

Cruise Report for Coastal Freeze – Ukpik 2025

Cruise dates: September 1-5, 2025

Vessel: R/V Ukpik

Science party: Maddie Smith, Jim Thomson, Alex de Klerk, Ian Robertson

Overview

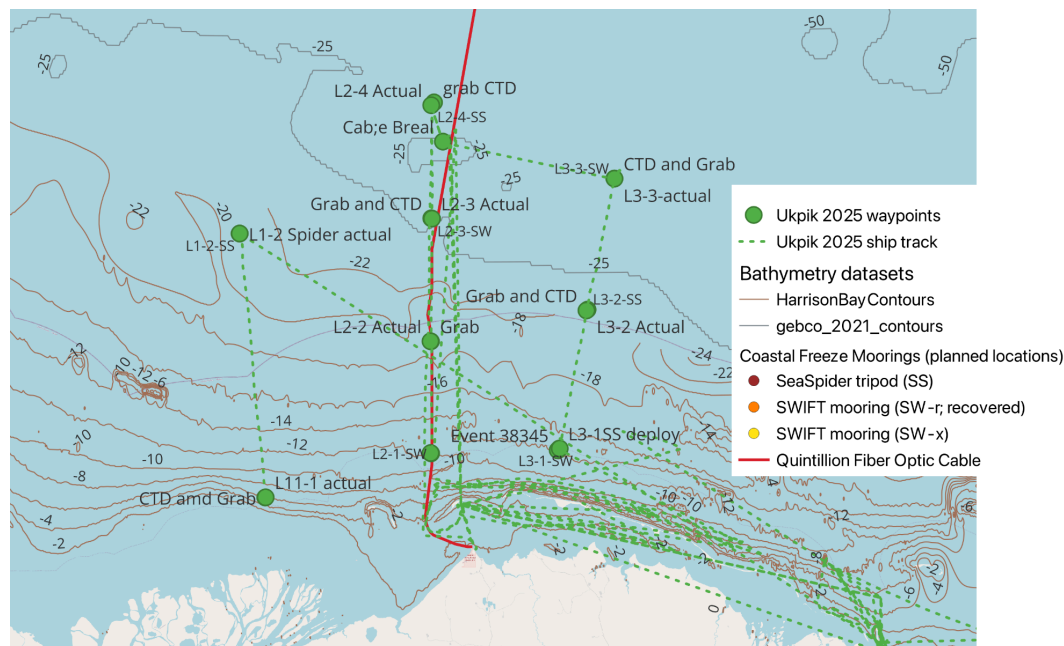
The goal of Coastal Freeze is to observe the interactions of waves, sea ice, and sediment during the initial formation of landfast sea ice in coastal Alaska. More information on Coastal Freeze:

whoi.edu/staff/madisonmsmith/coastal-freeze/.

This cruise focused on deployment of moorings in advance of an October-November 2025 cruise on the R/V Sikuliaq. Additional sampling with CTD casts and grab samplers was completed at each site.

Summary of daily activities (full daily notes in the [decklog](#)):

September 1	Arrive Prudhoe Bay. All gear retrieved and mob to Ukpik. Line 3 moorings prepped.
September 2	Line 3 moorings deployed. Line 2 moorings prepped on deck.
September 3	Line 2 moorings deployed. Line 1 moorings prepped on deck.
September 4	Line 1 moorings deployed (& grab sample from L3-1). Back to West Dock.
September 5	Complete demob from Ukpik



Map of as-deployed mooring and sampling locations (green points), and approximate Ukpik shiptrack (dashed green line). Mooring array designed and named as three cross-shore lines (L1, L2, L3).

