

Community sea ice observing collaborations

Olivia Lee

Hajo Eicken

Mette Kaufman

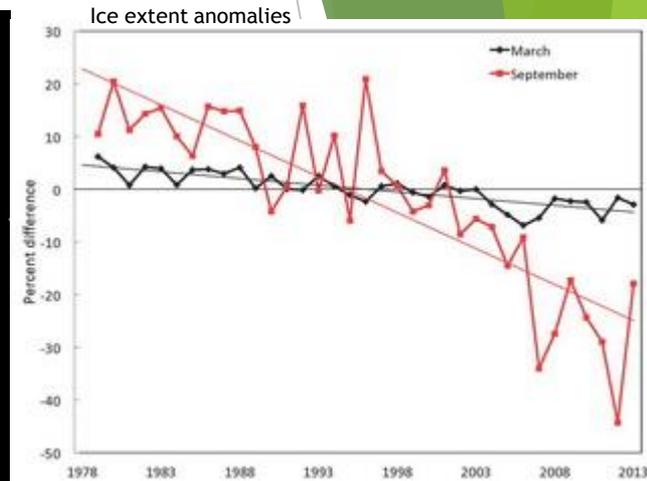
University of Alaska Fairbanks

International Arctic Research Center

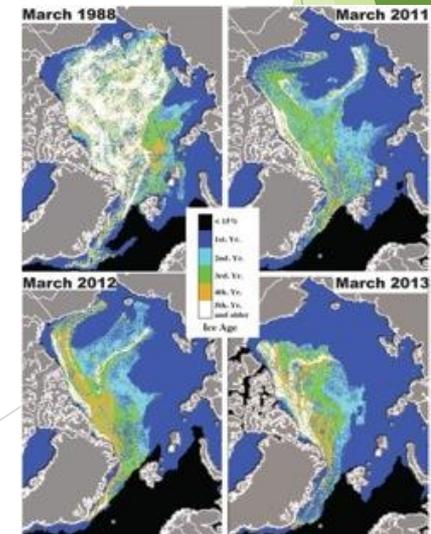
LEO Network Teleconference/ Webinar (18 October 2016)



Changing sea ice

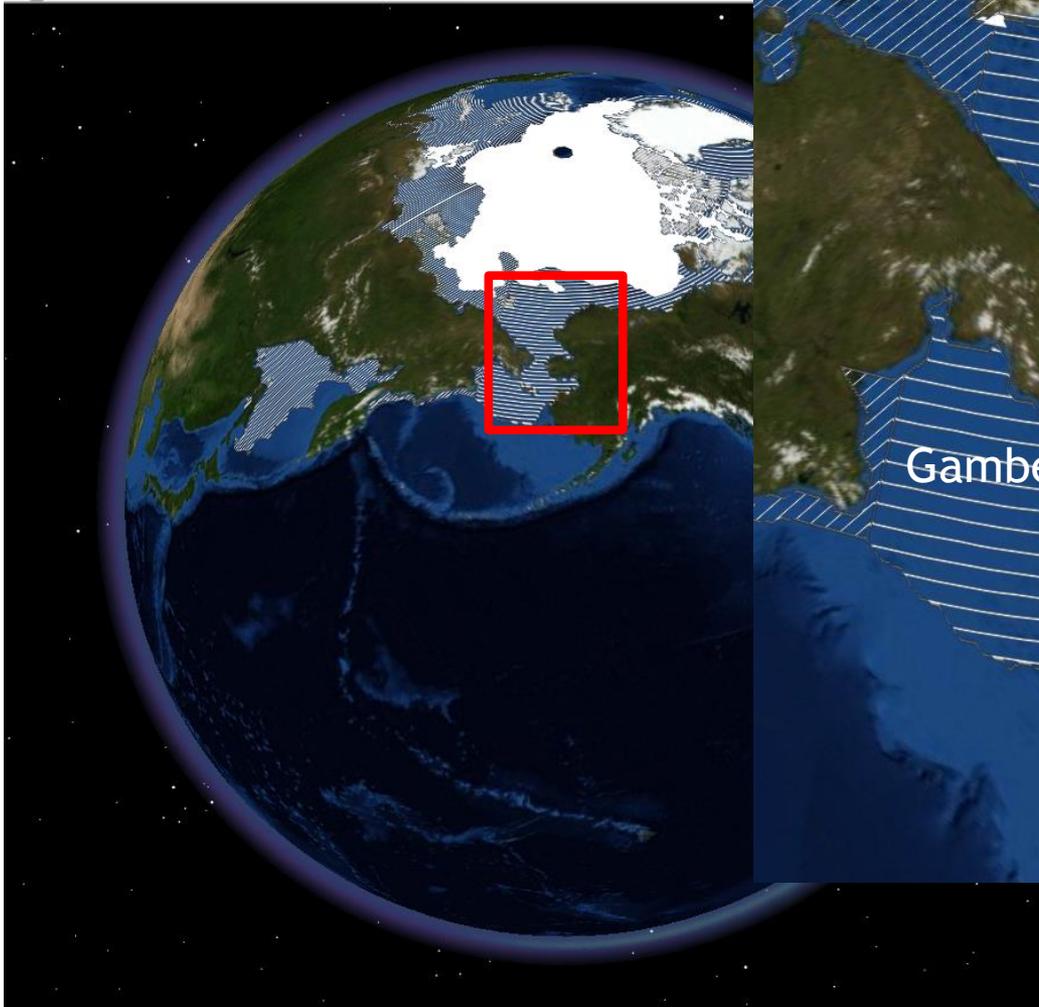


(NOAA 2013)



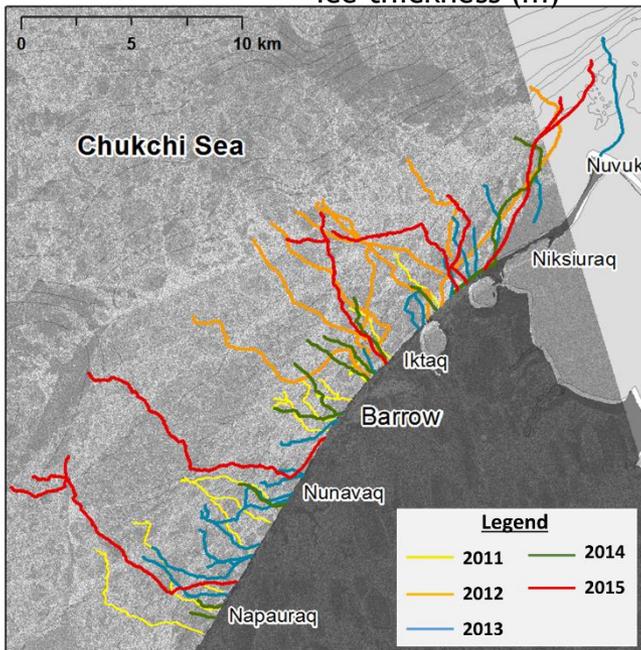
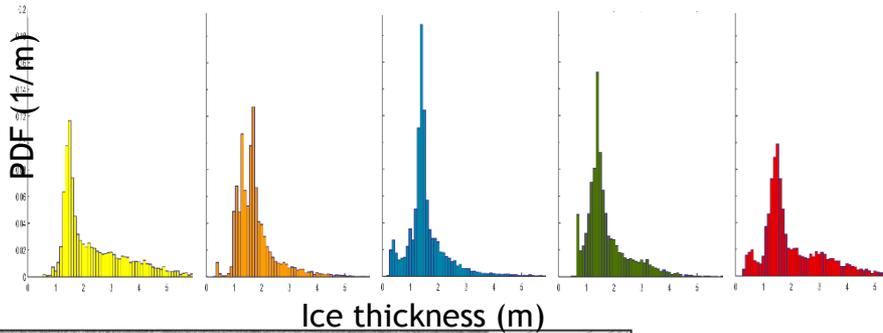
(Malasnik et al. 2011)

