# Coastal Observations for Fall Freeze Up in Alaska

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Why we make coastal observations:
Observations of local sea ice conditions are important to understand how changes in the ice cover affect people, the coastline and ecosystems. For this project we are particularly interested in fall freeze up and how ice on the ocean interacts with waves, winds and the shoreline. Satellite images can be used to study the changing sea ice but often they only tell a small part of the story. With detailed local observations, we can help make satellite images more useful and improve weather and ice forecasts.

Time and frequency of observations:
For this study we are interested in the fall freeze-up period. This is the time period between the first appearance of even small amounts of ice on the ocean and the time at which the coastal shorefast ice is stable and thick enough for people to walk out on. If interactions between landfast ice and the coast occur later in the season (for example an ice push), please report this as well. Frequent observations will help us understand how sea ice behaves in your village. At the same time, if a storm hits and moves ice around or breaks it up, forms ice berms or does something else to the ice, even just a few observations (and photos) of such events are of great help. Daily observations (even of noting in particular – like whether conditions are the same or changes have occurred) are very valuable. However, observations at longer intervals, in particular at times when ice conditions changed or a storm passed through are also very helpful.

What to include in an observation:
We are interested in what aspect of ice and ocean conditions along the shore are important for people in the village and how the ice interacts with the coast. The observations can therefore include anything that local observers consider important or noteworthy. This includes information about sea ice evolution, currents, waves, or anytime a rise or fall in water level occurs that is not caused by the tide (such as a storm surge). The following observed features are of particular interest:

- Sea ice forming with a rougher/smoother surface than usual making the ice harder/easier to travel across later in the season.

- Sea ice interaction with the coast line (for example by forming an ice berm, scouring the seabottom and throwing up mud, or by being pushed on shore in an ice push event - Iñupiaq: ivu).
- Sea ice protecting the shoreline from storms or waves, for example by forming a natural barrier.
- Sea ice results in the movement of sand, mud or gravel along the shoreline.
- First appearance of different ice types. For example: first formation of slush ice, ice floes, shorefast ice, and first time the shorefast ice is walkable.

<u>List of other examples of features of interest:</u>

*Freeze-up:*
- Start of ice freeze-up on lakes and lagoons
- Condition of the water, e.g. when does it first turn "greasy" with floating ice crystals
- First new ice forming on the ocean
- First appearance of landfast ice
- First landfast ice stable enough to walk or travel on

*Ice deformation close to shore:*
- Formation of ridges that ground on the seafloor
- Occurrence of ice push events (Iñupiaq: ivu)
- Movement and fracturing of ice

*Other ice conditions:*
- Ice berms (typically form from sea spray and waves freezing into a little dam onshore). If berm helps protects the coast from waves please indicate
- Appearance of older ice
- Observations of dirty, brown ice that contains larger amounts of sand, mud or gravel. Please give any information on how the mud has gotten into the ice.
- Occurrences of water being forced up through cracks in established fast ice

*Waves and currents:*
- Larger waves, increased/decreased sea level due to surge, and stormy weather that have an impact on the coast, either by flooding the land adjacent to shore or by eating away at the shoreline and cause the shoreline to erode or retreat inland. Also any time a surge lifts ice up onto the land.
- Currents or coastal flooding that impacts the shoreline, for example from late season rain or storm events
- Unusual river discharge from nearby rivers

Where appropriate, please indicate, ice types (sheets, grease ice, pancakes etc.), amounts, magnitude, and where features occur. Also, please indicate whether conditions or timing of events are usual for location (if first ice appears to form at a

different time than usual this year, please indicate). We are also very interested in common conditions that do not occur like usual (For example if the ice is usually smooth, but this season it is rough).

Please include the Native name in Yupik or Inupiaq if that adds to the description.

Recording the observations:
The exact location of the observation is of great interest. Identify the location by a local place name, marking it on a map, such as Google Maps (maps.google.com) or GPS coordinates if available. Please include photos taken with cell phone or other camera describing the observations if available. Having an accurate date for the different observations is very important. Therefore, it is best to write down observations on the same day, rather than wait for the end of the week to write a summary.

How should observations be submitted?
Depending on your preference and whether you are part of an observing network already, there are different ways you can submit observations.

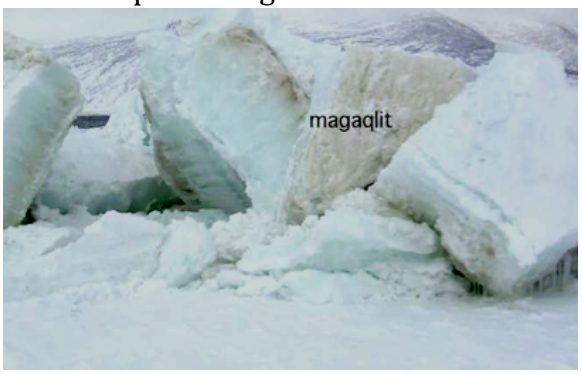
- For observers that are part of the Alaska Native Tribal Health Consortium's Local Environmental Observations (LEO) network, please submit through your LEO network just as you would with regular observations. The observations will be posted online and we will also obtain a copy.
- You can e-mail observations and photos directly to our group at the University of Alaska Fairbanks, please send to Ms. Mette Kaufman, mrkaufman@alaska.edu. You can also report observations to Ms. Kaufman over the phone: (907) 474-5431.
- You can send in observations by US Postal Service; please address to Ms. Mette Kaufman, Geophysical Institute, University of Alaska Fairbanks, PO Box 757320, 903 Koyukuk Drive, Fairbanks, AK 99775-7320.
- Submissions through Facebook will be available within the next few months.

Depending on what is easiest for you, you can send in a collection of observations at the end of freeze-up or the end of a month, or one by one as they are made.

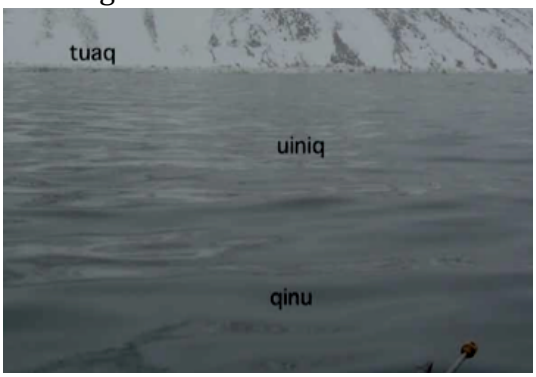
Quyana, Quyanaqpak and Quyanaghhalek! Thank you for your help.

Ice Berm protecting the shore line

Floating ice - Ice Floe




Signs of erosion by sediments being entrained in sea ice.




Formation of slush Ice

Ice push event - Ivu

Photos by Winton Weyapuk, Jr., Wales, AK; published in: Kingikmi Sigum Qanuq Ilitaavut - Wales Inupiaq sea ice dictionary, edited by I. Krupnik, H. Anungazuk and M. Druckenmiller, Arctic Studies Center, Smithsonian Institution, Washington, D.C.