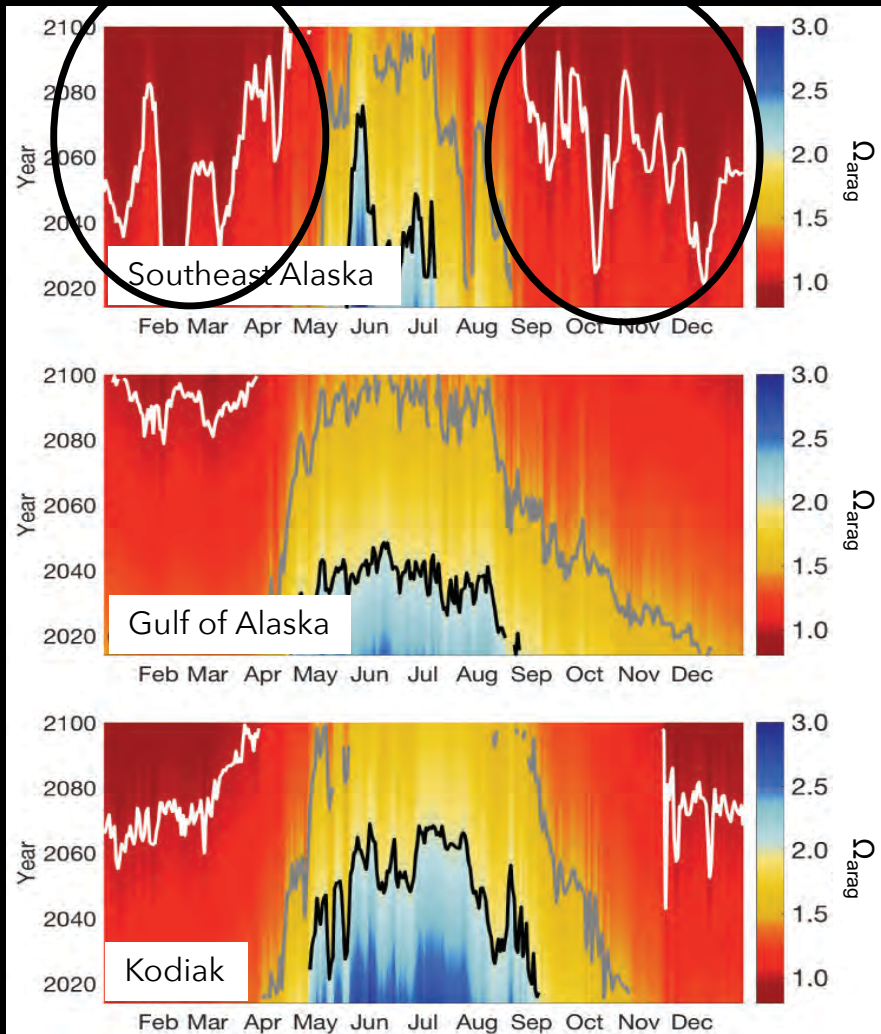


Daniel Yang, Scripps
Caitlin Meadows



Southeast Alaska may struggle first