Changing sea ice

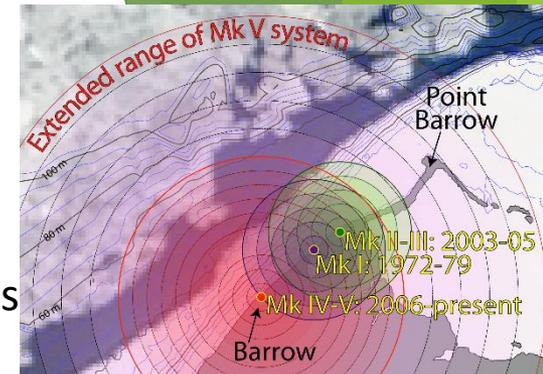


Sea ice measurements

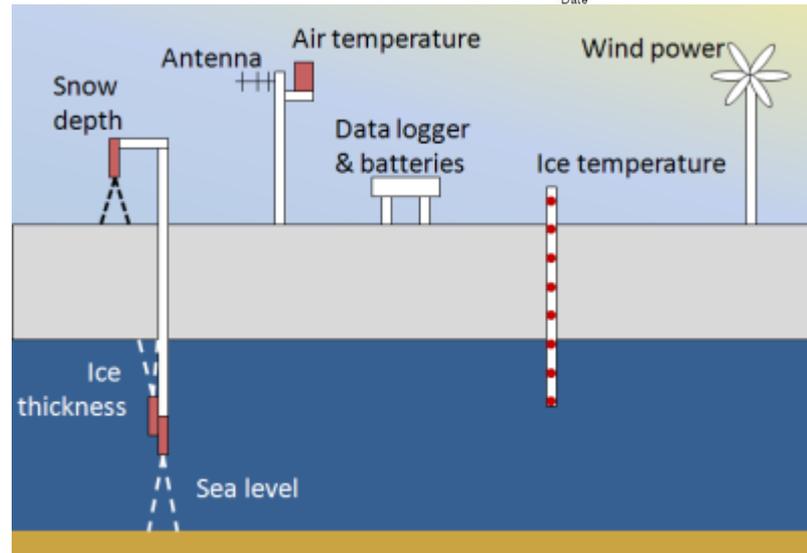
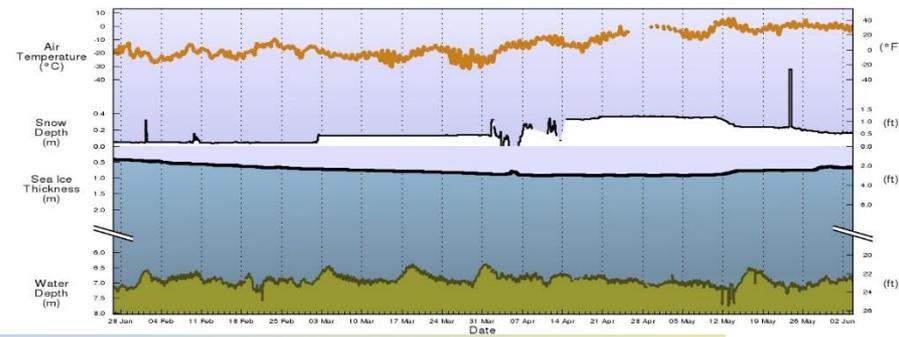
Sea ice thickness on hunting trails



Radar range and locations



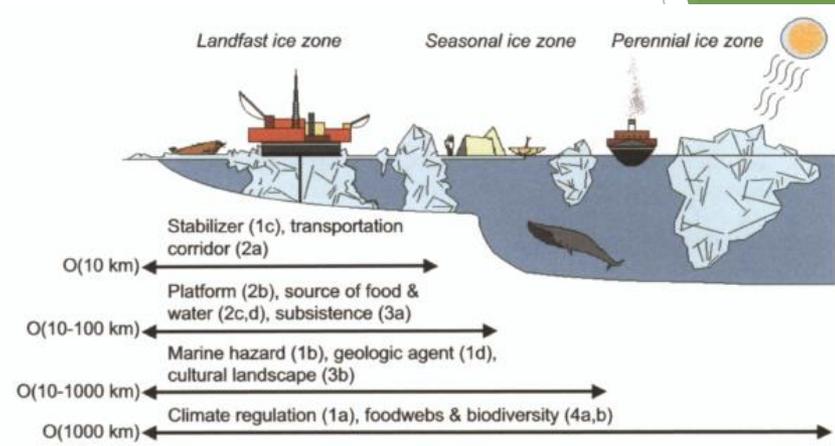
SIZONet Mass Balance Probe, Barrow, Alaska, 2016



Sea ice mass balance

Sea ice system services

▶ Akin to Ecosystem Services



(Eicken, Lovecraft & Druckenmiller 2009)

- ▶ Shared sea ice use: sea ice system services for subsistence hunters, walrus (*Odobenus rosmarus*) & bearded seals (*Erignathus barbatus*)
- ▶ Habitat partitioning in early spring/ winter
 - ▶ Walrus: & bearded seals: broken pack ice/ pack ice with leads
- ▶ Focused on spring migration period

Sea ice system services

Walrus

Ice habitat use

Bearded seal

Supporting services: year-round habitat, platform for resting, nursing, and molting ; ice-associated primary productivity that supports benthic prey

Provisioning services: ice-associate species as sources of food; multi-year ice as source of freshwater.

Cultural services

Subsistence hunting communities

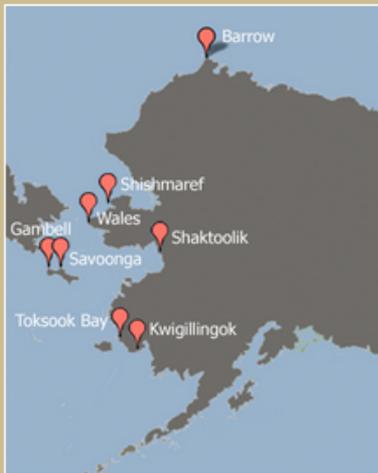
Materials and methods

- ▶ Community observations from February 2006 - July 2013
- ▶ Focus on spring migration (March - May) each year
 - ▶ SIZONet (<http://eloka-arctic.org/sizonet/>)
 - ▶ Sea Ice for Walrus Outlook (www.siwo.arcus.org)
- ▶ Database search for common names & native terminology for walrus & bearded seals
- ▶ Qualitative assessment of content
 - ▶ Concordance word counts from observations of walrus and bearded seals
- ▶ Local observations coded to specific ice categories (local, seasonal) & MODIS/ AVHRR satellite imagery for regional sea ice
- ▶ Differences in number of walrus/ bearded seal observations by sea ice category - randomization test (Simpkins et al. 2003)



Search the observations catalog:

[View All](#)



Search for:

AND: All observers ▼

AND: All villages ▼

Date range: 2006-04-01 to 2014-04-04

The SIZONet Observation Database is a collaboration between [SIZONet](#) and [ELOKA](#). This Web site is hosted by the [National Snow and Ice Data Center](#)

- ▶ Must agree to terms of use before being able to search database

CURRENT SEARCH

Keyword(s): walrus

Date(s): 2006-04-01 - 2016-09-30

Village(s): All

Observer(s): All

Photo contributor(s): All

Photo location(s): All

[Refine Search](#)

[New Search ▶](#)

Search Results

Showing observations 1 - 20 of 272

20 per page ▼

Go to Page:

First ← Previous Page 1 of 14 Next → Last

Sort by:

