



SALINITY SCIENCE AT THE SEA ICE EDGE

The NASA SASSIE project



Sep 1984



study site 

ALASKA

GREENLAND

CANADA

NASA Scientific
Visualization Studio

Sep 2016



study site 

ALASKA

GREENLAND

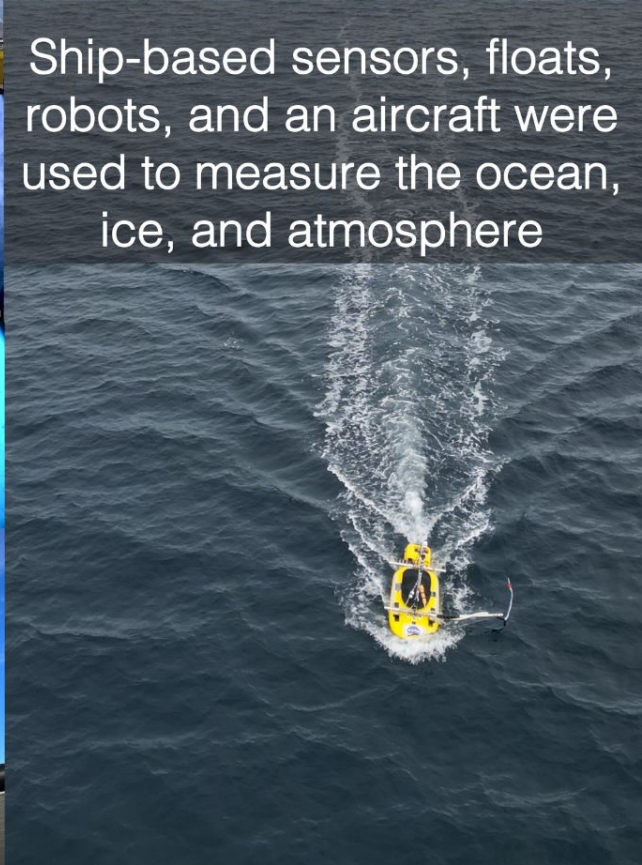
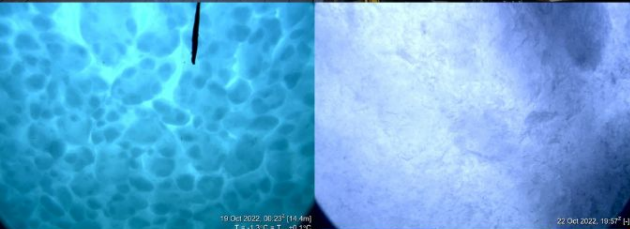
CANADA

SASSIE's primary goal is to understand how salinity stratification in the upper ocean affects the melting and refreezing of sea ice

NASA Scientific
Visualization Studio



Ship-based sensors, floats, robots, and an aircraft were used to measure the ocean, ice, and atmosphere