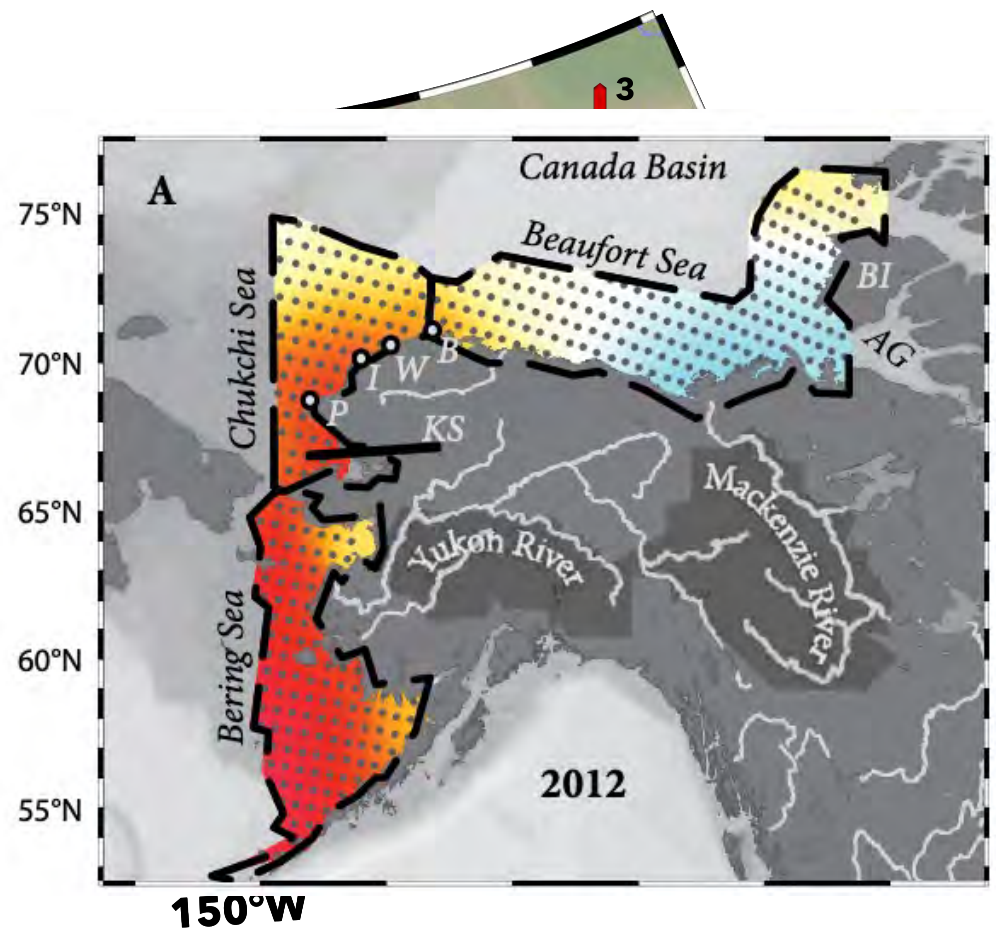
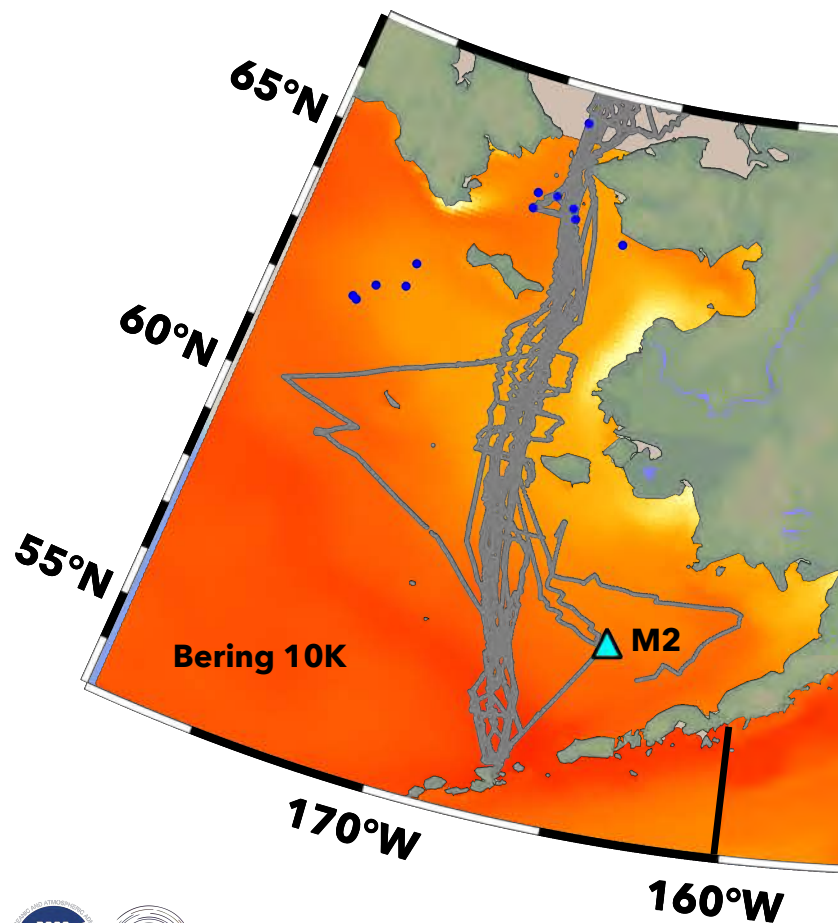
EARLY ONSET OF SUSTAINED ACIDIFICATION