Date	Observer	Village	Additional elements noted (legend)	
2016-09-27	Billy Adams	Barrow	     	All details
2016-07-15	Joe Leavitt	Barrow	   	All details
2016-07-07	Joe Leavitt	Barrow	   	All details
2016-07-06	Joe Leavitt	Barrow	  	All details
2015-06-26 03:00 PM	Billy Adams	Barrow	   	All details
2015-06-25 04:00 PM	Billy Adams	Barrow	    	All details
2015-06-01	Curtis Nayokpuk	Shishmaref	   	All details
2015-05-30	Curtis Nayokpuk	Shishmaref	   	All details
2015-05-27	Curtis Nayokpuk	Shishmaref	    	All details
2014-07-25	Joe Leavitt	Barrow	   	All details
2014-05-31 09:25 AM	Winton Weyapuk Jr.	Wales	   	All details
2014-05-25 08:30 AM	Winton Weyapuk Jr.	Wales	   	All details
2014-05-23 07:45 AM	Winton Weyapuk Jr.	Wales	   	All details
2014-05-18 07:30 AM	Winton Weyapuk Jr.	Wales	   	All details
2014-05-17 07:10 AM	Winton Weyapuk Jr.	Wales	   	All details
2014-05-08	Curtis Nayokpuk	Shishmaref		All details
2014-05-08 01:15 PM	Winton Weyapuk Jr.	Wales	   	All details



Observation ID:
SHINA140508_1
Recorder: Mette Kaufman
Observer: Curtis Nayokpuk
(Shishmaref)
Date: 2014-05-08

[New Search ▶](#)

Observation Details

[Back to search results](#) [Previous](#) [Next](#)

Multimedia



8 May 2014 - Piled ice



8 May 2014 - Hunters cross
the sea ice outside of
Shishmaref.



Observation ID:
BARAD160927

Recorder: Mette Kaufman

Observer: Billy Adams
(Barrow)

Date: 2016-09-27

Observation location: Pt.
Barrow

New Search ►

Observation Details

[Back to search results](#)

[Previous](#) [Next](#)

This observation has instructional or didactic value for students or other novices.

This record contains an unusual condition or situation.

Observation source(s):

- Local knowledge/comment
- Email communication

Sea ice related activities

Whaling:

Crews out on lead edge
Boats out looking for whales
Whale landed

Sea ice observations

Distance to lead/open water:

Approximately 26.0 miles

Weather

Wind speed:

Between 10.0 and 20.0 mph

Air temperature:

Between 30.0 and 35.0
Fahrenheit

Visibility:

Between 0.2 and 5.0 miles

Condition:

Fog

Sky:

Overcast

Wind direction:

W

Game and Wildlife

Marine Mammals:

Bowhead whale (Taken)
Seal (Sighted)
Walrus (Sighted)
Whale (Sighted)

Terrestrial Mammals:

Polar bear (Sighted)

Transcripts available for registered users



Local Observations
Seasonal Ice Zone Observing Network
(SIZONet)

Exchange for Local Observations and
Knowledge of the Arctic



[Home](#) [Search Observations](#) [About](#) [Research methods](#) [Contacts](#)

Logged in as *Community Member*

[Log out](#)

Observation ID:
BARAD160927

Recorder: Mette Kaufman

Observer: Billy Adams
(Barrow)

Date: 2016-09-27

Observation location: Pt.
Barrow

[New Search ▶](#)

Observation Details

[Back to search results](#)

[Previous](#) [Next](#)

Transcript

September 19-27; location Barrow, opening day of whaling was on the 19th and the whales were 25-30 miles out! The ice from the south was like on shore from Monument to the point and it was ½ mile wide to 1 mile in some areas. The winds were constantly from the west northwest and west 10-20 mph, temperature ranged from 30-35f, overcast, with visibility 2-5 miles and sometimes ¼ mile where there was areas of fog. It has been mostly cruddy with a few hours of clear beautiful sunsets and sunrise then it turns bad weather during the day. Our crew was lucky and landed a 30 foot whale on the 26th ! The ice stretched out from the point to about 26 miles out a calm area to wait and ambush a whale. I still have no camera to take amazing photos many and all kinds of sea birds, ducks, seals, walruses, bears, and whales would have been very nice.

This observation has instructional or didactic value for students or other novices.

This record contains an unusual condition or situation.

Observation source(s):

- Local knowledge/comment
- Email communication

Sea ice related activities

Whaling:

Crews out on lead edge

Boats out looking for whales

Whale landed

Sea ice observations

Distance to lead/open water:

Approximately 26.0 miles

Weather

Wind speed:

Between 10.0 and 20.0 mph

Air temperature:

Between 30.0 and 35.0
Fahrenheit

Visibility:

Between 0.2 and 5.0 miles

Condition: Fog

Sea Ice for Walrus Outlook



SEARCH : STUDY OF ENVIRONMENTAL ARCTIC CHANGE

[ABOUT](#) [SCIENCE THEMES](#) [MEETINGS AND EVENTS](#) [CALENDAR](#) [PRODUCTS](#) [NEWS](#)



Sea Ice for Walrus Outlook (SIWO)

Update

Status: Thanks to all for your contributions to a great 2016 SIWO season. Updates will resume in April 2017!

To share comments or images about the conditions in your area, send them to Lisa Sheffield Guy (lisa@arcus.org) or join the conversation on the SIWO Facebook page: <https://www.facebook.com/seaiceforwalrus>.

[Printer Friendly/Low-Bandwidth Version](#)

Overview

Resources

Contact

Subscribe

Subscribe here to receive new SIWO reports via email.

Enter your email address:

Subscribe

Sea Ice for Walrus Outlook

[Overview](#)

[Resources](#)

[Contact](#)

The Sea Ice for Walrus Outlook (SIWO), an activity of the [SEARCH Sea Ice Outlook](#) started in 2010, is a resource for Alaska Native subsistence hunters, coastal communities, and others interested in sea ice and walrus. The SIWO provides weekly reports from April through June with information on sea ice conditions relevant to walrus in the Northern Bering Sea and southern Chukchi Sea regions of Alaska.

This collaboration includes weather and ice forecasters, climate scientists and sea-ice researchers at NOAA, the National Weather Service, the University of Alaska, and the Arctic Research Consortium of the U.S. (ARCUS, with funding from the National Science Foundation's Division of Arctic Sciences), who are teaming up with Alaska Native sea-ice experts and the Eskimo Walrus Commission.



Photo by Maggie Prevenas - PolarTREC/ARCUS



Sea ice categories

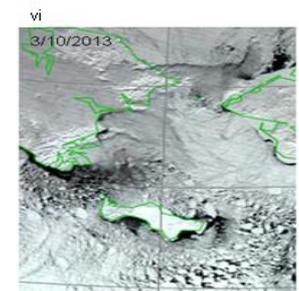
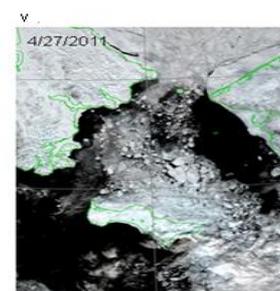
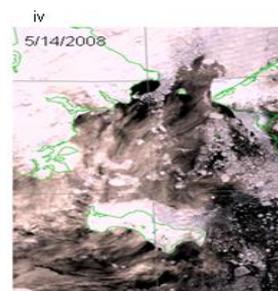
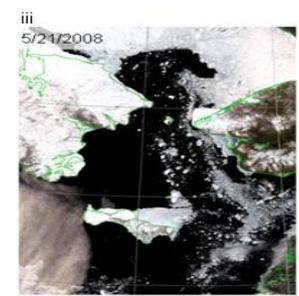
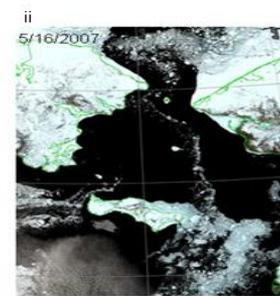
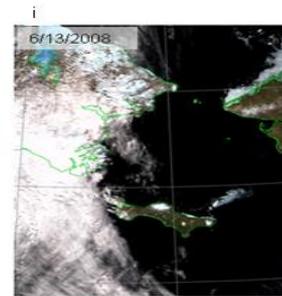
▶ Local sea ice conditions