SASSIE measured the seasonal ice zone and adjacent open water

N75°

SASSIE UnderIce Float
drift
10 September – 23 October 2022

N73°

Beaufort Sea

R/V Woldstad
10– 25 September 2022

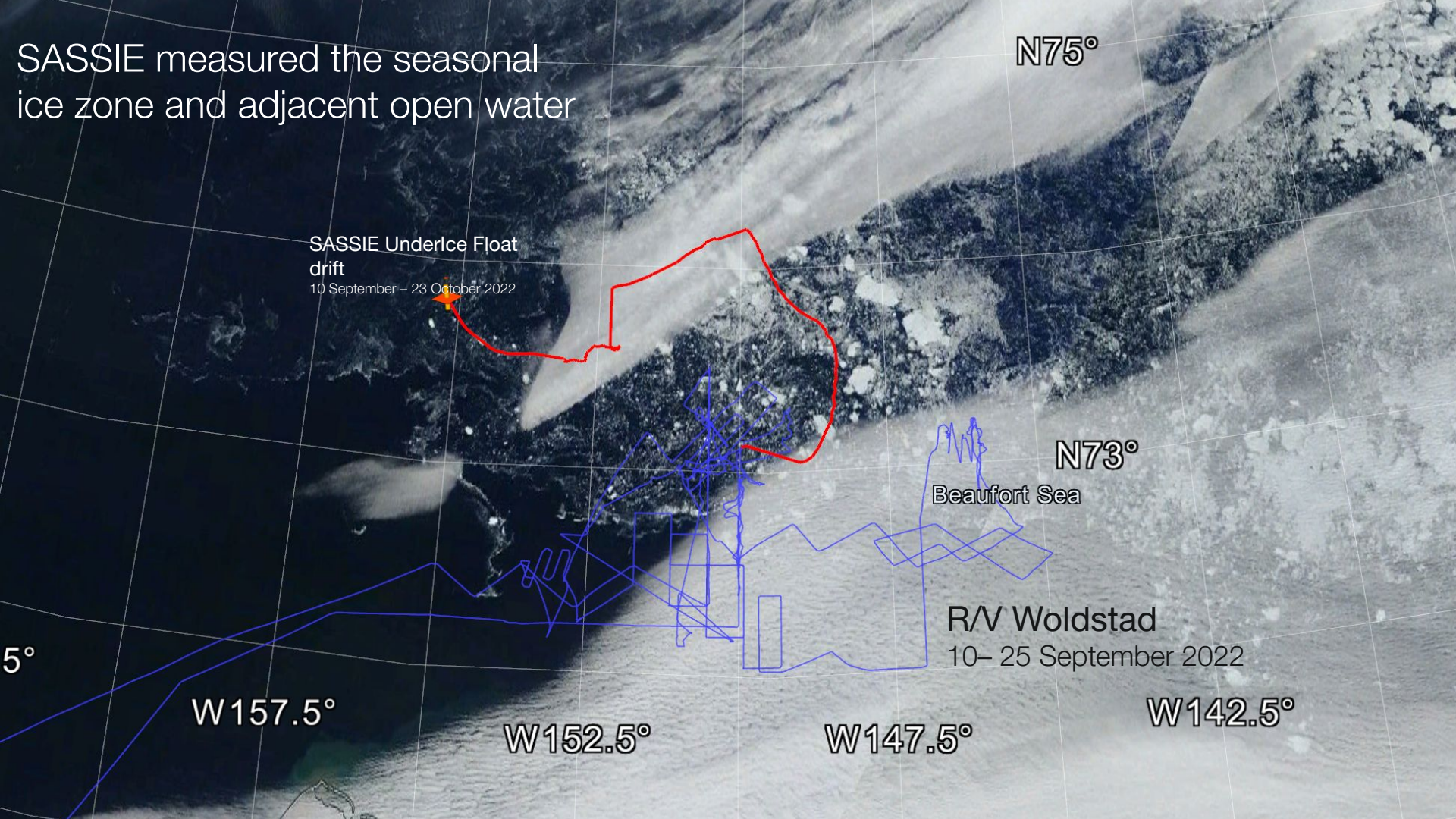
5°

W157.5°

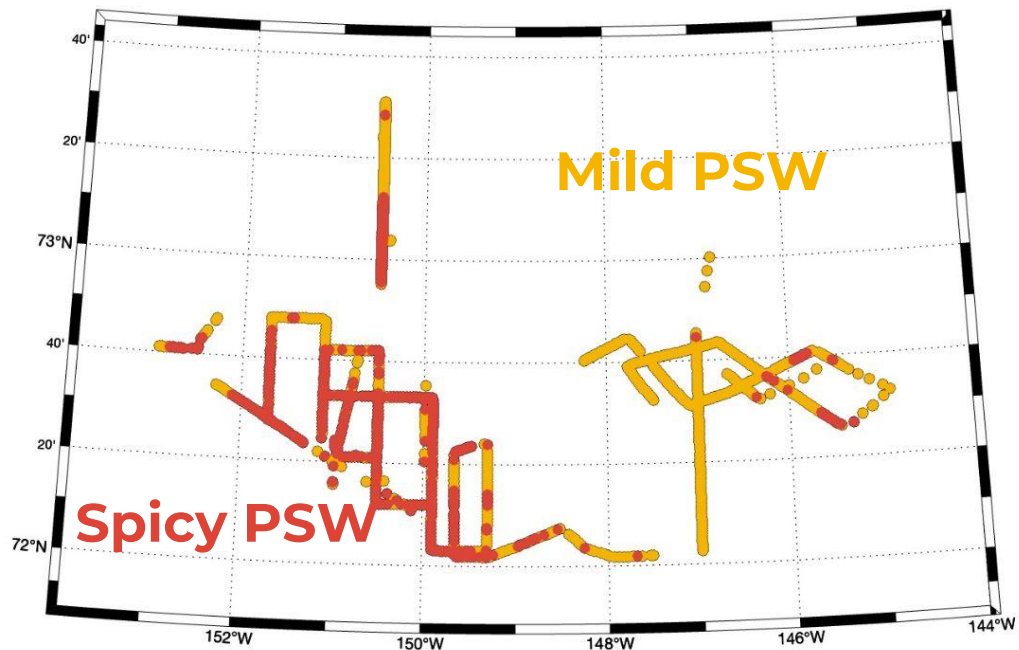
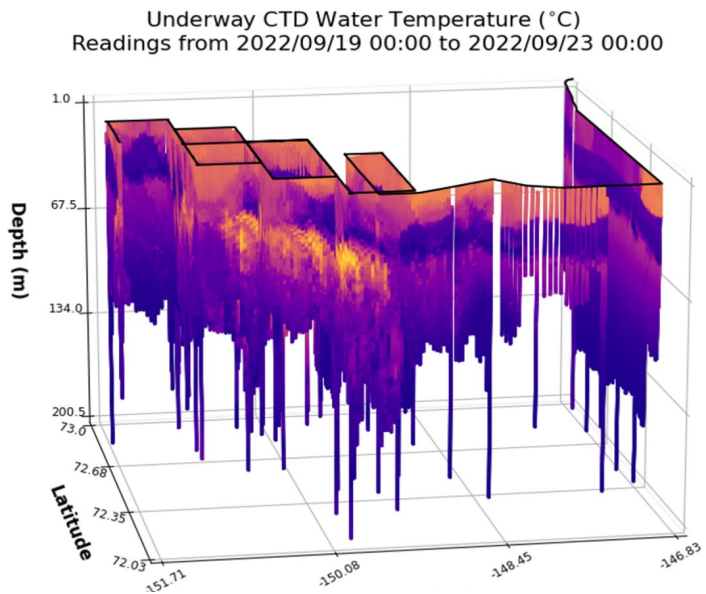
W152.5°