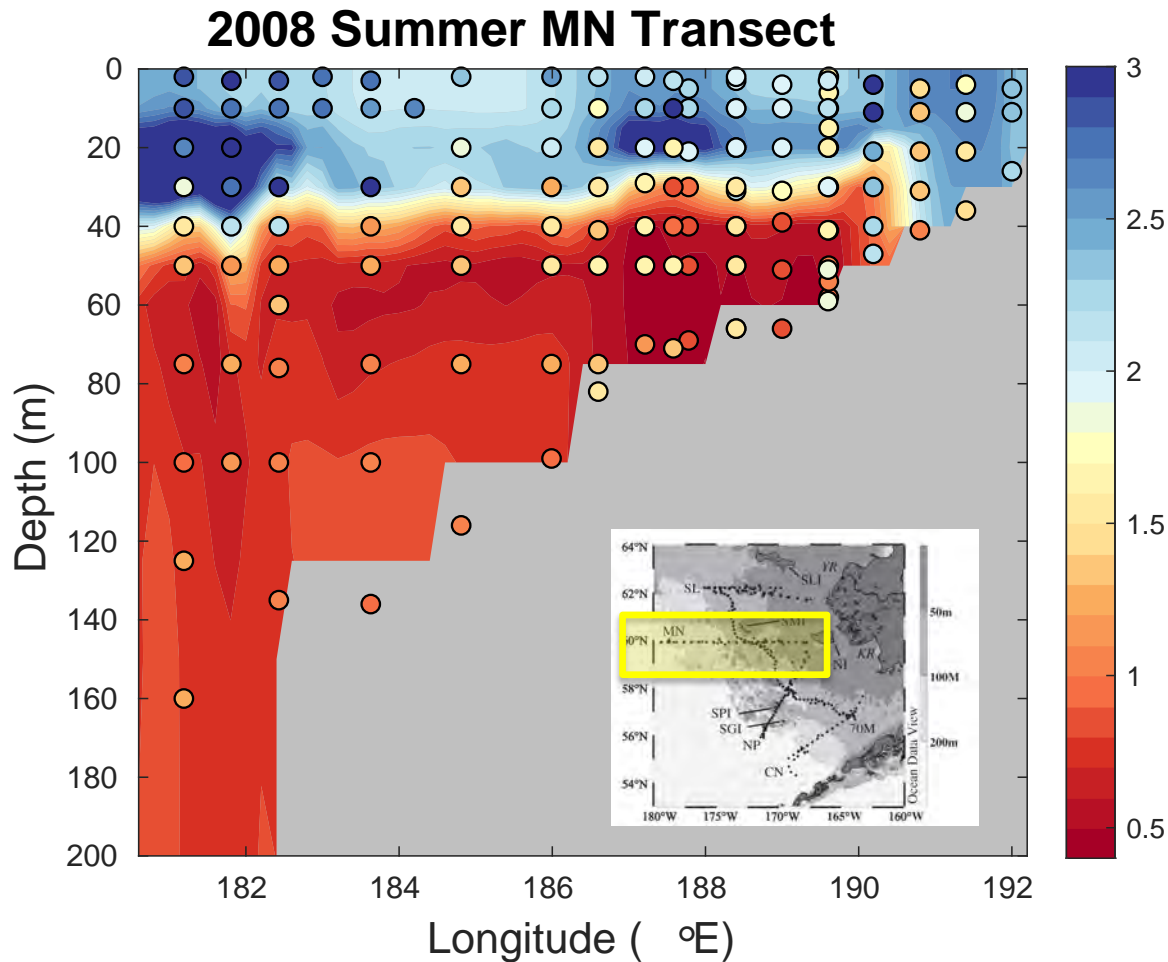
Wiley Evans

Hakai

Regional models can help refine regional-scale risk and hazard exposure, especially in data-poor areas.

