AICC Project Update:
Coastal Freeze on the *R/V Sikuliaq*

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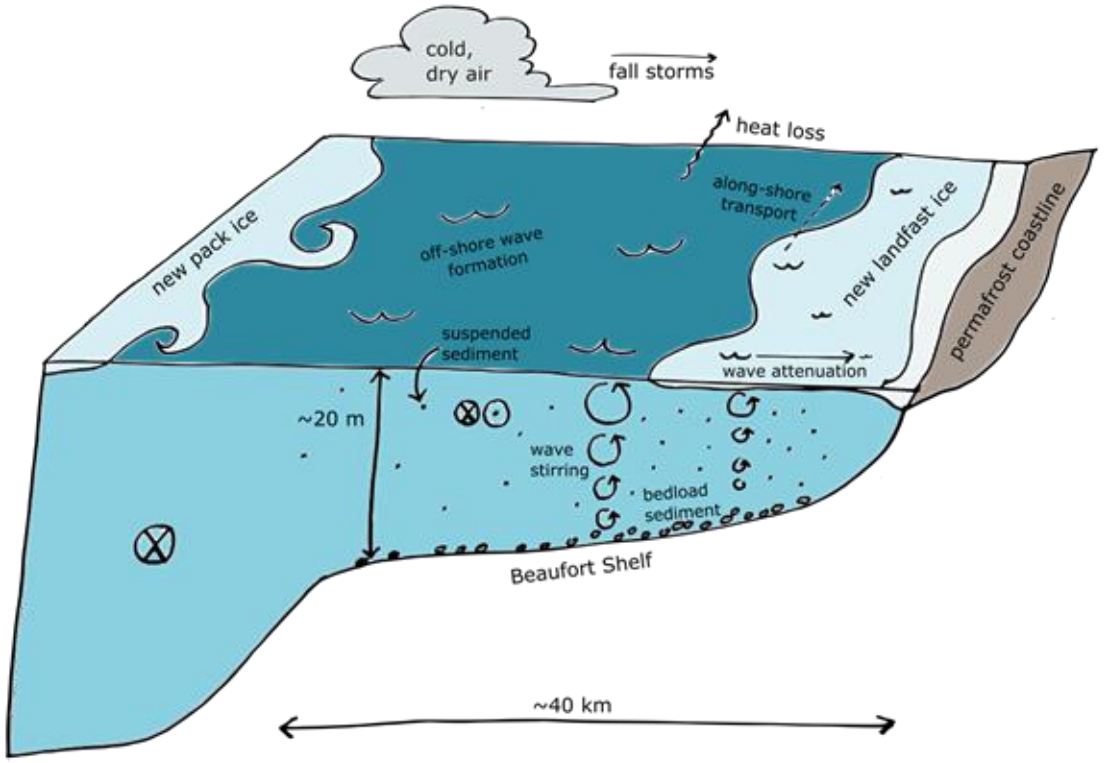
Funded by NSF OPP Arctic Natural Sciences
OPP-2336693 (WHOI), 2336695 (OSU), 2336694 (UW)