W147.5°

W142.5°

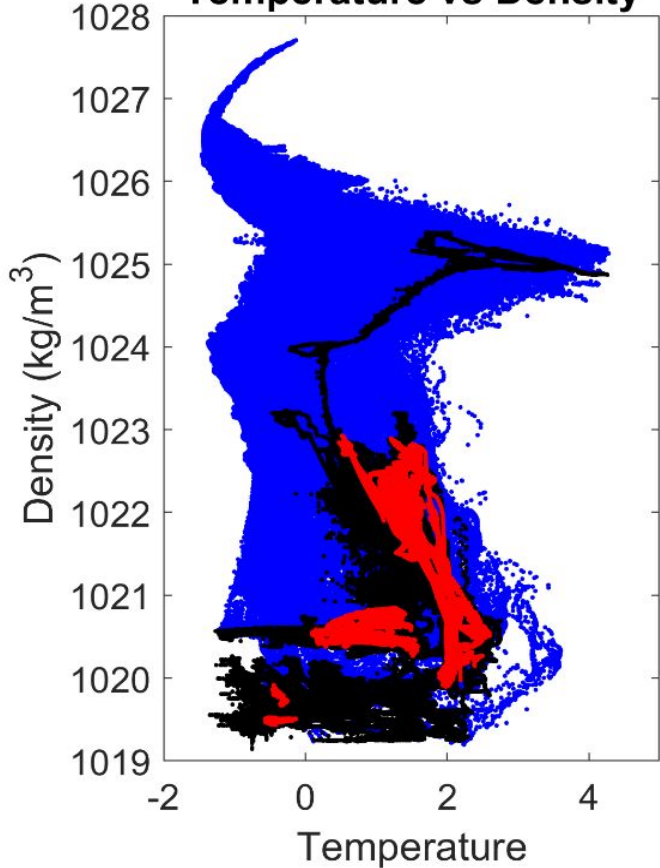


Subsurface heat is trapped by salinity stratification

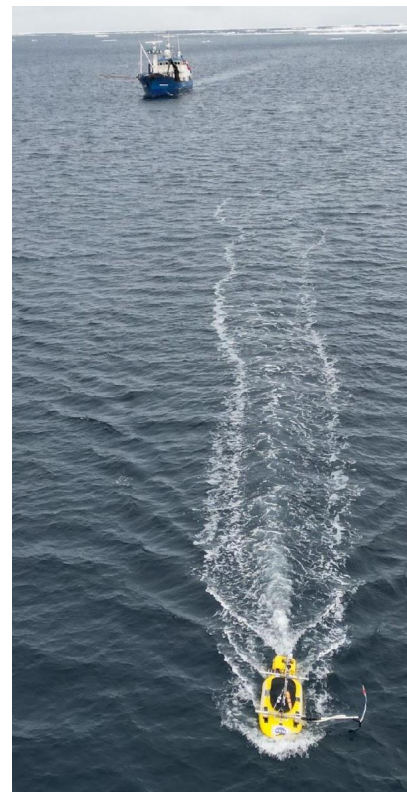
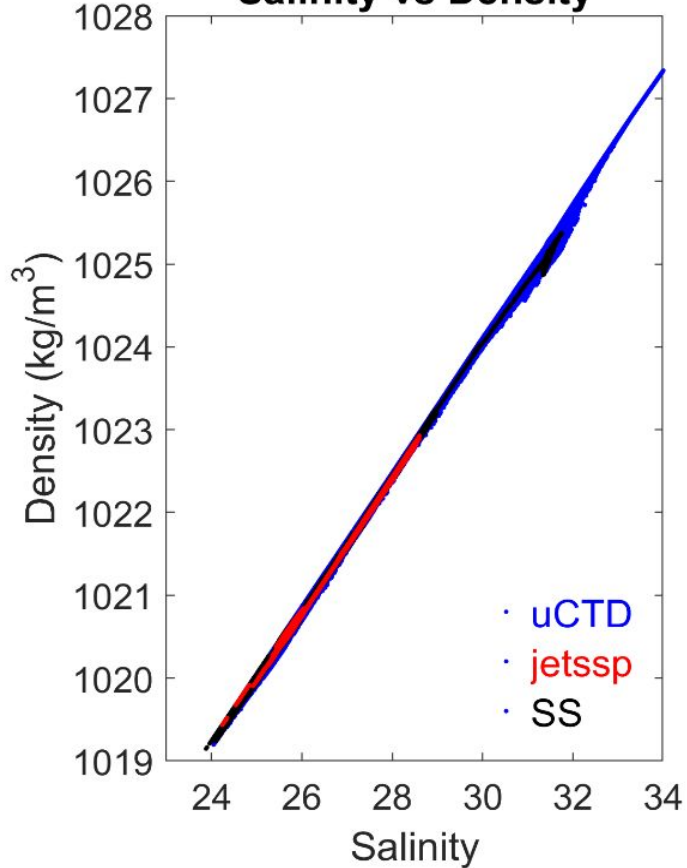


