

Sea Ice for Walrus Outlook

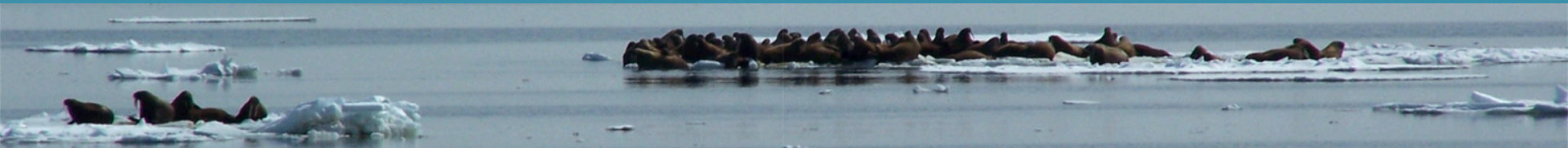
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¹Arctic Research Consortium of the U.S.

²National Weather Service, Alaska Region

Melting Ice, Rising Seas Focus Session

16 November 2016



Arctic Research Consortium of the United States

Connecting Arctic Research Across Boundaries



ARCUS is a catalyst for interdisciplinary thinking, acting, and education leading to the development of highly collaborative partnerships.

Sea Ice for Walrus Outlook (SIWO)

A cross-boundary collaboration

WHAT

Weekly forecasts of weather and sea ice conditions combining operational sea-ice products, model forecasts, and local observations

WHY

To provide subsistence hunters, local communities, and marine resource managers with practical, regional information on weather and sea ice conditions