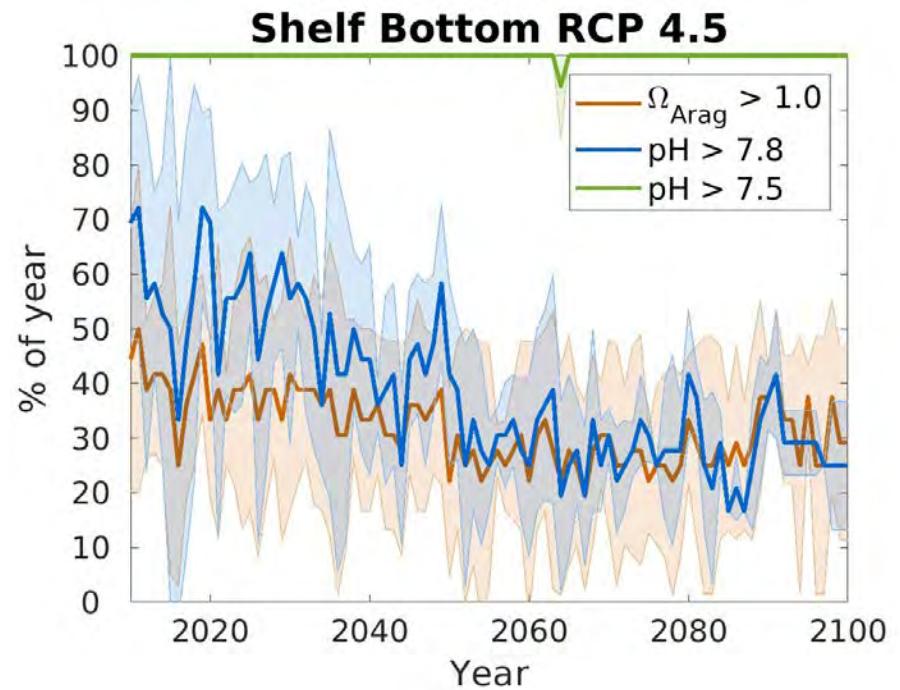
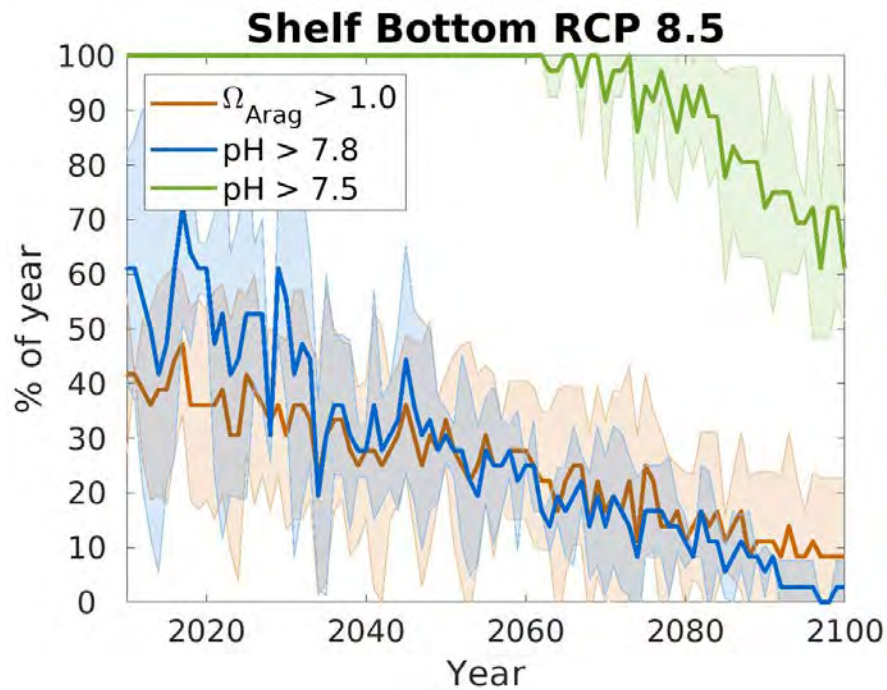


First: Does the model work?