- ▶ Relatively close to shore (0 - 50 km)
- ▶ Nine categories related to pack ice and shorefast ice observations

▶ Regional scale seasonal sea ice retreat

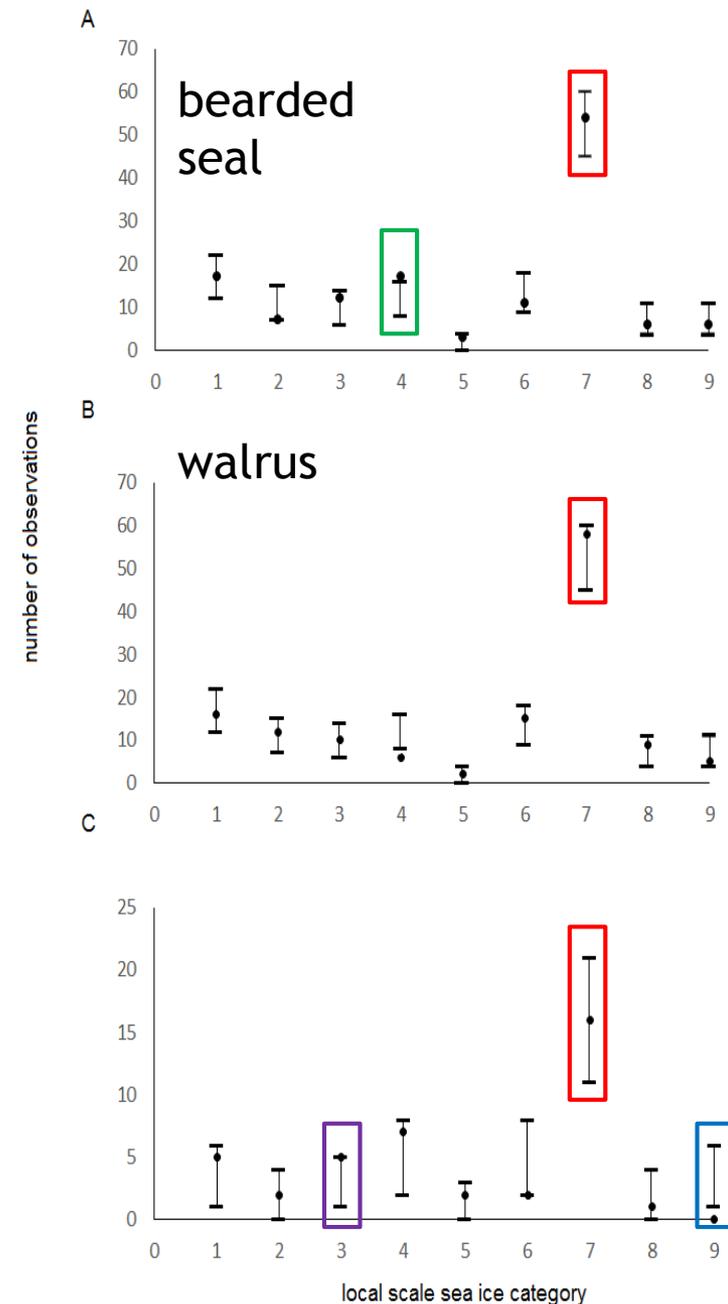
- ▶ Six categories
- ▶ Related to presence of visible pack ice
- ▶ Accessibility through Bering Strait

Category	Local sea ice condition
1	No ice in sight
2	Scattered floes
3	Shorefast ice breaking up
4	Shorefast/ landfast ice described
5	Pack ice blown out to sea
6	Pack ice pushed inshore
7	Pack ice visible from shore
8	Young/ slushy/ thin ice
9	Heavy pack ice



Results

- ▶ Local observations reflect detailed information about relevant sea ice conditions
 - ▶ Floe sizes (large, very large, big, loose, small)
 - ▶ Ice thickness (thin, thick)
 - ▶ Surface conditions, development stage, concentration
- ▶ Local sea ice conditions:
 - ▶ Most walrus, ringed and bearded seal observations reported with **pack ice visible from shore**
 - ▶ Bearded seals more commonly reported with **fast ice described**
 - ▶ Ringed seals not reported in **heavy pack-ice**, but reported **when fast ice is breaking up**

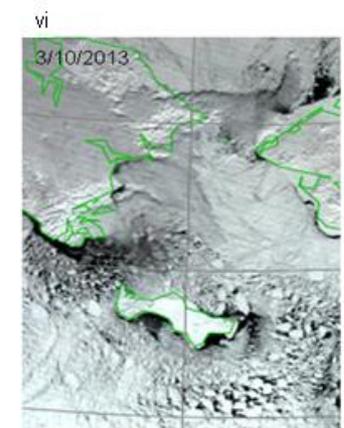
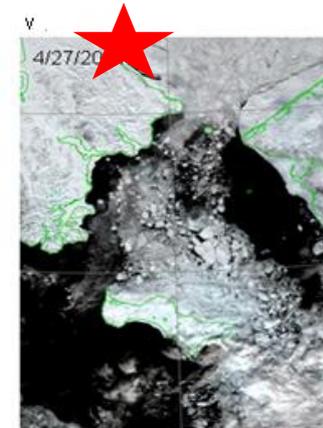
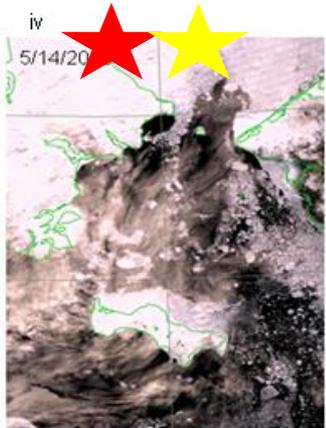
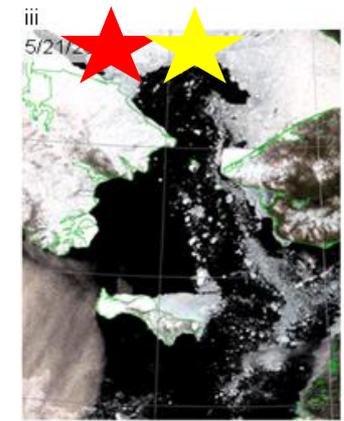