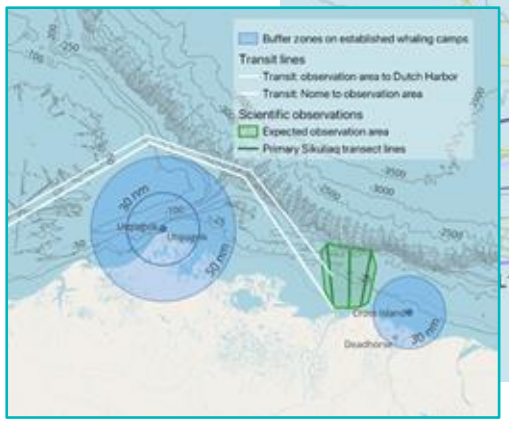
Coastal Freeze Questions

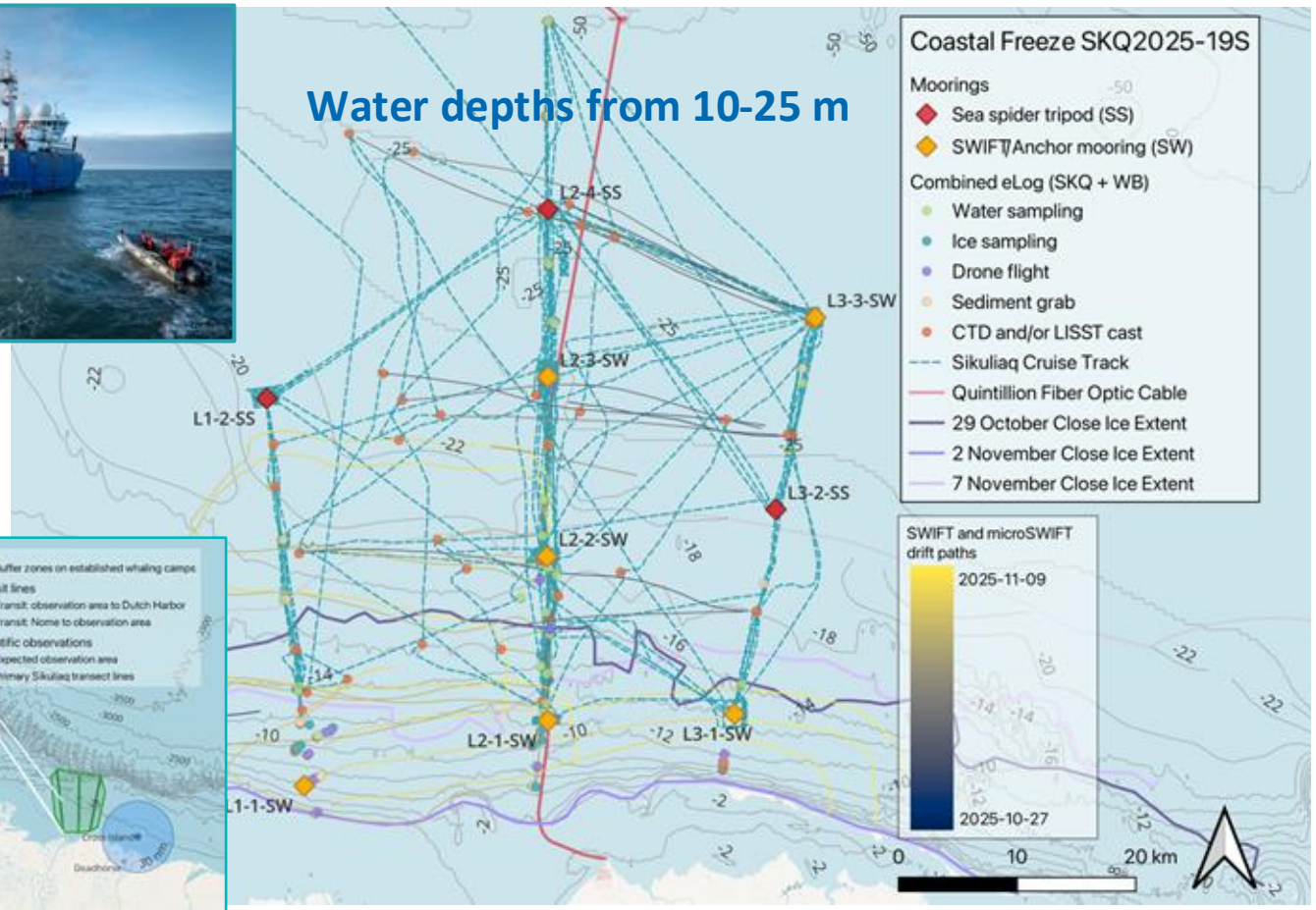
- **Overarching aim:** understand the feedbacks between sea ice, upper ocean processes – particularly, surface waves – and sediment transport during the highly spatially and temporally heterogeneous landfast ice formation period
  - ***How do surface waves mediate ice formation and redistribution?***
  - ***What regulates spatial and temporal gradients in sediment resuspension and availability for entrainment to sea ice?***
  - *Does the relative timing of storms (waves) and freezing onset play a significant role in the rate of ice formation and the shutdown of sediment transport potential?*



Observations focused on a region of the Alaskan Beaufort shelf where landfast ice forms

