



# *NGGPS Community Sea Ice Model Recommendation Workshop*

Rebecca Heim / Gene Petrescu  
NOAA/NWS Alaska Region



# NWS Alaska Region Ice Services

## Excerpts from NOAAs Arctic Action Plan

- NOAA's National Weather Service provides forecast services **to protect life and property**, to enhance the national economy, and to fulfill NOAA's obligations under international treaties for the safety and security of maritime shipping, energy exploration, and tourism activities. Major stakeholders and partners, including the U.S. Coast Guard and the State of Alaska, **require weather, water, and sea ice** information for planning and decision-making to serve communities and to manage the region's many resources. **People in the Arctic rely heavily on aviation, marine weather, and sea ice information for safe transportation and access to goods and services.**
- Weather and sea ice forecasting are closely linked, and forecasts are often provided together. Weather conditions affect the development and movement of sea ice, and the loss of sea ice in the Arctic impacts the weather and climate. The present rate of sea ice loss, with its regional and global impact, creates an urgency **to improve sea ice predictions at all time scales, from the short term (i.e., daily to weekly) to seasonal and decadal time scales.**



# NWS Alaska Region Ice Services

## Scope of Mission

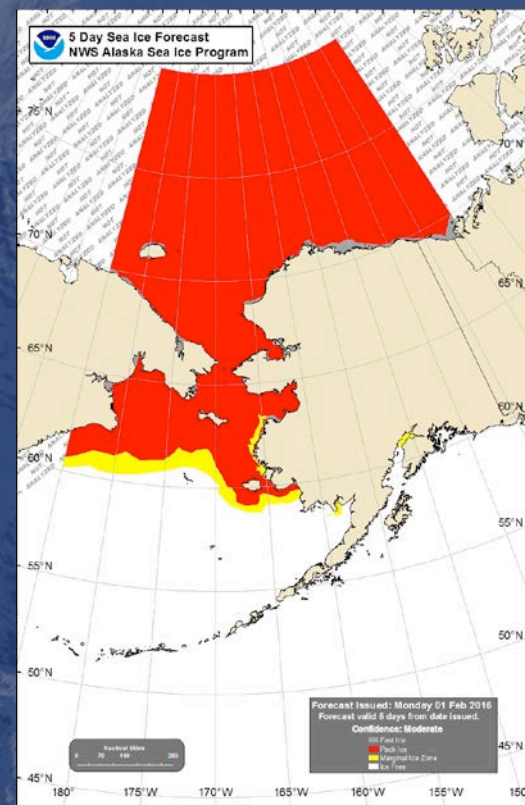




# NWS Alaska Region Ice Services

## Products and Services

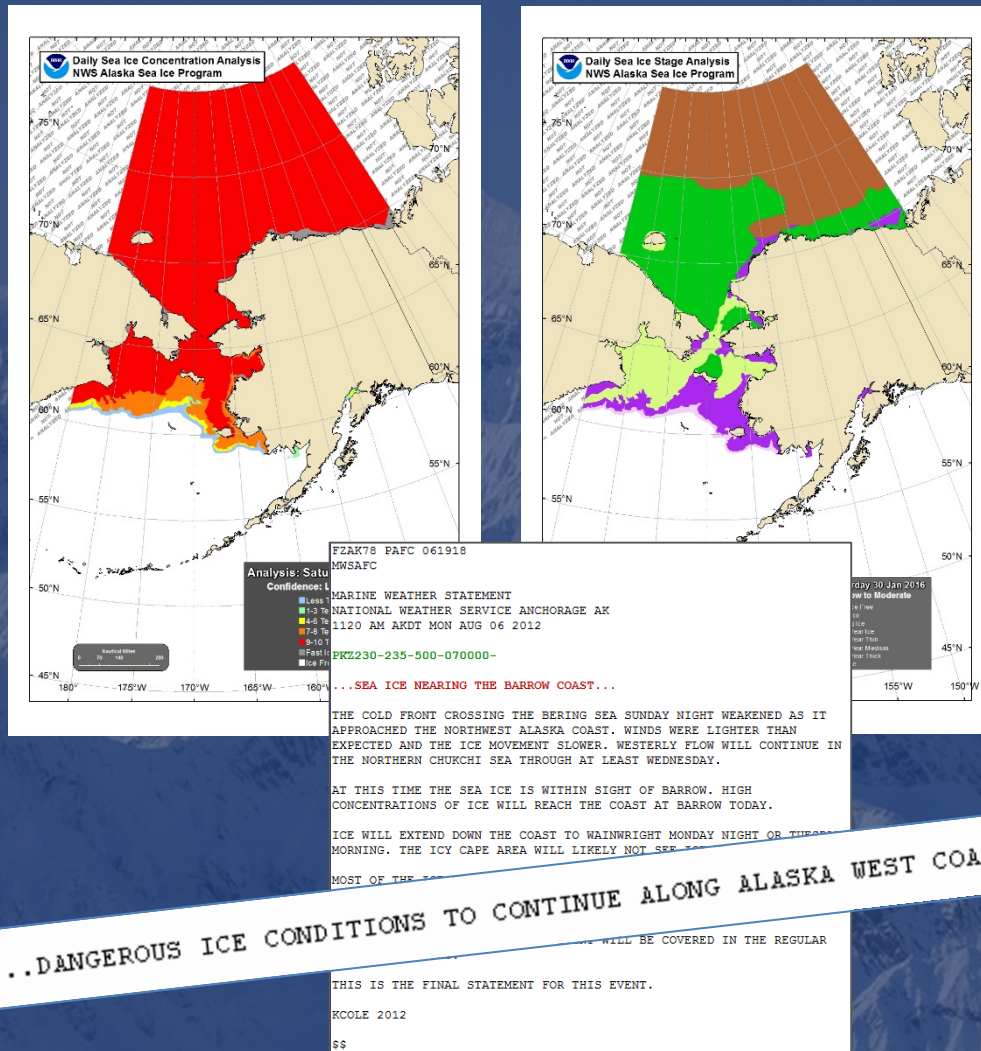
- Daily Sea Ice Analysis
  - Sea Ice Concentration & Stage in WMO standard color mapping & SIGRID data file format
- Daily Sea Surface Temperature Maps
  - Utilizing NASA SPoRT dataset
- Monday/Wednesday/Friday 5-day Ice Forecasts
  - Graphic and Sea Ice Advisory Text Product
  - Forecast Ice Pack, Marginal Ice Zone, Shorefast Ice & Sea Ice Free Waters
  - Currently Utilize ACNFS model output & MMAB Drift model output