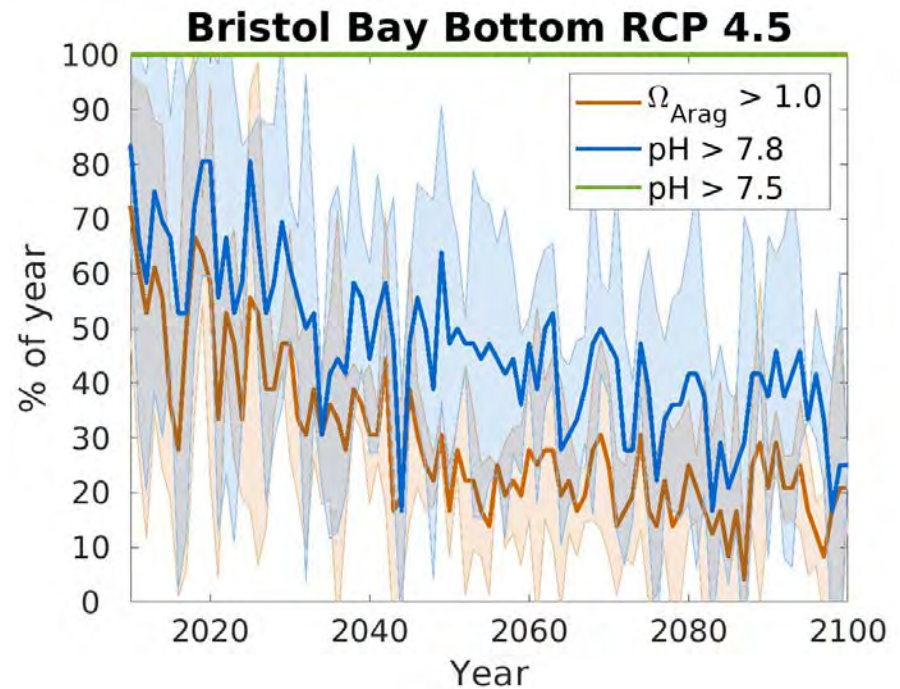
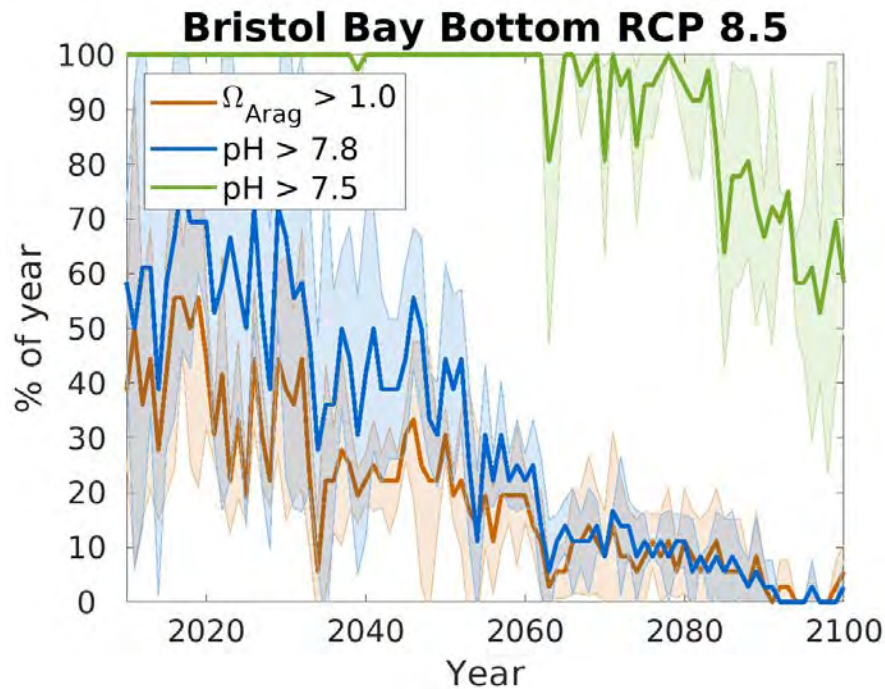