Results

Bearded seals ★

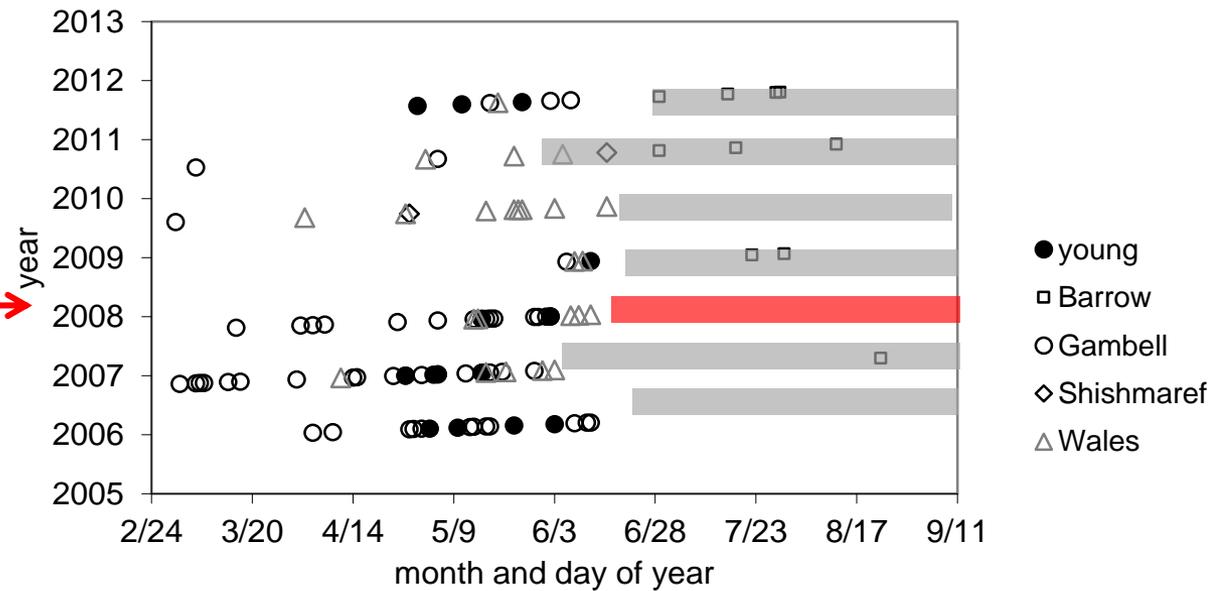
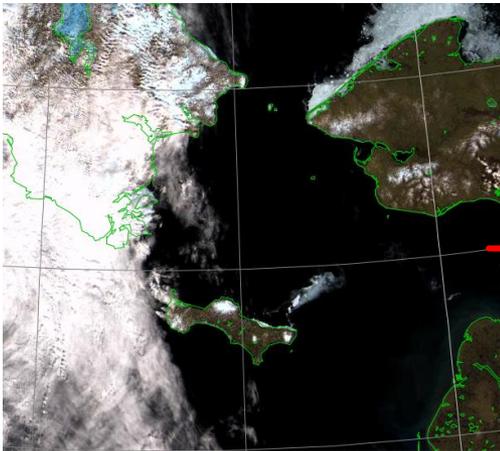
Walrus ★

- Bearded seals frequently reported when ice still blocks passage through Bering Strait
 - Acoustic data show bearded seals can be found year-round
- Walrus more frequently reported south of Barrow with greater open water present in Bering Strait



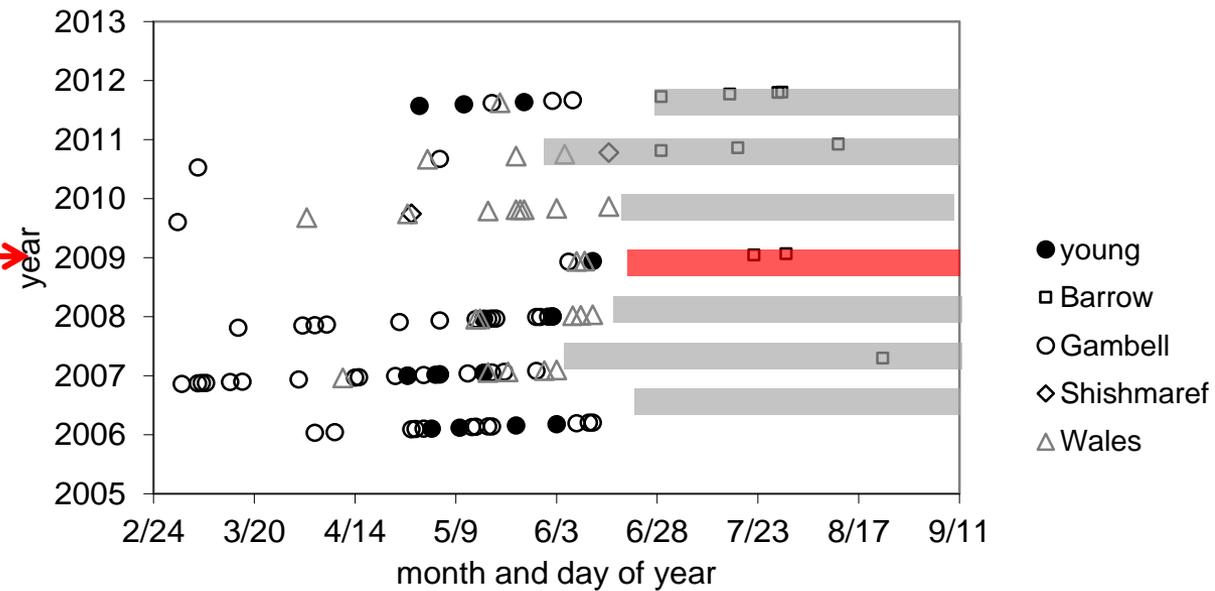
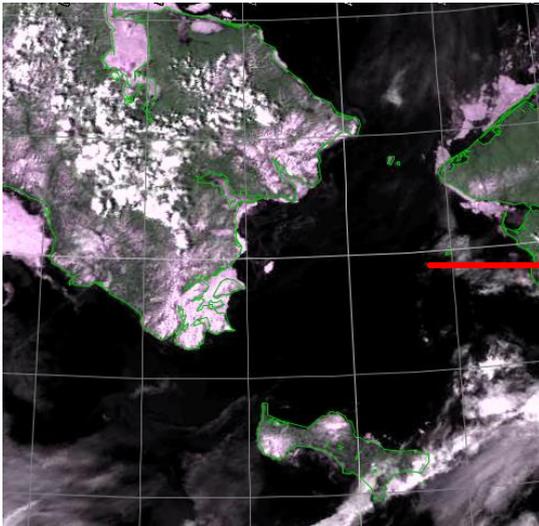
Results

