

# Community-based observations of fall freeze-up and ice interacting with the shoreline



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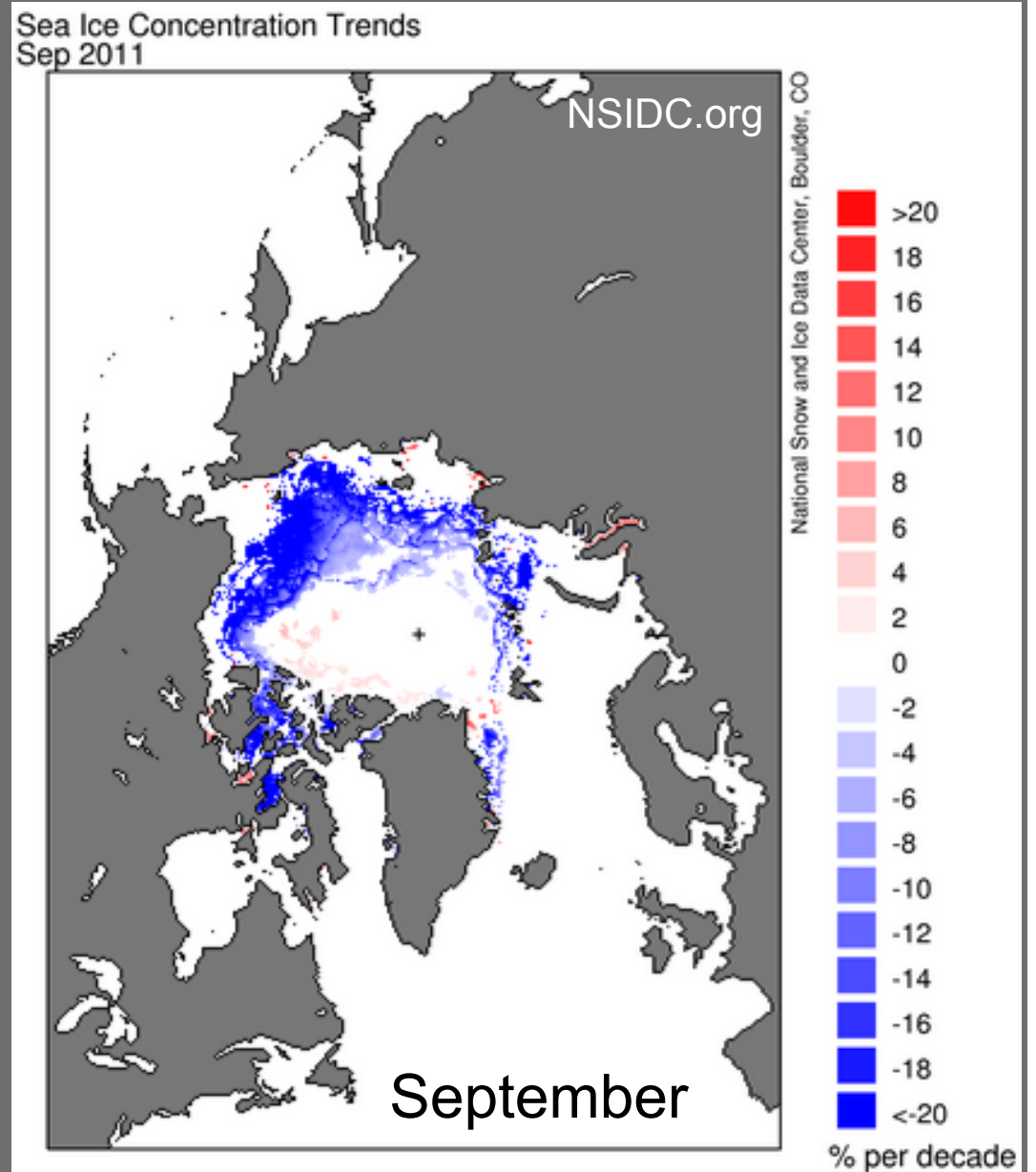
- Sea ice change and fall freeze-up
- Community-based ice observations
- How to participate

Project supported by Landscape Conservation  
Cooperative Western Alaska (USFWS)

Ice & wave action, Fatigue Bay,  
13 Oct 2006; Photo: Richard Glenn

# Alaska: Large reductions in summer ice extent

- Seas north of Alaska & Eastern Siberia have seen greatest change anywhere in the Arctic
- Summer ice less extensive than before
- Coasts more vulnerable to storms & ice interaction in the fall





Ice balls and sediment layers in frozen slush ice,  
Point Barrow, 19 Nov 2006; Photo: Ocean Mercier



Seal hunters on ice formed during fall storm,  
Point Barrow, 19 Nov 2006; Photo: Matt Druckenmiller

# Observations of freeze-up

## W. Weyapuk Ice Log

8 Nov 2007

...There is a **slush berm** about 3 to 4 feet high right along the tide line. Light slush in front of the village 1/4 to 1/2 mile wide.