Salinity controls density in the Beaufort Sea

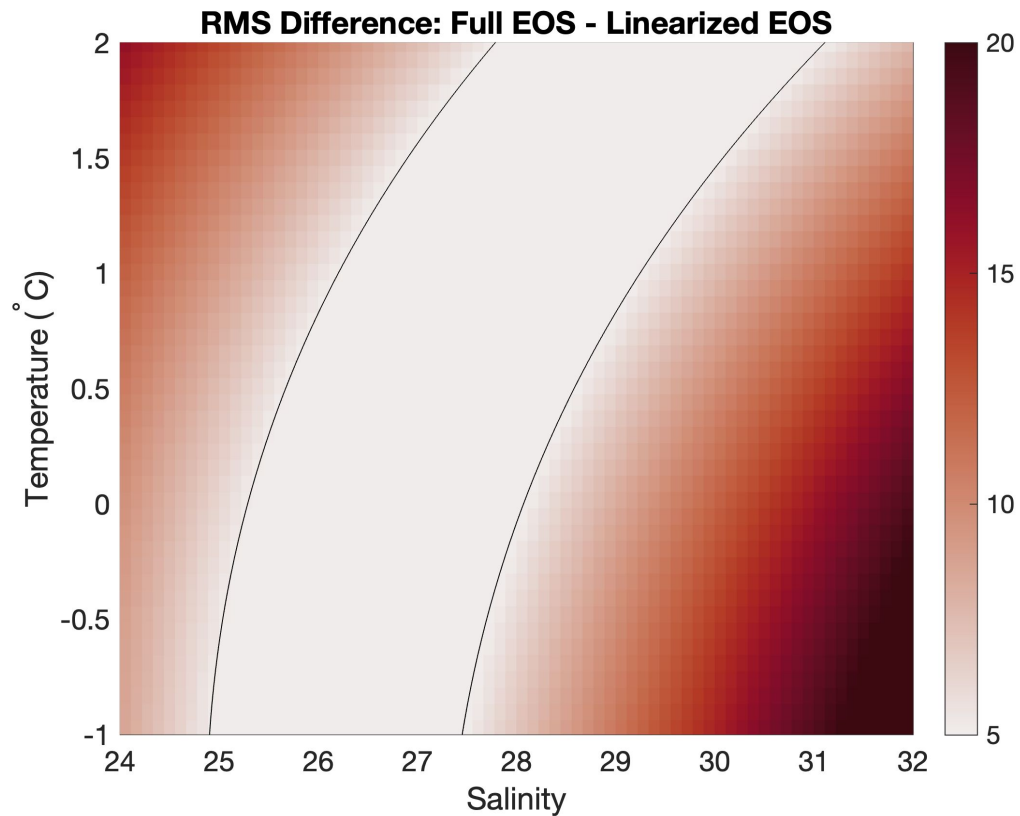
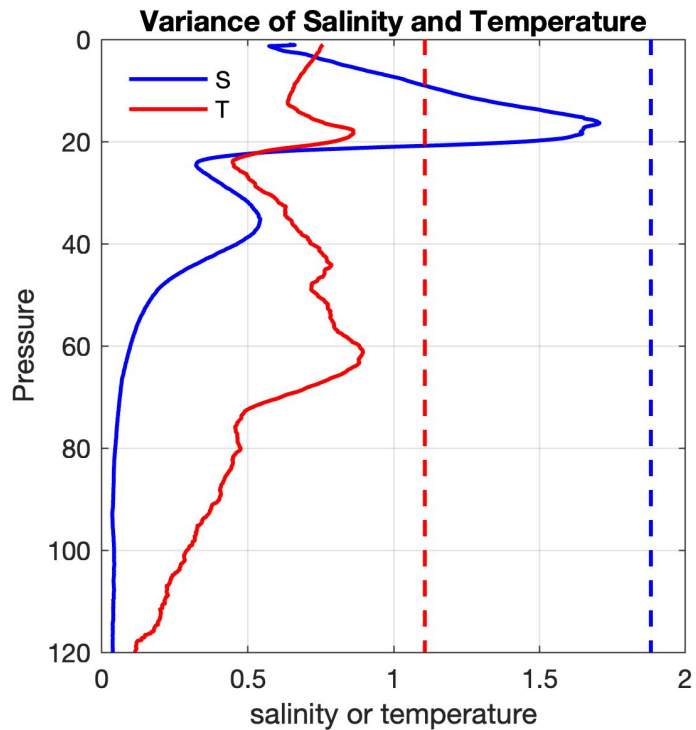
Temperature vs Density