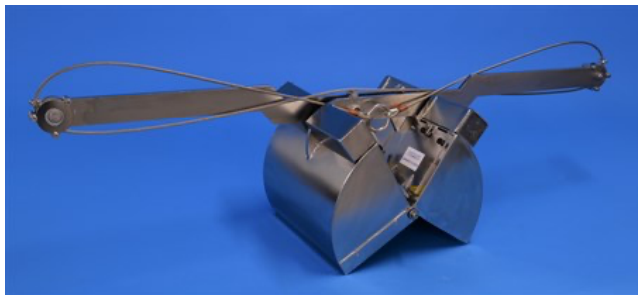
Sampling

Overview of sampling locations and times

Name (line, number, type)	Latitude	Longitude	Time	Activity
L1-1-SW	70.56473802	-150.55468	2025/09/04 19:27:07.776+00	Grab sample & CTD
L1-2-SS	70.85753105	-150.6502918	2025/09/04 17:48:23.236+00	Grab sample & CTD
L2-1-SW	70.61467449	-150.0028889	2025/09/03 19:38:52.998+00	Grab sample & CTD
L2-2-SW	70.73901658	-150.0034628	2025/09/03 18:37:57.109+00	Grab sample & CTD
L2-3-SW	70.87566732	-150.0023069	2025/09/03 17:38:36.512+00	Grab sample & CTD
L2-4-SS	71.0044766	-149.993021	2025/09/03 16:36:12.279+00	Grab sample & CTD
L3-1-SW	70.61763156	-149.5804695	2025/09/02 16:34:35.486+00	CTD
	70.61946994	-149.5735432	2025/09/04 21:07:52.154+00	Grab sample
L3-2-SS	70.77253792	-149.4802325	2025/09/02 18:06:01.847+00	Grab sample & CTD
L3-3-SW	70.91870536	-149.3810197	2025/09/02 19:07:01.178+00	Grab sample & CTD