### Local observations in Wales, Shishmaref and Shaktoolik:

- Slush ice berms protect coast from fall storms



Photo: Winton Weyapuk Jr.

# Observations of freeze-up and impact of storms on coast in fall 2012

- *Why?* – Improve forecasts of storm impacts, assess vulnerability of coast
  - *How often?* – Observations of progress of freeze-up (first ice, stable ice etc) most valuable; BUT: brief observations & photos of impact of storms during freeze-up of great value
- What to observe?* –
- First appearance of different ice types (slush ice, floe ice, shorefast ice, etc.)
  - Ice protecting the coast: ice berms, bottomfast ice
  - Ice interacting with shoreline: ice push, mud and sand frozen into ice, etc.

# What to do with the observations

- For regular LEO observers: Please submit through LEO network
- Please record observations (log sheet, computer, text message)
- E-mail observations to Ms. Mette Kaufman:  
mrkaufman@alaska.edu
- Phone: (907)474-5431
- Text: (907)347-5350
- Fax: (907)474-7290
- If possible, please include photos (by e-mail or text message)
- You can also collect observations and send in at end of freeze-up (when shorefast ice is stable enough to walk on) to:  
Mette Kaufman  
Geophysical Institute,  
UAF, PO Box 757320  
Fairbanks, AK 99775



## Fall Freeze Up Log Sheet



It is important to understand the details of how sea ice is changing along Alaska's shorelines, and how this change affects the coastline and coastal communities. In a small pilot project, we want to learn more about how ice, waves and wind interact with the coast during freeze-up. In particular, we are interested in observations in your community of how nearshore ice protects or damages the coast and impacts other activities in your area. The time period we are interested in is from the very first appearance of ice nearshore until the ice is stable and thick enough to travel on. This log sheet may be helpful in recording such observations. Also, we are interested in photos of some of the ice features or the potential impacts of storms, waves and ice on the coast.

**Your name:**  
**Where was observation made**  
**(village and specific location):**

Observation	Date	Description (and guidance on additional helpful information)	
First signs of ice on the ocean			Is slush or grease ice visible in the ocean?
First signs of other types of ice			What type of ice (floe ice, old ice)? Where did it come from?
First appearance of ice attached to the shore			How far out does the shorefast ice extend?
Ice berm formed (ice wall protecting shore along beach)			How did the berm form and how long did it stay in place?
Sea ice with mud or sand (dirty ice)			Where is the mud in the ice? Where did the ice come from?
Ice push event (ice driven onto the shore)			
Ice pressure ridges forming (floating or grounded)			
Strong ice movement and fracturing			
Unusually large waves, currents or coastal flooding			
Ice is stable enough to walk on for first time			
		Additional observations – please record on back of this sheet	

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

We want to learn what is important to people in your community about the ice and ocean. Please include anything else you observed about coastal ice that is interesting or important to you. You can use the reverse side of this page or additional pages.

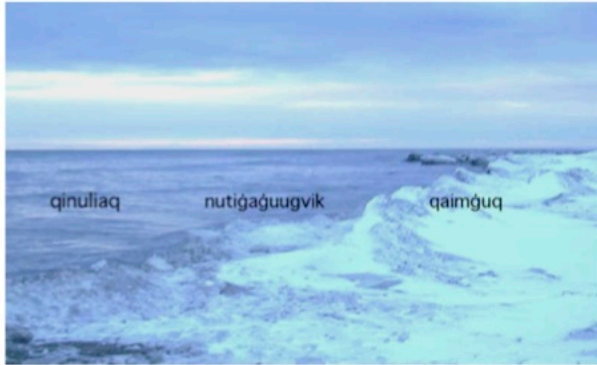
Once freeze-up is over, please mail this page to Ms. Mette Kaufman who is part of our project at the University of Alaska Fairbanks (contact information below, you can also call by phone). Quyana, Quyanaqpak and Quyanaghalek! Thank you for your help.

Contact: Mette Kaufman, Geophysical Institute, University of Alaska Fairbanks  
 PO Box 757320, 903 Koyukuk Drive, Fairbanks, AK 99775-7320.  
 mrkaufman@alaska.edu ph (907) 474-5431, fax (907) 474-7290

- Observation log sheet:
  - First signs of ice on ocean – When & what type of ice
  - First shorefast ice – When? Stable?
  - Ice berm forming during storm?
  - Ice pushed onto beach by storm?
  - Other notable events impacting shoreline (flooding, wave action with ice in the surf zone, etc.)



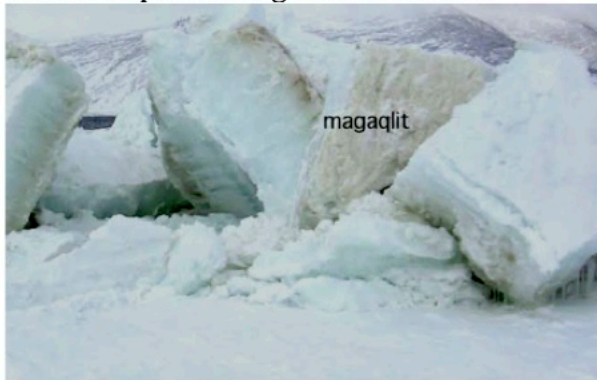
Examples of key ice features.