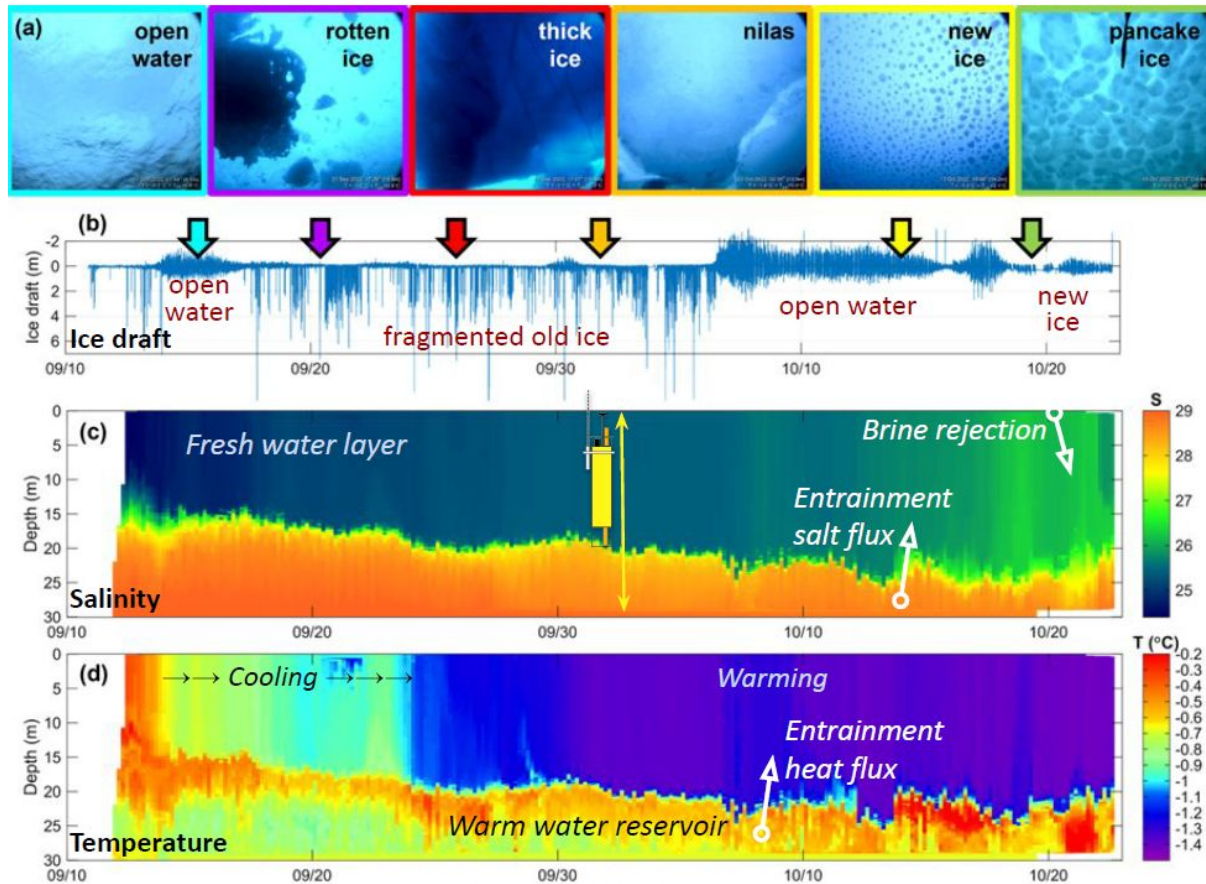
Salinity vs Density



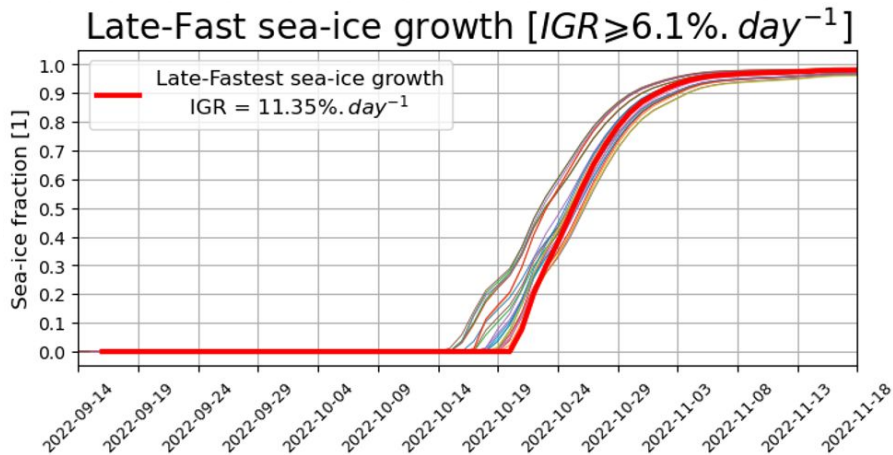
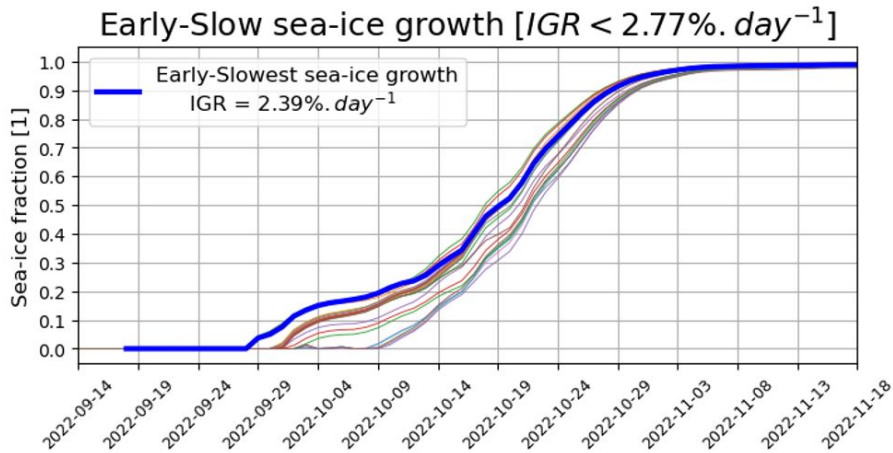
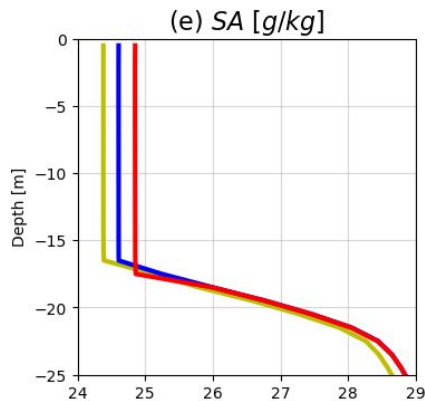
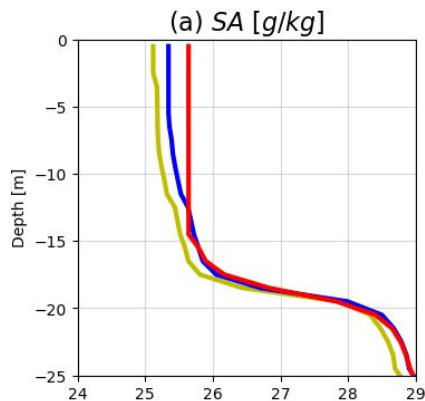
Surface salinity controls upper-ocean density in the Beaufort