- ▶ Observations of young animals associated with ice presence in Bering Strait



Results

- ▶ Observations of young animals associated with ice presence in Bering Strait

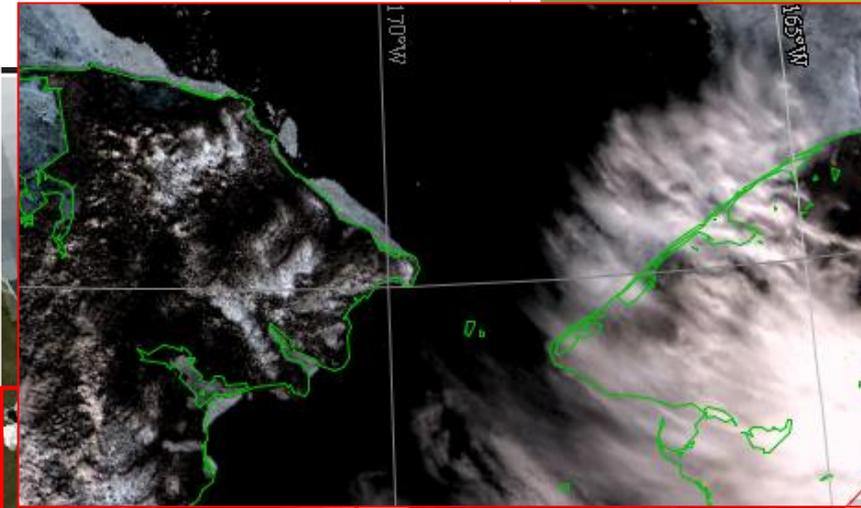


Applications

- ▶ Multi-scale approach to track sea ice conditions

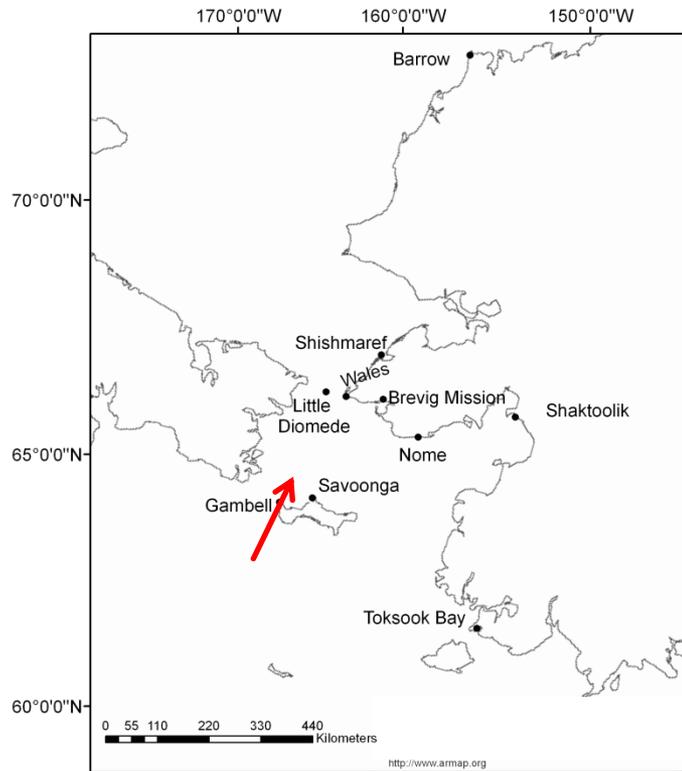
(4 June 2007)

W. Weyapuk: There are a few pieces of grounded floes in front of the village that moved there from the south. The shore fast ice is still attached about 6 miles north of the village... There were three boats out hunting during the weekend. They got some bearded seals and walrus... One boat crew met a crew from Diomedes a few miles out on the pack ice and had lunch with them. The Diomedes crew was hunting on this side of the strait because of the lack of ice on their side.

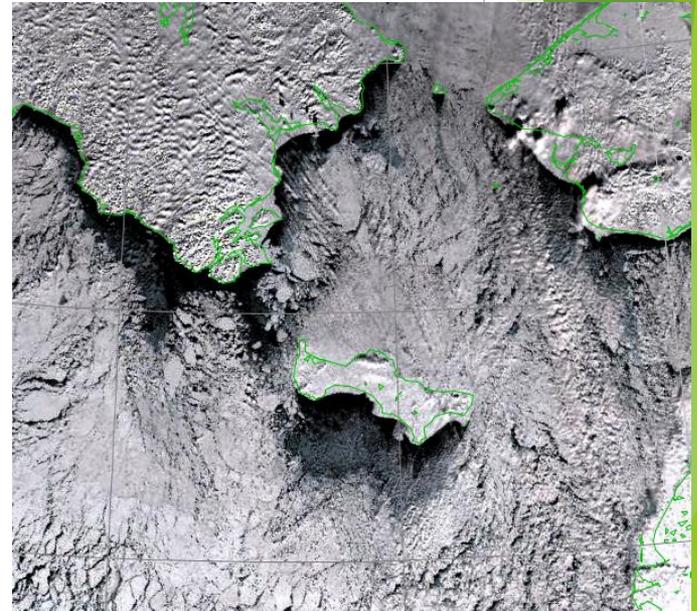


Applications

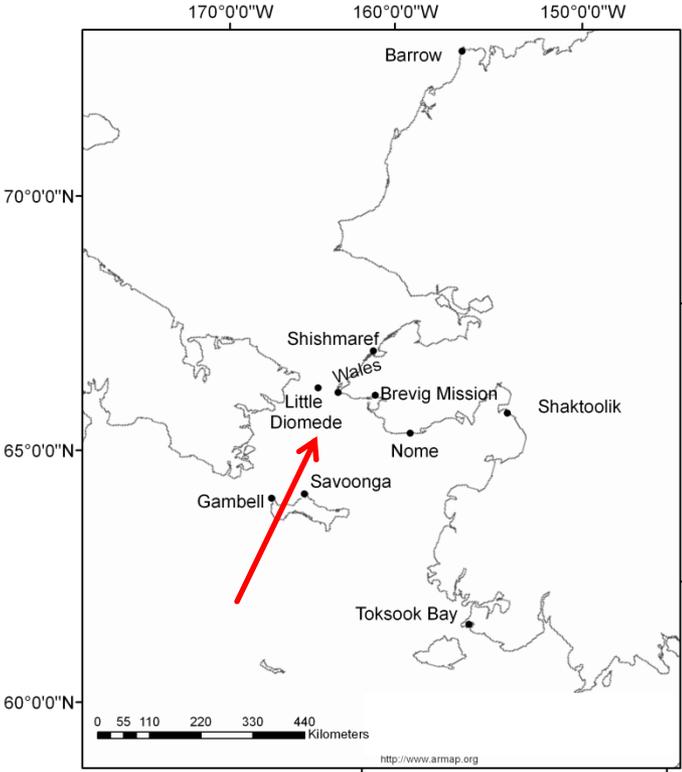
- Supplementary information on species movements