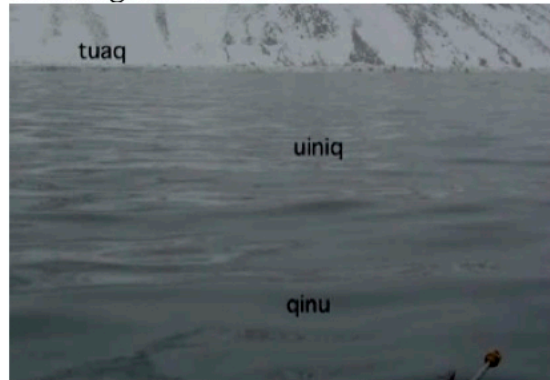
Ice Berm protecting the shore line



Floating ice - Ice Floe



Signs of erosion by sediments being entrained in sea ice.



Formation of slush Ice



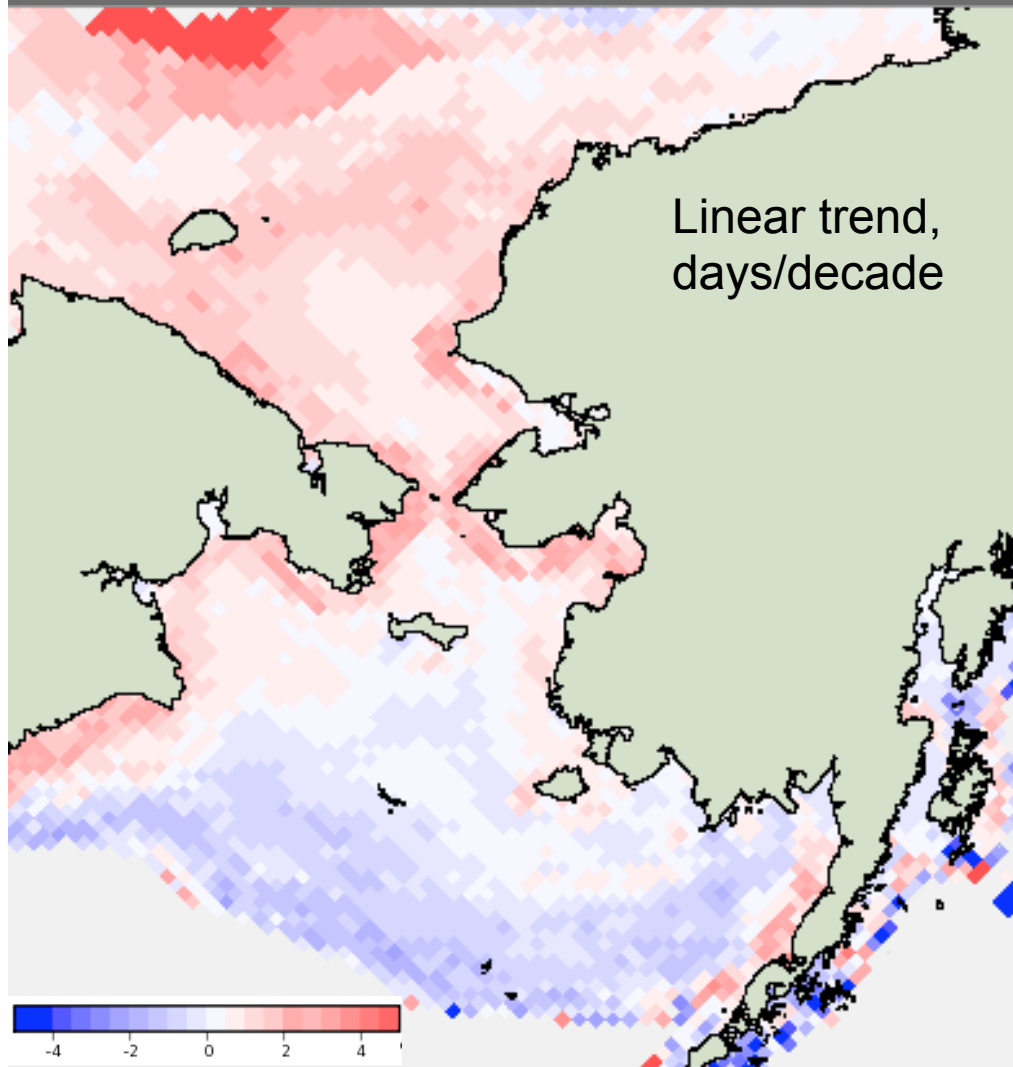
Ice push event - Ivu



Ice push event - Ivu

- Ice features to look out for

# Onset of freeze-up: Combining local observations with satellite data



- Building on local observations we can create maps of changes in freeze-up between 1979 and today
- Freeze-up delayed by up to 2-3 days per decade
- Norton Sound, Bering Straits region, southern Chukchi Sea coasts