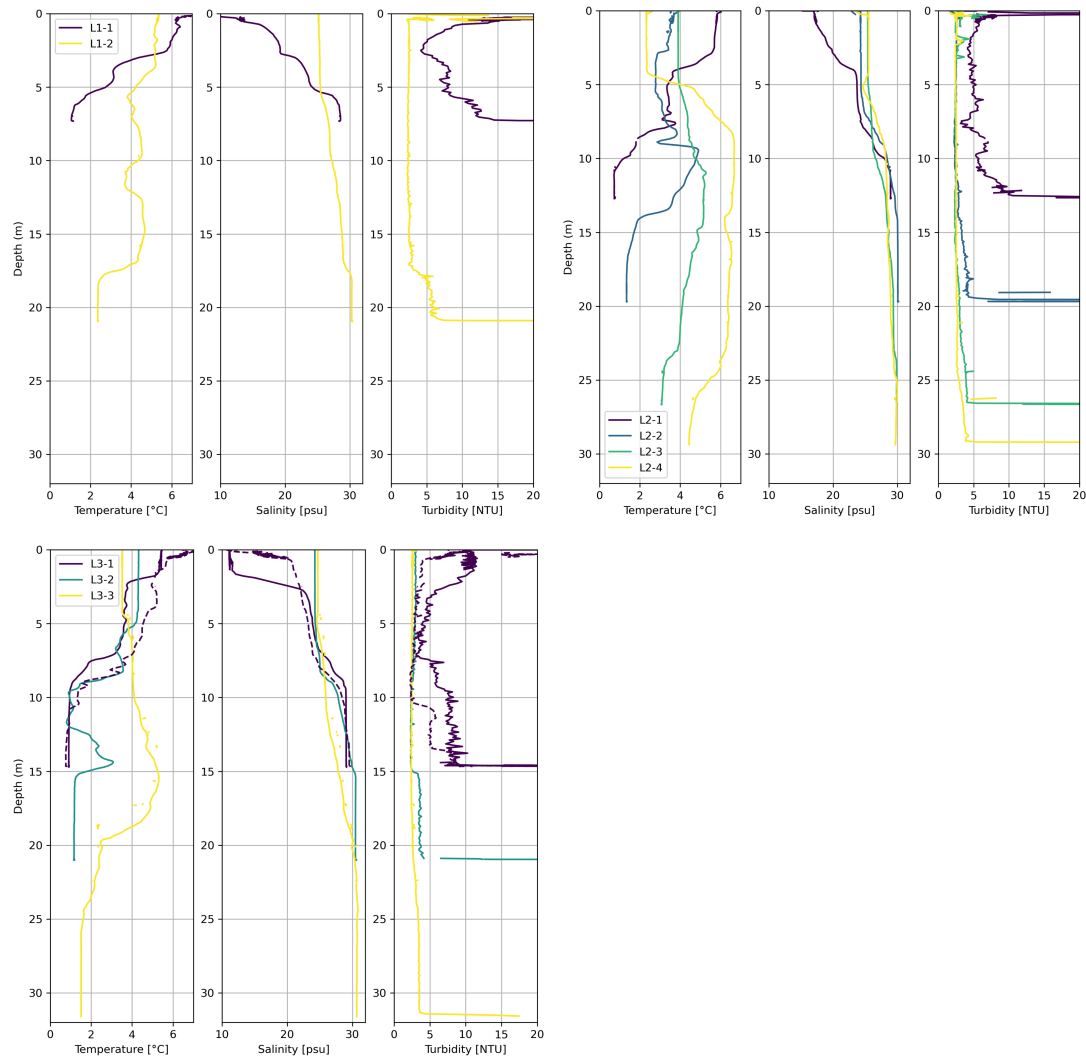
Grab samples

Sediment grabs were collected with hand-deployed mini Van Veen at all 9 mooring sites. A sediment sample was collected at each for grain size analysis by Eidam.



CTD casts

CTD casts were collected with an RBR Maestro at all 9 mooring sites. Sensors measure depth, temperature, salinity, turbidity, dissolved oxygen, PAR, Chl-a, FDOM.



Quickplot profiles of temperature, salinity, turbidity from down-casts along all 3 lines.

All three sites show river plume signals close to shore (“1” sites; warm, fresh, turbid). Some near-surface temperature maximums (warm water) subsurface at offshore sites. The dashed line for L3-1 is a repeat cast on revisit 3 days later, which is suggestive of a plume spreading/thinning following wind cessation.

Moorings

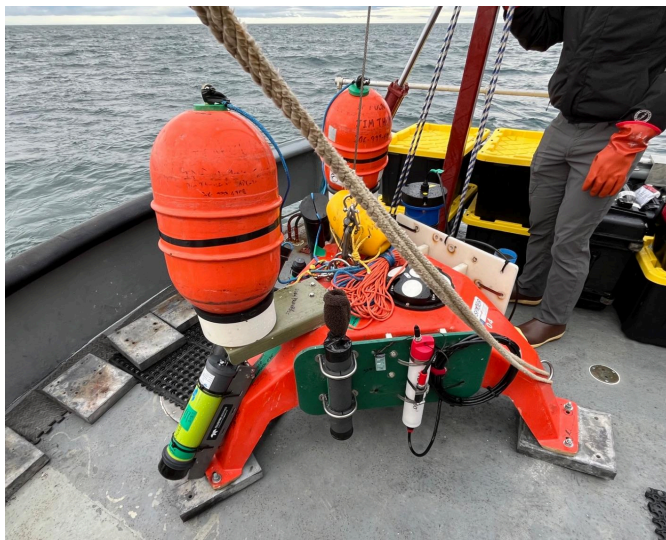
Moorings were deployed at the following locations and depths. SS denotes sea spider mooring, and SW is SWIFT mooring (details below). Full details in [mooring table](#)

Name	Latitude	Longitude	Ukpik activity	Deployed depth (m)
L1-1-SW	70.56494	-150.55351	Deployed as combined SWIFT mooring with instrumented anchor	7

L1-2-SS	70.85757	-150.64985	Deployed tripod	21.2
L2-1-SW	70.61506	-150.00431	Deployed as combined SWIFT mooring with instrumented anchor	12
L2-2-SW	70.73910	-150.00494	Deployed as combined SWIFT mooring with instrumented anchor	20
L2-3-SW	70.87528	-149.99979	Deployed as combined SWIFT mooring with instrumented anchor	26
L2-4-SS	71.00133	-150.00244	Deployed tripod	30
L3-1-SW	70.61940	-149.57533	Deployed as 1) separate seafloor package and 2) SWIFT mooring (which went off-station)	14
L3-2-SS	70.77345	-149.47654	Deployed tripod	21
L3-3-SW	70.91877	-149.38148	Deployed as combined SWIFT mooring with instrumented anchor	28

Sea spider moorings

Sea spider moorings are primarily built around a Nortek Signature 500 ADCP which measures waves, currents, and ice draft (if present). All were also deployed with a turbidity sensor, light/temperature logger, and sediment trap. One has a CTD (L2-4-SS). Two (L2-4-SS, L3-2-SS) were deployed with hydrophones (SNAP loggerhead). Each had a Benthos acoustic release (primary) and Sonardyne acoustic release (secondary) for recovery.