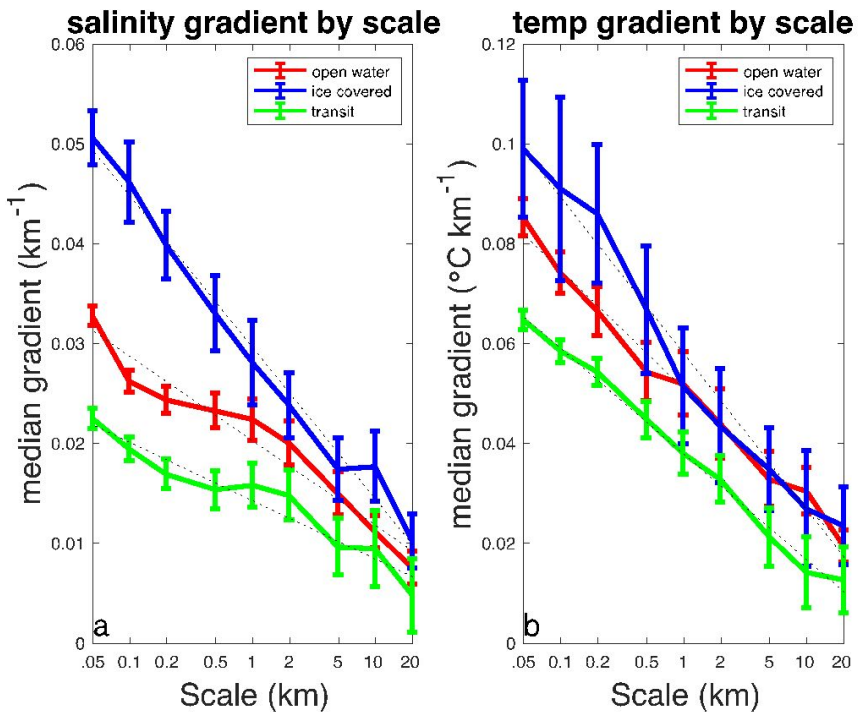
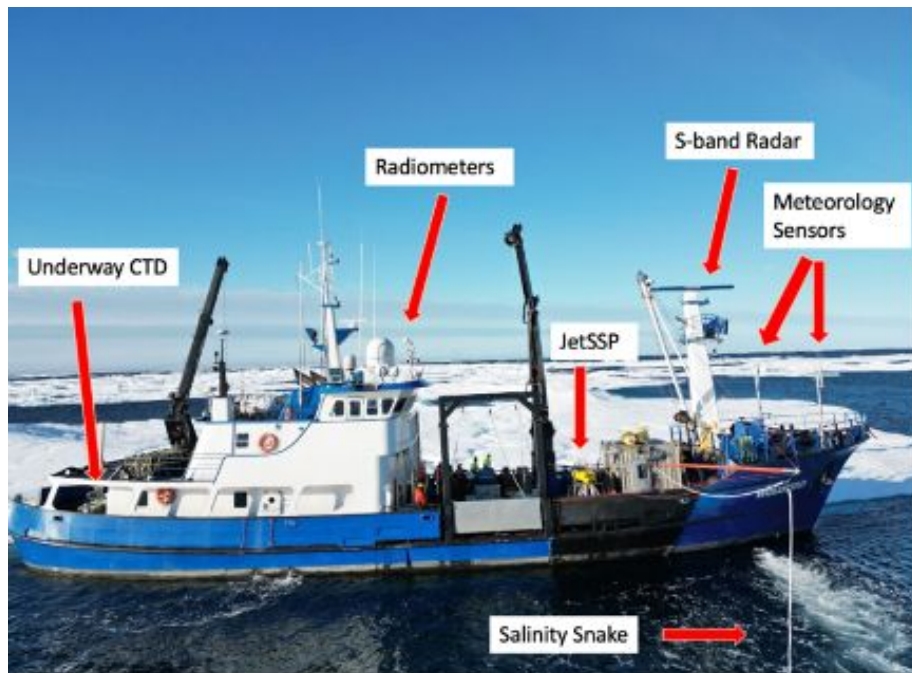
SASSIE Under Ice Float observed salinity stratification supporting refreezing



Surface salinity stratification results in early freezing and slow accumulation



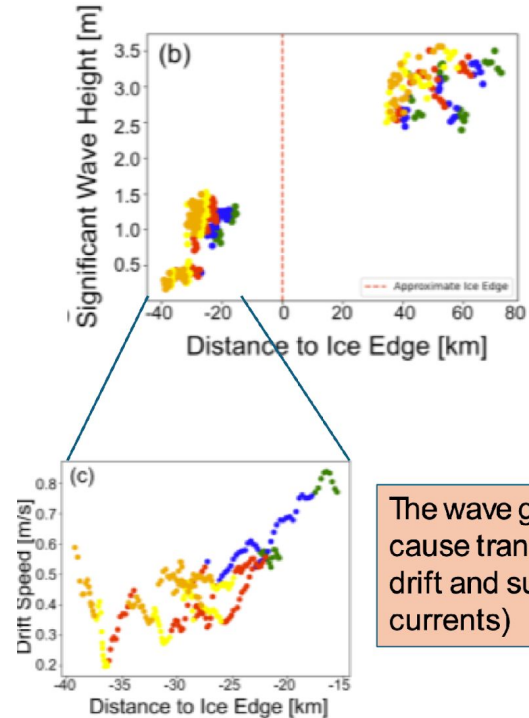
Small-scale gradients increase in the proximity to the ice pack



Waves and surface transport are attenuated into the ice pack



Wave heights are attenuated with distance into the ice pack



The wave gradients cause transport (ice drift and surface currents)

SASSIE Data for You

Discover the who, what, and why behind SASSIE's data collection

TSG & Meteorology

Underway CTD

Salinity Snake

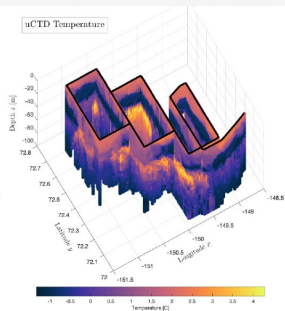
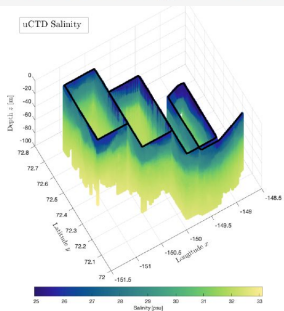
Wave Gliders & SWIFT Drifters