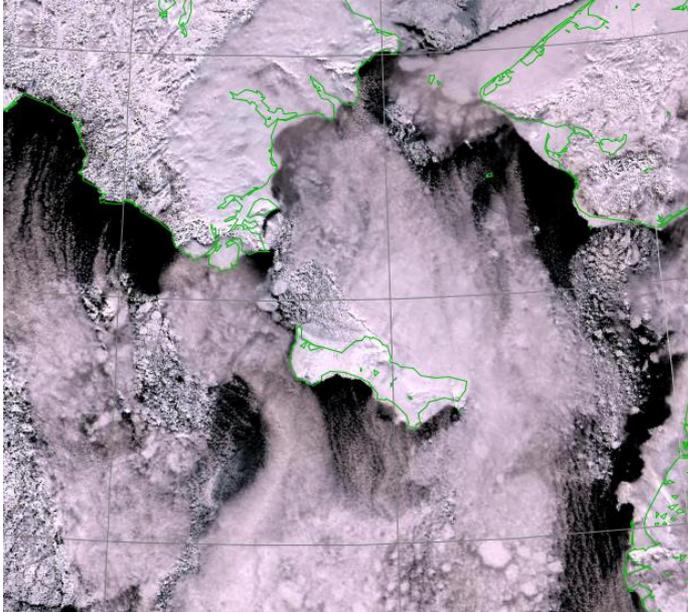
3 March 2007



Applications



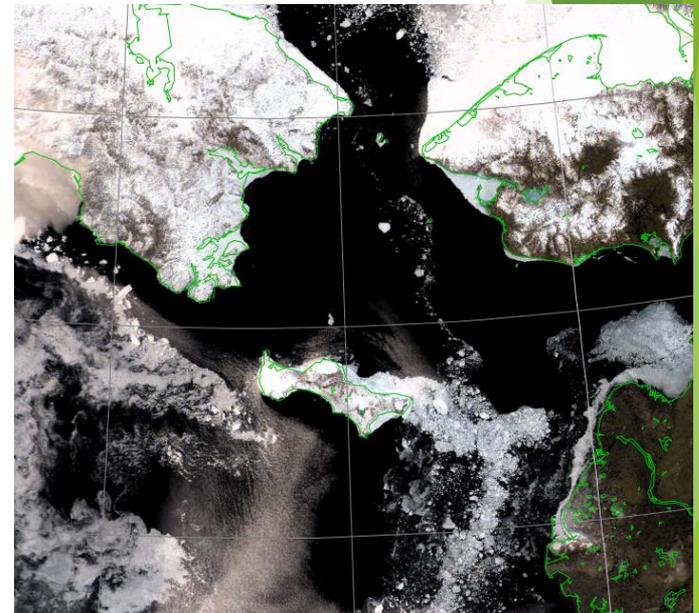
15 April 2007



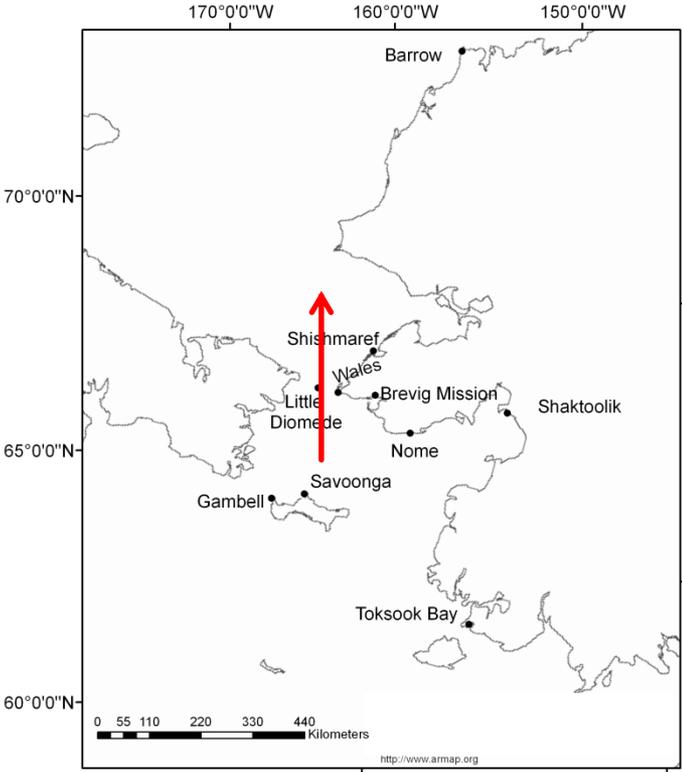
Applications



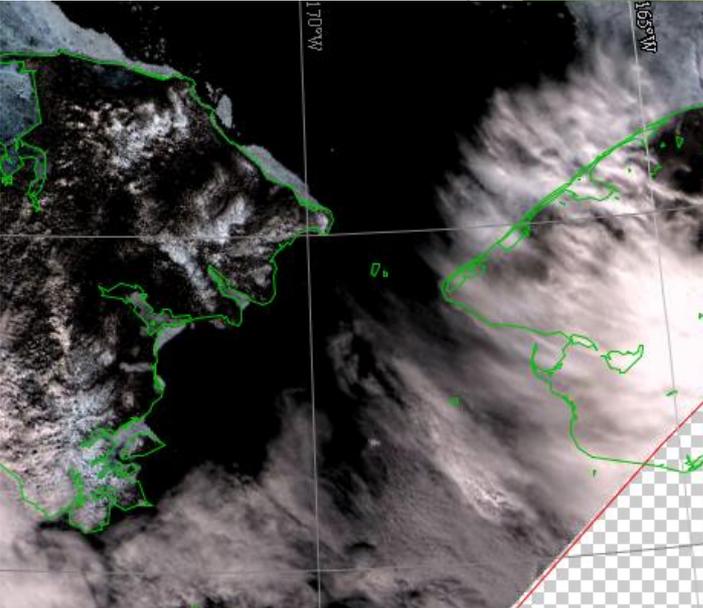
18 May 2007
through 30 May 2007



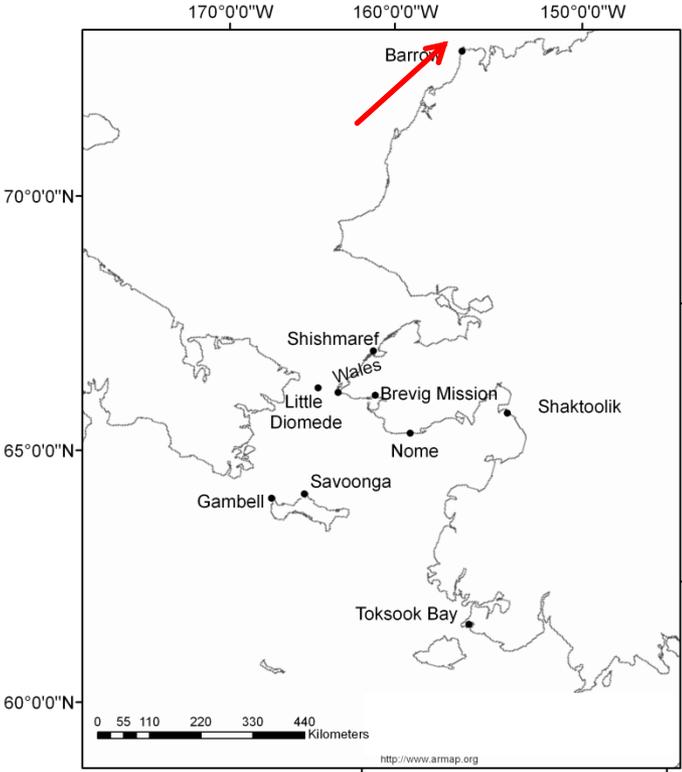
Applications



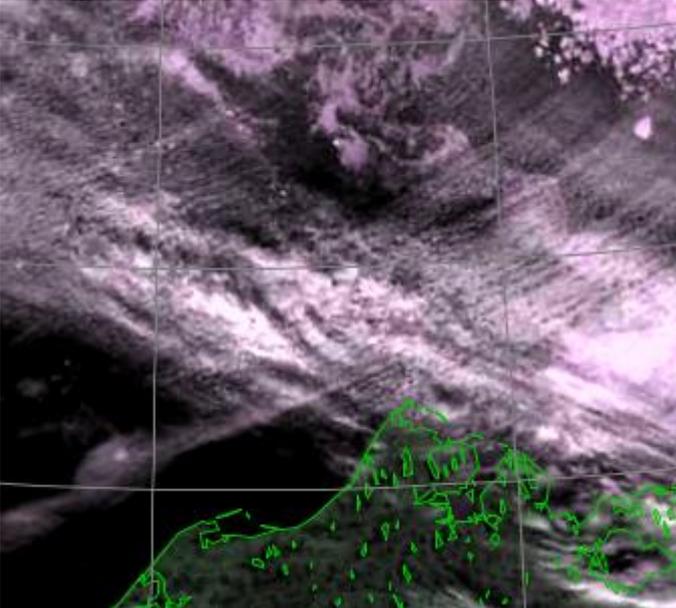
4 June 2007



Applications



21 July 2007



Trends

- ▶ Shorter sea ice observation period from the Sea Ice for Walrus Outlook from 2010-2016
- ▶ Past: end date ~June 25
- ▶ Present: end date~June 7

2016 Archive

9 June 2016
2 June 2016
27 May 2016
19 May 2016
12 May 2016
5 May 2016
28 April 2016

2014 Archive

20 June 2014
13 June 2014
6 June 2014
30 May 2014
23 May 2014
16 May 2014
9 May 2014
2 May 2014
25 April 2014
18 April 2014
11 April 2014
4 April 2014
28 March 2014

2012 Archive

22 June 2012
15 June 2012
8 June 2012
1 June 2012
25 May 2012
18 May 2012
11 May 2012
4 May 2012
27 April 2012
20 April 2012
13 April 2012
6 April 2012

2015 Archive

5 June 2015
29 May 2015
22 May 2015
15 May 2015
8 May 2015
1 May 2015
24 April 2015
17 April 2015
10 April 2015
3 April 2015

2013 Archive

28 June 2013
21 June 2013
14 June 2013
7 June 2013
31 May 2013
24 May 2013
17 May 2013
10 May 2013
3 May 2013
26 April 2013
19 April 2013
12 April 2013
5 April 2013

2011 Archive

24 June 2011
17 June 2011
10 June 2011
3 June 2011
27 May 2011
20 May 2011
13 May 2011
6 May 2011
30 April 2011

Changing ice & young seals

Observations ▾

About ▾



Explore / Observations / Dead Seals



Observation: 4:24 PM, On the community of Wales beach (Village Creek) near the Wales Kingikmiut School we are spotting dead baby spotted and ringed seals washing up on the beach with no signs of lesions or signs of gun shots. They looked like they have washed in after high tide last night to day before. Most appear to have been eaten by seagulls or ravens. The ice has just went out the past couple of weeks with the change in seasons and summer on the rise. The past couple of days we have seen 35 to 40 degree weather. The ice was seen breaking up by sea surf and can see that the ice has gotten rotten in most areas up the beach. The growth of seals and other sea mammals are a great food resource to our community and this is the first time I have seen baby seals wash up in front of the village.