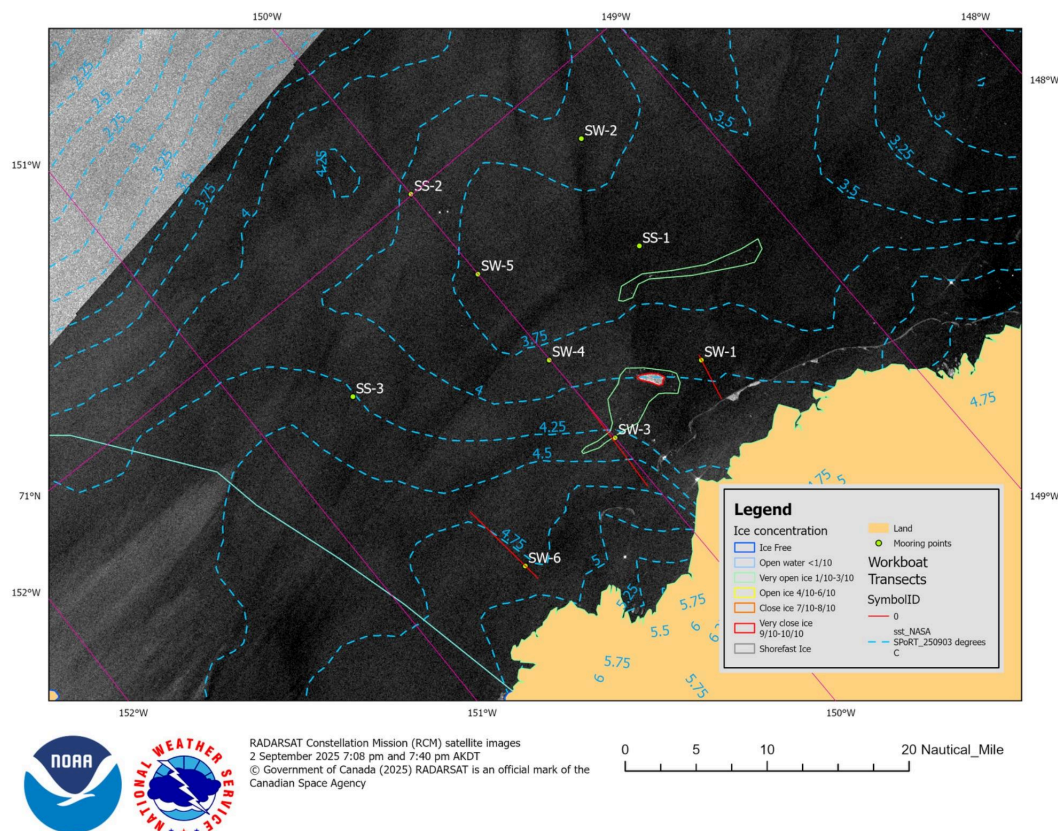


Sea spider tripod before deployment. Orange floats are on acoustic release recovery lines, the ADCP head is in the center of the tripod. The closest side (green panel) holds the hydrophone, turbidity sensor/CTD, and light sensor.

SWIFT moorings.

SWIFT moorings were typically made up of a SWIFT buoy in a moored setup, with additional sensors on the anchor. The exception was L3-1-SW, which was deployed with a decoupled seafloor package (instrumented anchor) with acoustic release, and SWIFT on blank anchor. Two SWIFTs (L2-1-SW, L2-3-SW) were deployed with met stations for wind speed, direction, and air temperature, and four (L1-1-SW, L2-1-SW, L2-3-SW, L3-3-SW) were deployed with up-looking aquadopps for near-surface turbulence measurements.

L3-1-SW additionally had a “nanoCTD” on a Spotter mooring (equipment test for a colleague at APL-UW) attached by line, which was intended to be recovered at the end of the cruise. Unfortunately, comms from SWIFT mooring L3-1 were lost less than a day after deployment. Suspected cause is a large, multi-year ice floe in the region which likely drifted over the mooring location. See image below (which was provided after the deployment).



Sea ice support product from September 2 showing large ice floe (~1 x 3 km) between moorings L2-1 and L3-1. (Provided by Michael Lawson/Alaska Sea Ice Program)

The remainder of the SWIFTs (IDs: 13, 15, 16, 17, 21) are providing real-time measurements of waves and other parameters on a 2-hr duty cycle. ([Data request](#))