A combination of moorings, autonomous systems, ship-based measurements (R/V Sikuliaq + work boat), and seafloor cables to capture the spatio-temporal variability in freeze-up processes over an approximately 75 km x 50 km region on the Alaskan Beaufort shelf





Timed to observe the initial formation of landfast sea ice

October 16 – November 10, 2025

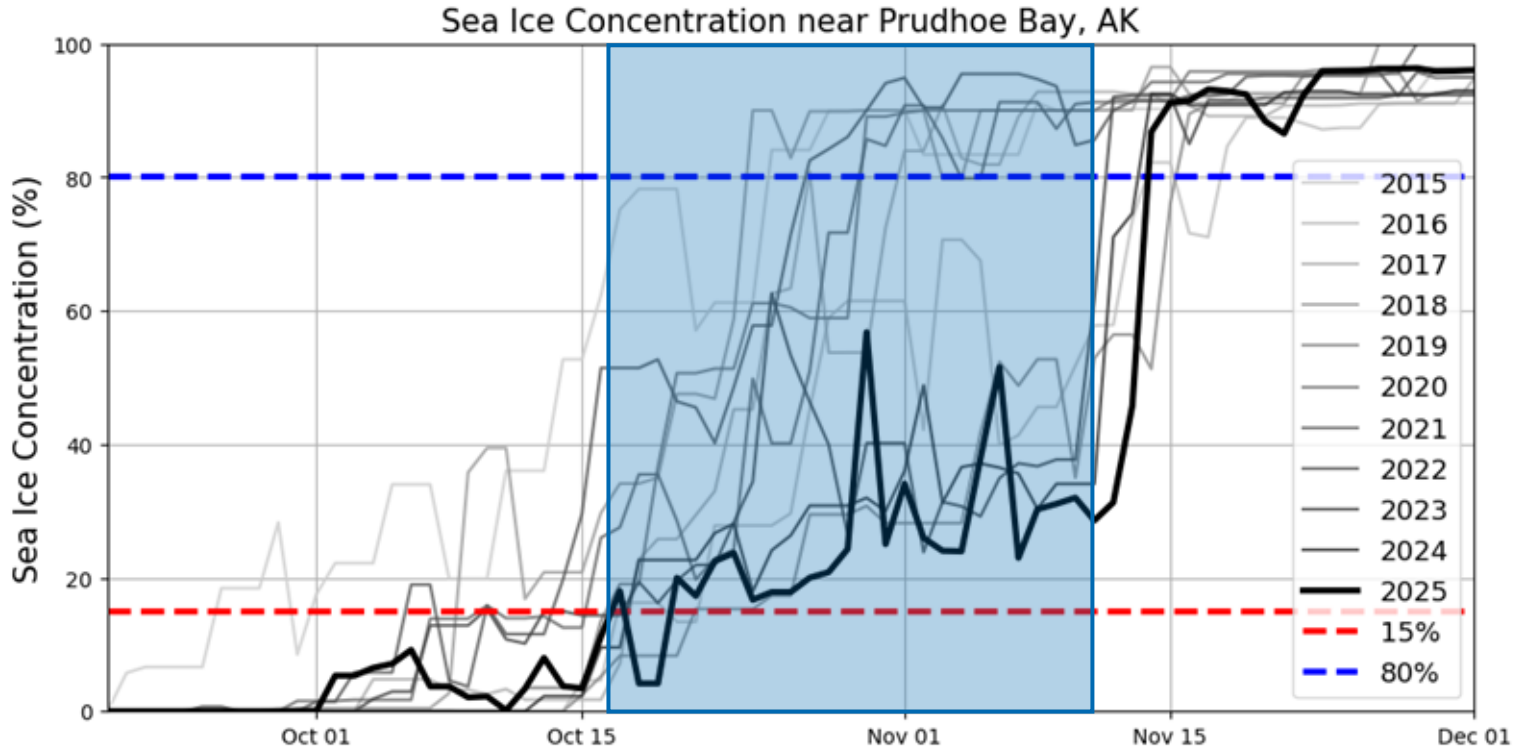
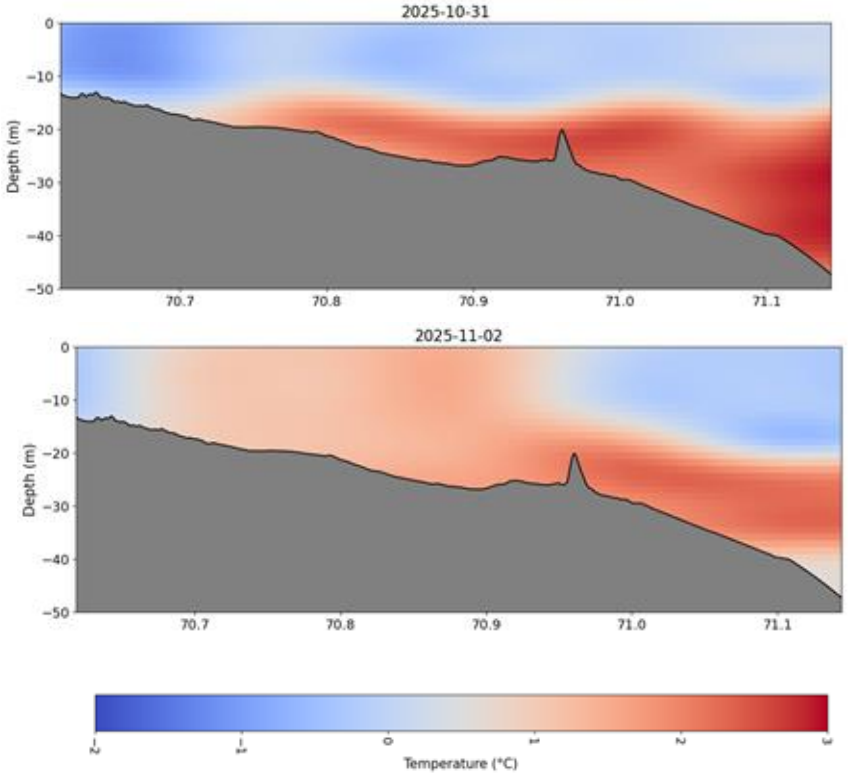
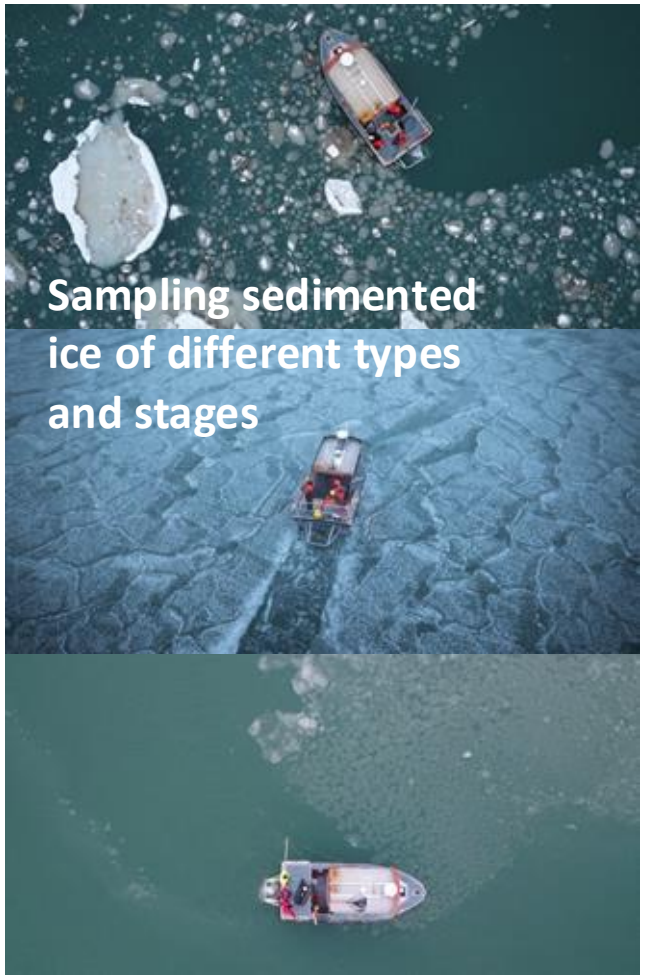


Figure: Ian Robertson (data: ASIP via Pacini et al., 2025)