Jet Surface Salinity Profiler

Under Ice Float

HydroBuoys

ALTO & ALAMO Floats

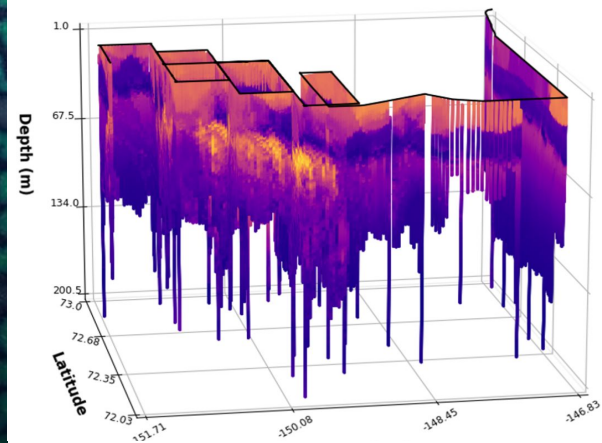




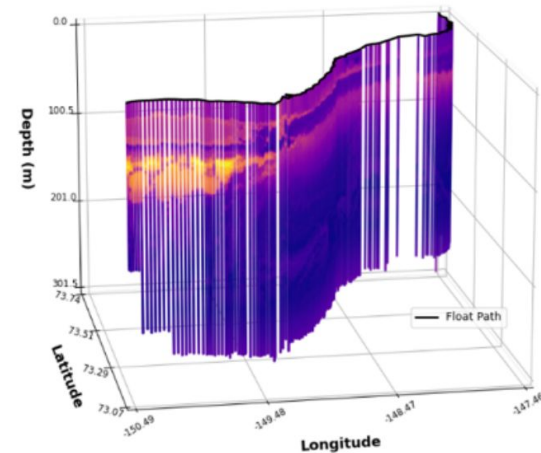
SASSIE Code for You

Data is best served with a side of accessible code

Underway CTD Water Temperature (°C)
Readings from 2022/09/19 00:00 to 2022/09/23 00:00



ALTO/ALAMO Water Temperature (°C)
Float 9098



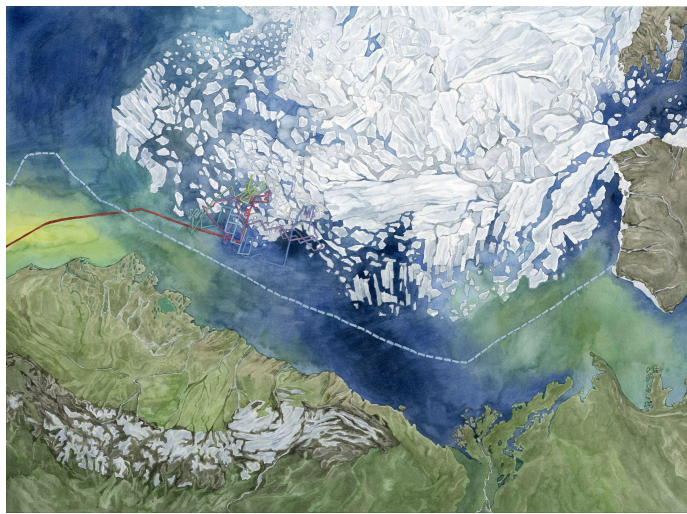
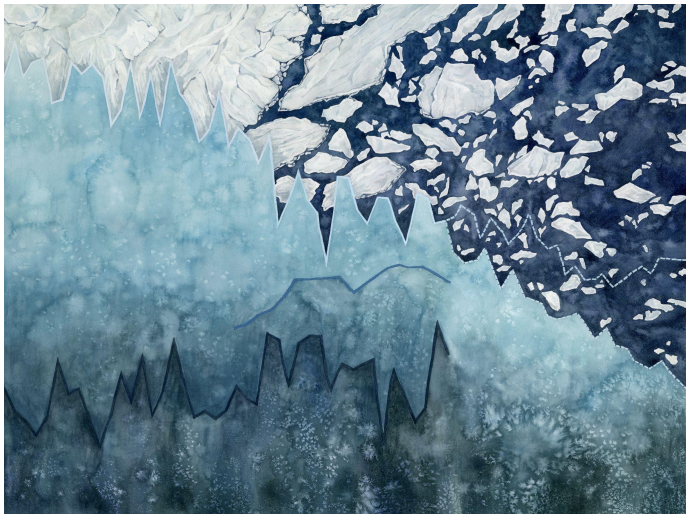

SASSIE Tools featured below (left to right): Research vessel (R/V) Woodward, Underway CTD, Salinity Snob, Wave Glider, SWIFT Drifter, Jet Surface Salinity Profiler, Hydrobuoys, Under Ice Float, and ALTO float.

In the following section, types of measurements made by each instrument are shown as icons.