FUNDING



MANAGEMENT



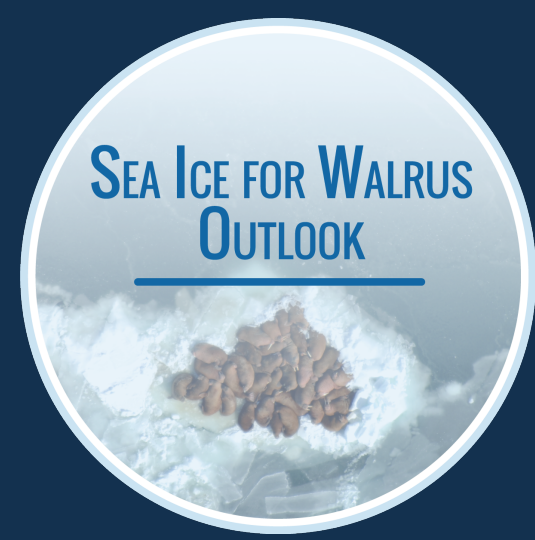
OPERATIONAL PARTNERS



Indigenous
sea ice
experts



Background



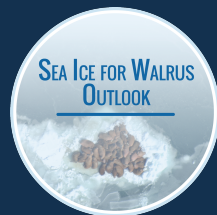
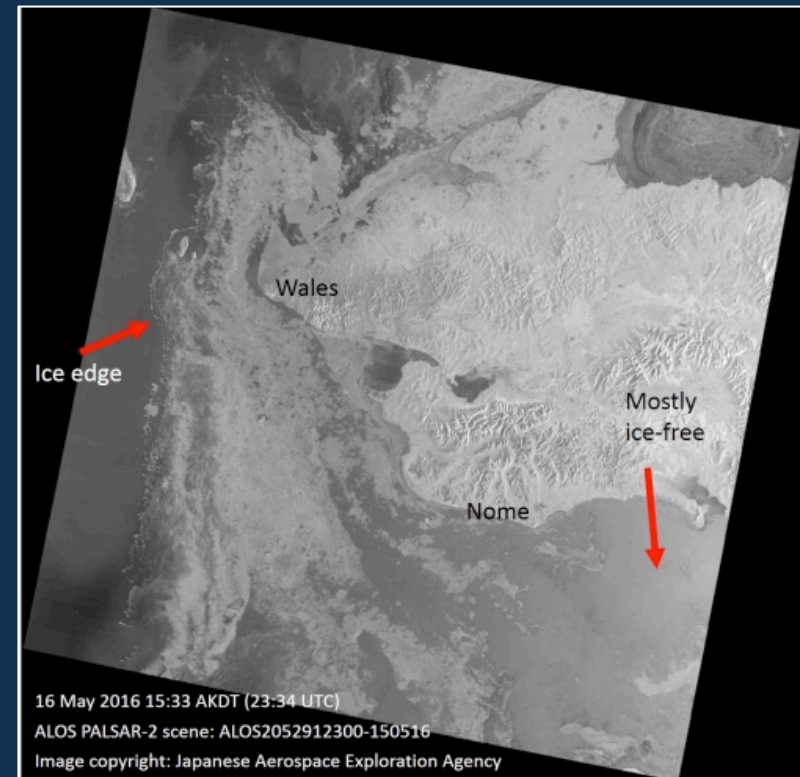
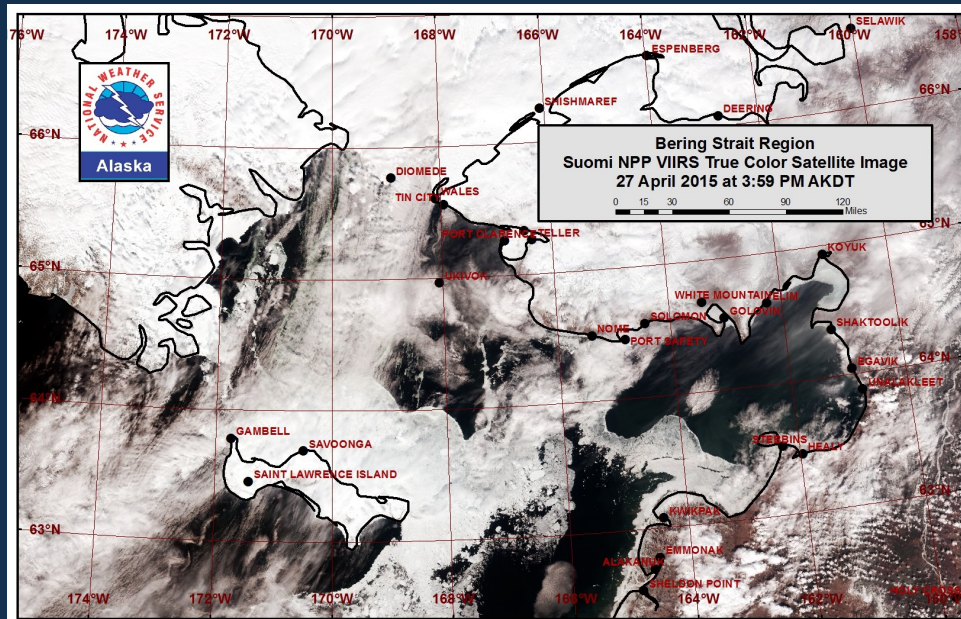
- SIWO launched in 2010 in response to community needs in the Bering Strait
- Format – Weekly forecasts during April – June
- Integration of scientific information and local observations
 - Combined summary of current conditions, ice and weather forecasts, remote sensing imagery, and local observations
- Accessible format – Web, social media

Weekly Outlooks

Sea Ice Products

Remote sensing Data

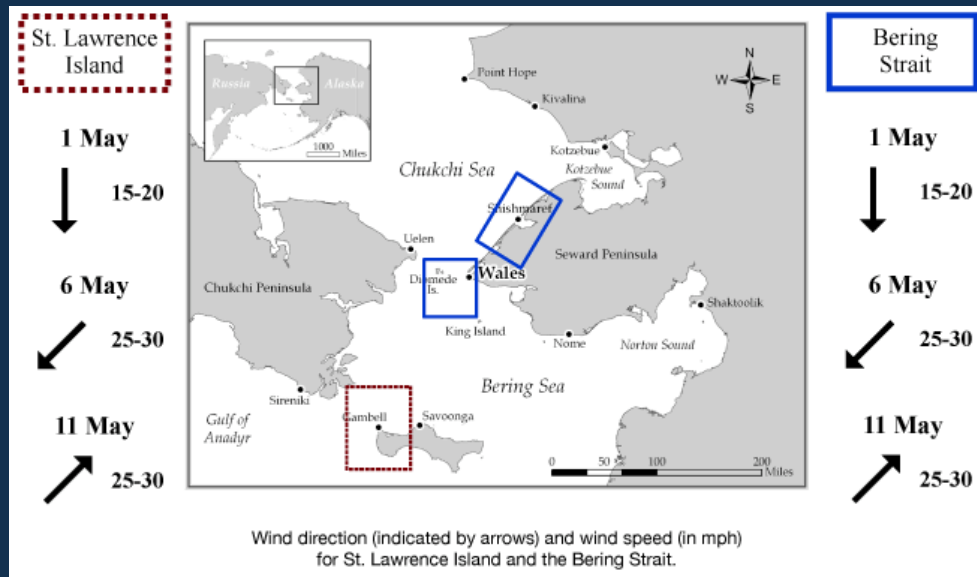
- NASA Aqua & Terra MODIS (Visible & IR)
- SNPP – VIIRS (Visible, IR, and Day-Night-Band)
- Sentinel-1a and -1b (Synthetic Aperture Radar)



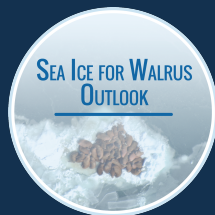
Weekly Outlooks

Model Forecasts

- Forecast discussion
 - Weather system/wind synopsis
 - Temperature trends
 - Assessment of ice conditions relevant to walrus



- 5-day wind forecast
- Core communities bounded by the forecast zones are Gambell, Wales, and Shishmaref