LEO says: It is possible that the early and rapid retreat of the ice has resulted in tough conditions for young seals. See LEO observation by Mike Brubaker with Hajo Eicken and Olivia Lee posted June 27, 2014 and titled: Early ice retreat may explain seal pup mortality.

Contributors

Observer



Robert Tokeinna, Jr.
Diomedes Alaska, Unite...

Tribal President
Wales Native
Corporation

Consultant



Gay Sheffield
Nome Alaska, United St...

Marine Advisory
Program **Bering
Strait**
UAF Sea Grant

Add Comment



Olivia Lee
Oct 18, 2016

Enter Your Comment Here ...

Who can see your comment?

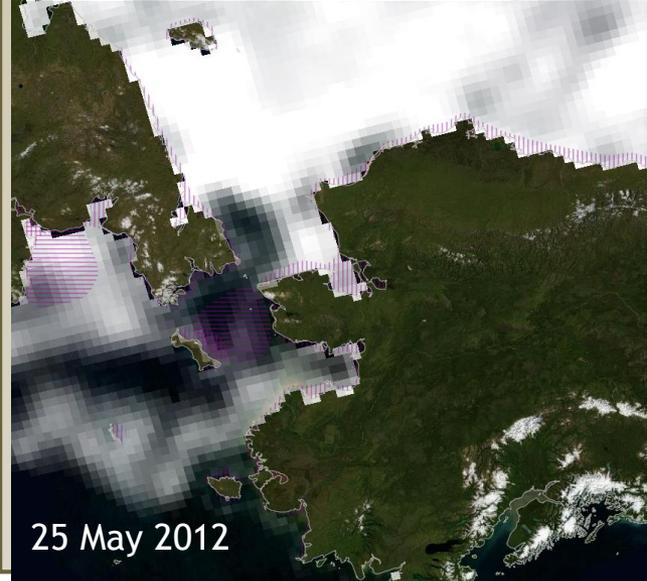
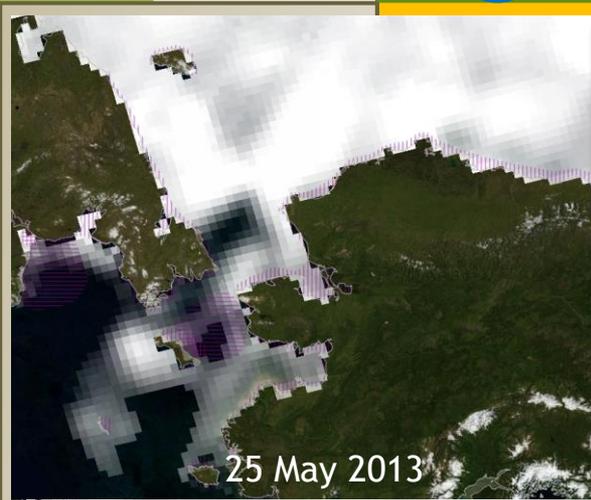
Latitude 65.603567453962

Longitude -168.08687210083

Citation

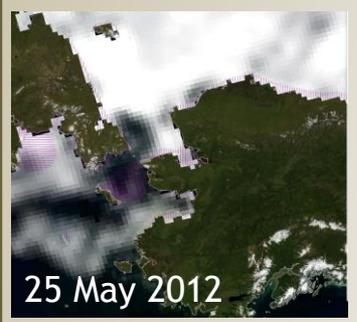
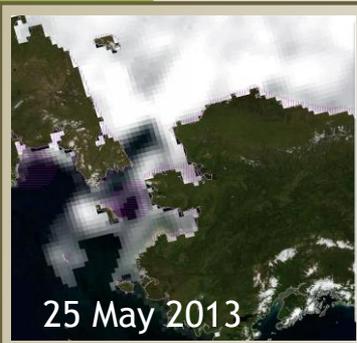
Tokeinna, Jr., Robert, and Gay Sheffield. "Dead Seals." *LEO* / Tribal Health Consortium, Observed 16 June 2014. Web. Acc 2016

Changing ice & young seals



Purple= ringed seal concentration areas Feb-June
(and Oct/ Nov in Kotzebue Sound)

Source: Arctic Marine Synthesis, AOOs



25 May 2013

25 May 2011

25 May 2012

25 May 2007

May 25 2014

25 May 2003

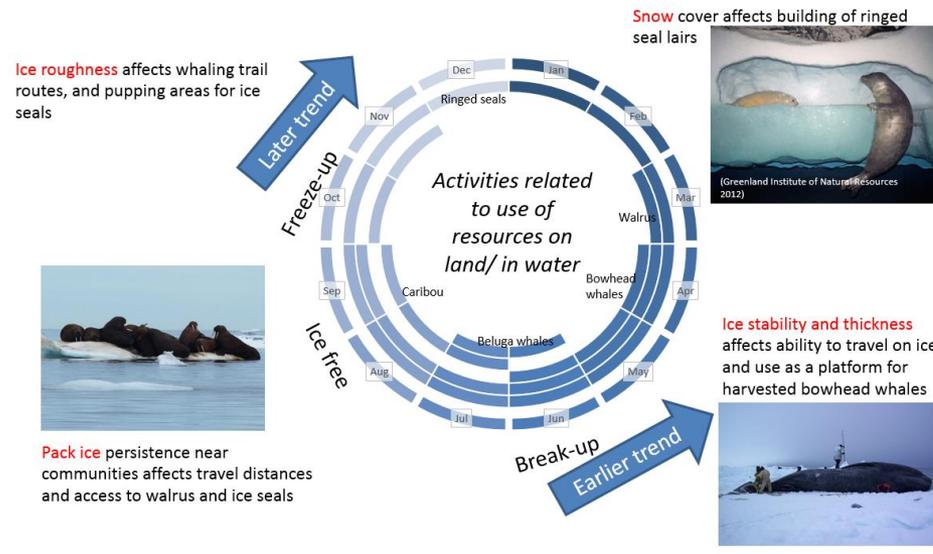


R. Tokeinna Jr. LEO

New efforts

- ▶ Alaska Observatory and Knowledge Hub (www.arctic-aok.com):
 - ▶ Community observations of sea ice and permafrost ice cellars
 - ▶ Instrument measurements of sea ice change

The seasonal cycle framework links community activities of interest to observational data



- ▶ LEO Sea ice project
 - ▶ Unusual observations on sea ice conditions and ice-related animals

Summary

- ▶ Community observers provide an important link between local scale ice observations and remote sensing broad scale observations
 - ▶ Multi-scale approach to monitor sea ice change
- ▶ Local observations of sea ice as habitat
 - ▶ Pack ice visible from shore (walrus and bearded seals)
 - ▶ Presence of fast ice, ice thickness, movements, currents, temperature
 - ▶ Animal behavior: resting, swimming, vocalizing
 - ▶ Variability in ice and lead conditions
- ▶ Network of community observations
 - ▶ Supplements tracking of animal movements
 - ▶ Observations of young animals

Questions?



Acknowledgements

- ▶ Key collaborating sea-ice experts & observers:
 - ▶ Winton Weyapuk Jr. (Wales)
 - ▶ Joe Leavitt (Barrow)
 - ▶ Billy Adams (Barrow)
 - ▶ Paul & Leonard Apangalook Sr. (Gambell)