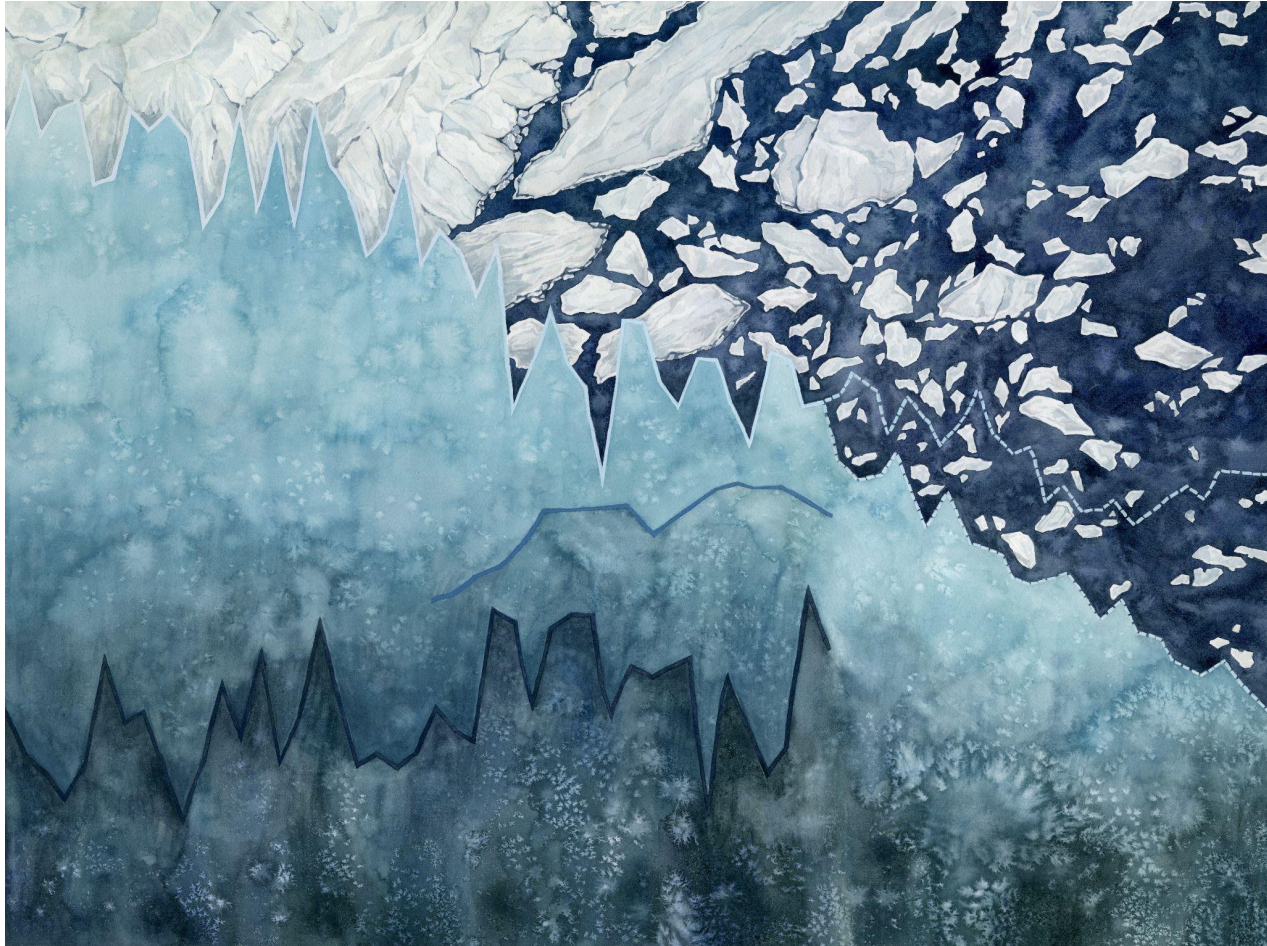


SASSIE Art + Science with Jill Pelto

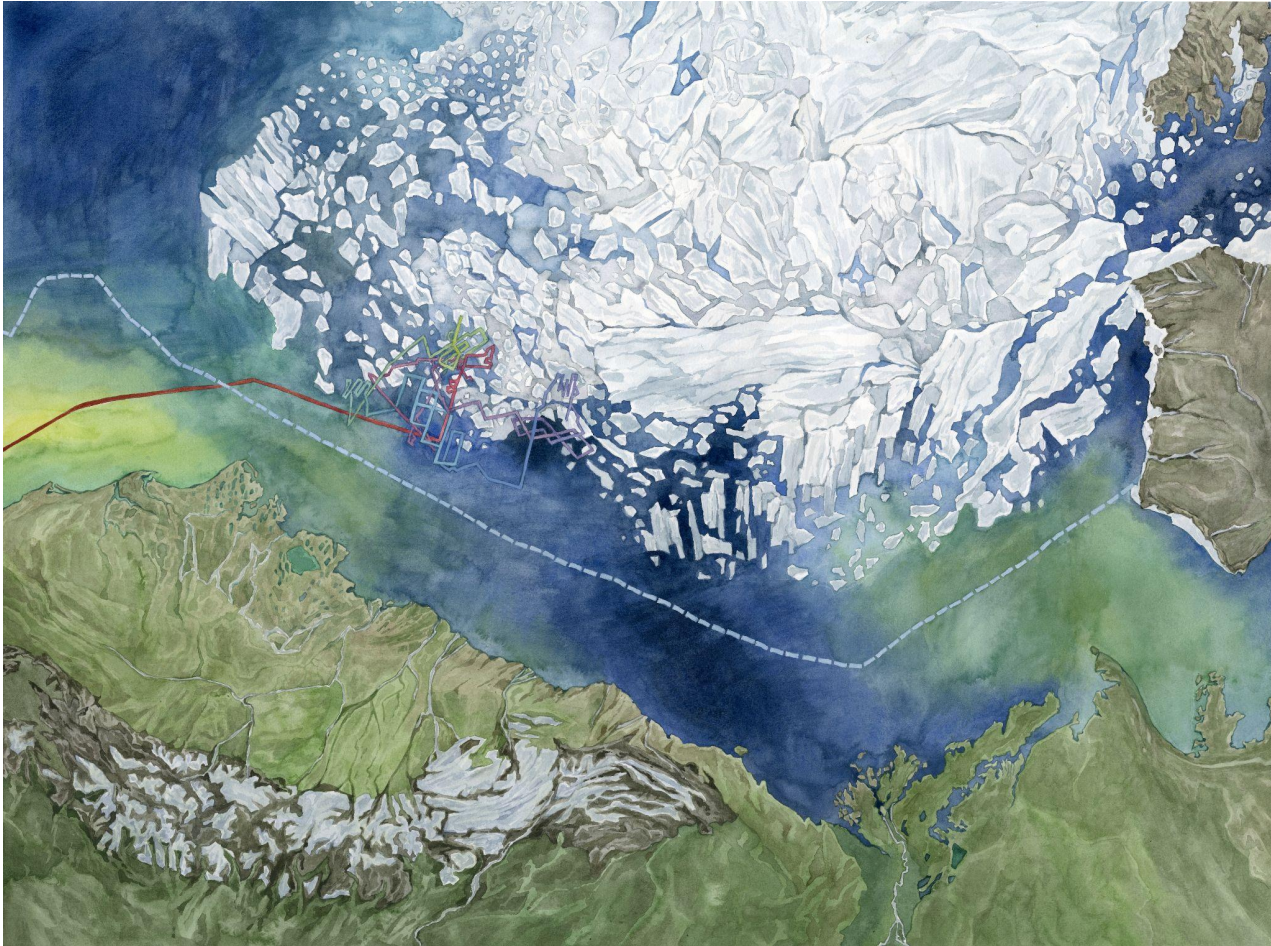




Studying a Changing Arctic Ocean



Mapping the Sea Ice Edge



Surveying Above and Below the Surface



Understanding Sea Ice Futures