- Compare the model output to previous observations
- Bering10K broadly captures spatial patterns as expected

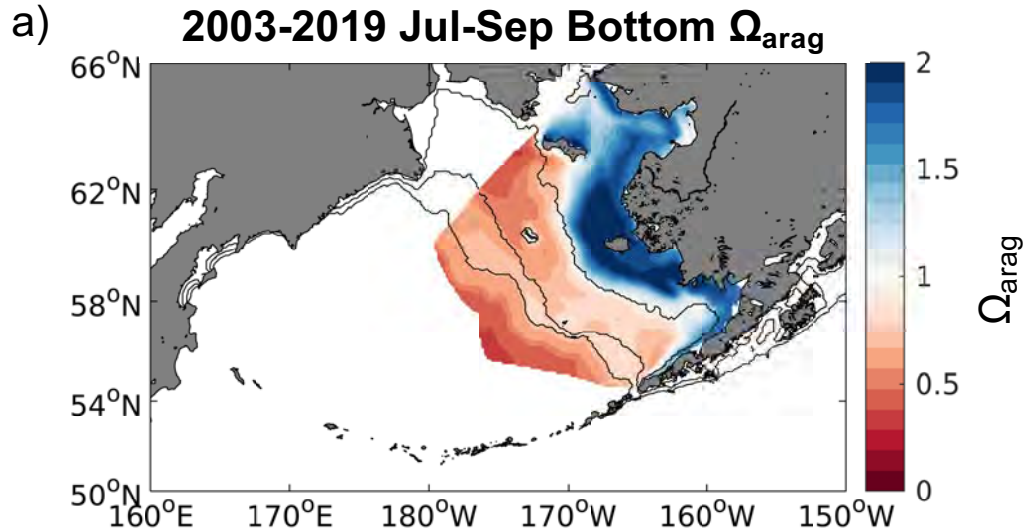
Regional models can help refine regional-scale risk and hazard exposure, especially in data-poor areas.



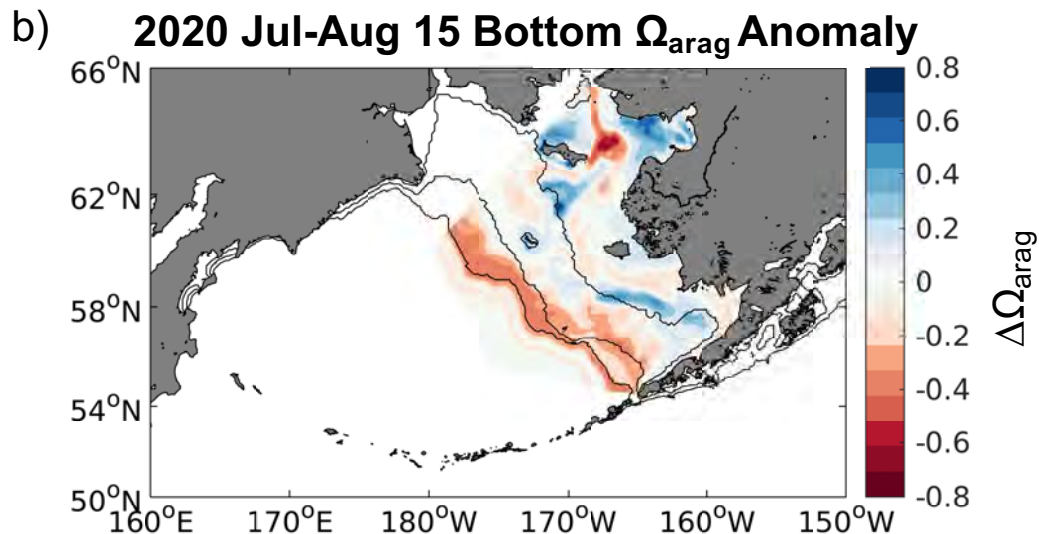
Regional models can help refine regional-scale risk and hazard exposure, especially in data-poor areas.



Bering 10K: What happened in 2020



Calculating a **long-term average** provides a reference point for considering individual years.