A few preliminary science highlights

Heat transport onshore (upwelling) during a storm





Seafloor mapping of keel scours

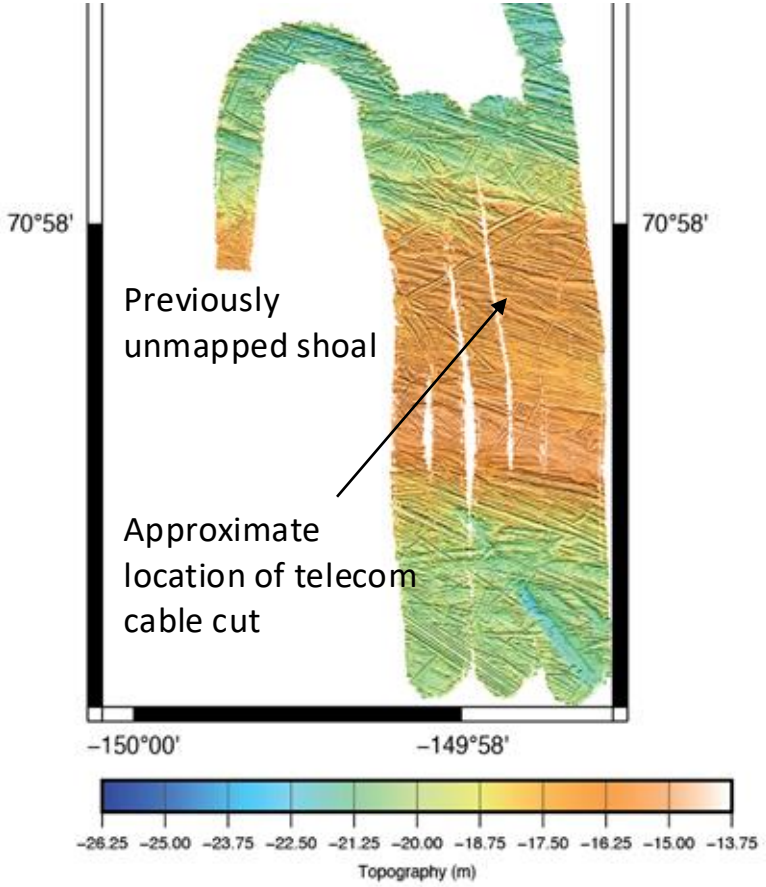


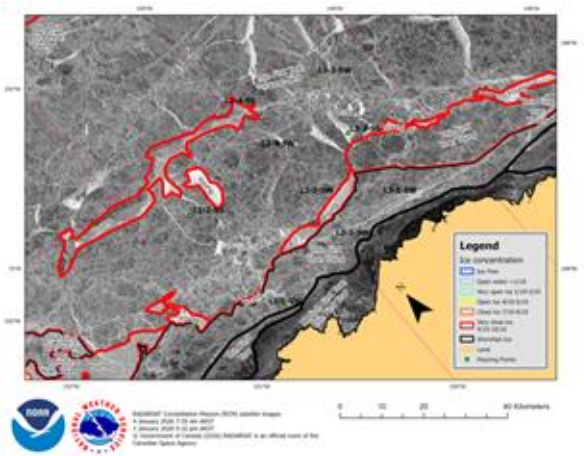
Figure: Emily Eidam (OSU)

Outreach & Engagement

- A community observer from UIC science provided daily updates about survey track and data collection to regional community representatives.
  - Answered some questions about data and observations, but no concerns expressed
- **2 educational live streams from the ship communicated science to middle school classrooms (~3k students) across the globe. (via Exploring by the seat of your pants) Youtube:**
- Science class lessons in Lawrence School (Falmouth, MA) 8th grade classrooms
- Engagement of students and early-career researchers on team

Reflections on icebreaker capabilities

- Combined force of the Sikuliaq and small boats (work boat, landing craft) was essential for coastal observations
- Great capabilities in shoulder season conditions (currently, with a hard cutoff date)
- At-sea and ongoing targeted product support from ASIP (Michael Lawson)
- *How can we enable more observations in interesting late season fall/winter in the Arctic?*



Questions?

Thanks to the crew of the R/V Sikuliaq for supporting our cruise!