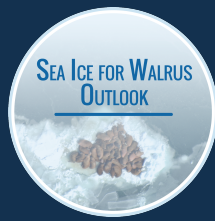
Weekly Outlooks

Local Observations

- Local observations presented alongside scientific information with equal emphasis
- Platform for sharing of knowledge and observations among Bering Strait communities



© Amos Oxereok



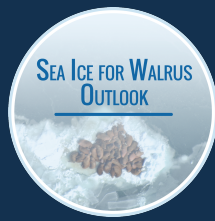
Weekly Outlooks

Local Observations

- Local observations valuable to scientists, industry, and shipping/transportation
- Provides validation of scientific observations, imagery, and models



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Weekly Outlooks

Local Observations



Observations from Gambell

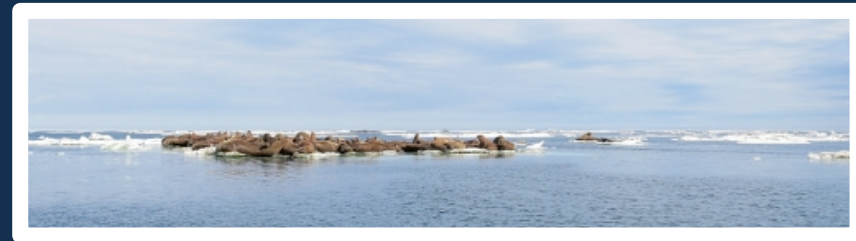
2 June 2016 - Merle Apassingok

Most of the ice has melted and what was left has been taken by the current in the immediate vicinity of Gambell. There is some remnant shorefast ice on the north side of the island. The broken up ice from the Gulf of Anadyr is still expected but it hasn't been seen yet.

Observations from Shishmaref

20 May 2016 - Curtis Nayokpuk

The ice is stable for travel to leads 5 to 6 miles north of Shishmaref, and hunters are having good bearded seal hunts. There are no open, ice-free areas to venture further out from the boat launch and no walrus have been seen yet. Bearded seals will be the main take for now as ice holds and forecasted southerly winds should open up large ice pans for safe travel out for walrus later in the week.

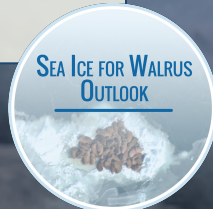


© Curtis Nayokpuk

Applications of ICESat-2

Information need: Sea ice type and distribution

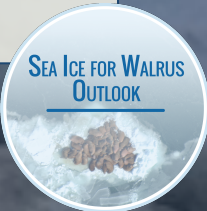
- Directly tied to animal abundance, availability, and behavior
 - Haul-outs – used for resting between feeding events
 - Calving areas – for ice-dependent seals, walrus
- Polynyas – presence of open water areas, biologically productive
- Open water leads – allow access and travel through open water by both humans and wildlife



Applications of ICESat-2

Information need: Tools to support food-security and safety of indigenous communities

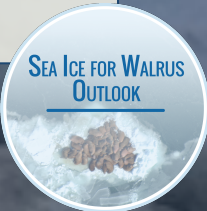
- Unprecedented rates of change make conditions difficult to predict
- Descriptive information on sea ice conditions (freeboard, concentration) is increasingly valuable for travel on or through sea ice
- The SIWO network can readily communicate this new information to our users



Applications of ICESat-2

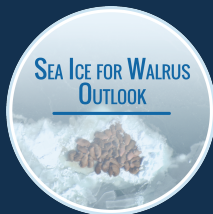
State-of-the-Science and Opportunities

- Visible satellite imagery and SAR currently provide quality observations of sea ice position and concentration
- Challenges:
 - Visible satellite imagery limited by cloud cover
 - SAR limited by geographic coverage in SIWO area
 - Interpretation of sea ice thickness
- Opportunity to improve interpretations of sea ice thickness with ICESat-2 observations



Looking Ahead

- Proposal submitted for community workshop
- Evaluate utility of current outlooks and new information and tools needed by users
- Determine best way to deliver outlook to users
- Consider broader geographic, temporal, and subsistence species support



Get the Outlook!

- Visit the SIWO website
 - <https://www.arcus.org/search-program/siwo>
- Receive weekly outlook emails
- Find us on Facebook
 - <https://www.facebook.com/seaiceforwalrus/>
- Join ARCUS as an organization or individual!
 - <https://www.arcus.org/>



Preliminary Perspectives

Synergistic Opportunities	<ul style="list-style-type: none">• Deliver information from ICESat-2 via existing SIWO network of indigenous and community users• Improved observations of sea ice thickness to support Arctic community food-security and safety
Understanding processes, informing decisions	<ul style="list-style-type: none">• Provide more detailed descriptive information and predictions of sea ice type and characteristics – especially sea ice thickness• Validation/verification of sea ice models
Challenges	<ul style="list-style-type: none">• Direct incorporation of ICESat-2 information into SIWO products – Need frequent, location-specific information in an easy-to-understand format