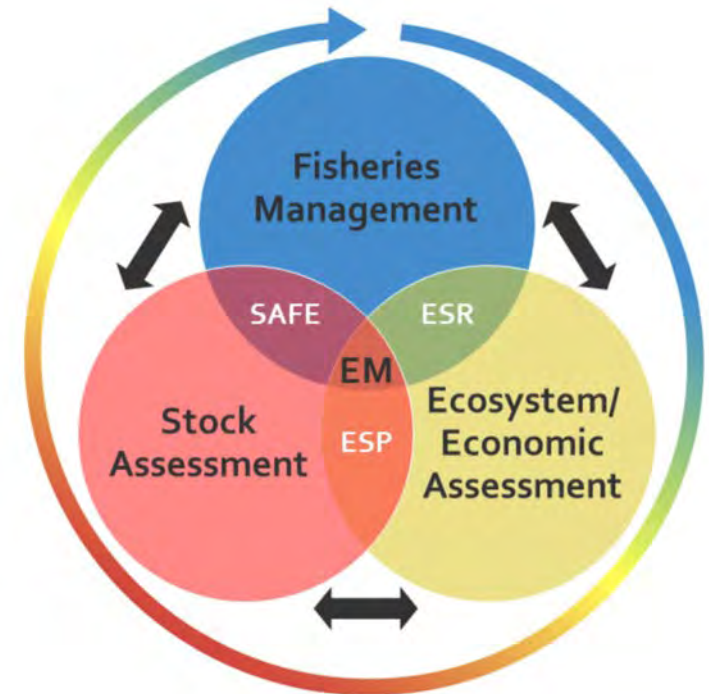
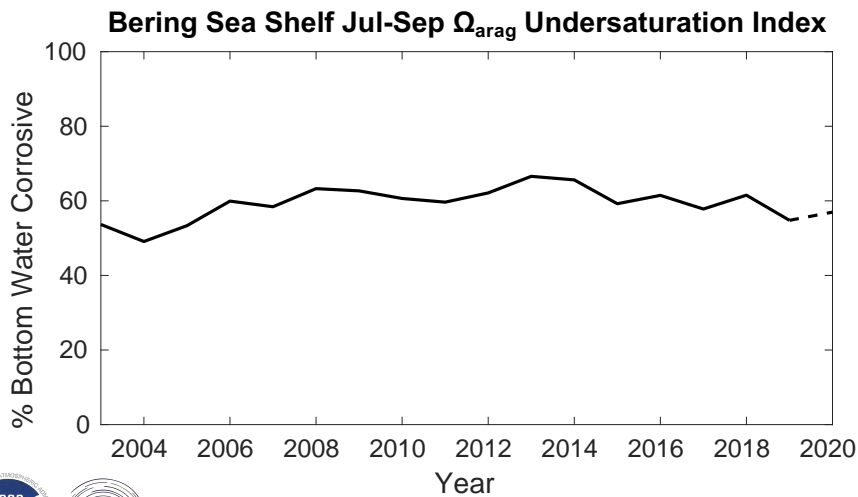


2020's major trend was that the outer shelf had lower than average values.

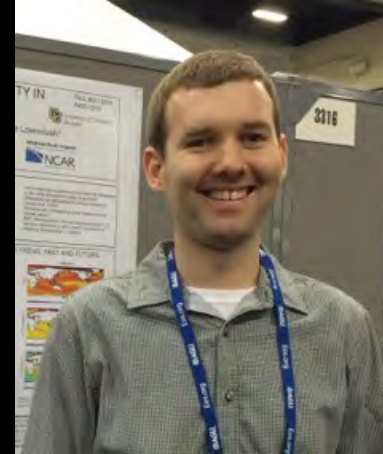
We are still investigating the possible cause of this anomaly.

Future applications for Bering10K

- Can help define hazard exposure and long-term trends in key management areas
- Soliciting input on the most useful metrics now
- Ideally, moving towards **seasonal forecasting**. Work postponed to 2022 because of COVID.

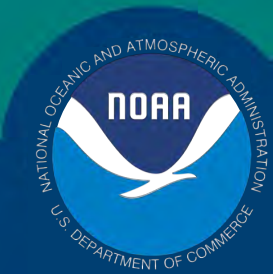


Thanks to the team!



And our many collaborators

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NOAA