  - Also utilize weather models in AWIPS & sea surface temperature fields
  - When available, ESRL-RASM & COAMPS
- Monthly Sea Ice Outlook
  - 3 month window
  - Focused on freeze-up/breakup timing for DSS of stakeholders
- **Detailed tactical decision support services**
  - BOEM
  - Sea Ice for Walrus Outlook (SIWO)
  - Emergency Response for State of Alaska or US Coast Guard





# NWS Alaska Region Ice Services

## Products and Services



- Sea ice analysis and forecast focused on the EEZ
- NWS Weather Ready Nation
  - Fully integrate sea ice into coastal and marine services
- High resolution, local scale for tactical DSS
- Stakeholders:
  - subsistence hunters to ice breakers
- Collaborations with
  - National Ice Center
  - Canadian Ice Service



# NWS Alaska Region Sea Ice Services

- With Rapidly Changing Sea Ice – Many New Emerging Customer Requirements



- Regulatory
- Emergency Response
- Supply Chain Management
- Resource Extraction
- Transportation
- Ecological

Nome Fuel Resupply  
Dec 2011 - Jan 2012



# NWS Alaska Region Sea Ice Services

## Specific Operational Requirements



May 30, 2011 - Sea Ice  
Kotzebue, AK structure damage

- Short Term – Days 1 to 7
  - Ice concentration
  - Ice drift,
  - Ice thickness
  - Land Fast Ice Extent and Dynamics
  - Compressive Strength of Ice
  - Lead Opening Rate
  - Polynya Production
- Weekly - Monthly – Seasonal
  - Ice concentration
  - Ice Thickness
  - Land Fast Ice Extent and Dynamics
  - Dates of Stable Land Fast Ice
  - Dates of First / Last Ice at Key Locations (Coastal and Offshore)



# NWS Alaska Region Sea Ice Services

## Specific Operational Requirements

### A Few Key Physical Parameters

- New Ice Formation
- Transition to Young and First Year Ice
- Breakup Processes
  - Storms (Wind and Waves)
    - Including within the pack and not just at the edges
    - Is Land Fast really Land Fast?
    - Ice Shove Potential
  - Ocean Currents (Dynamic and Thermal)
  - Upper Ocean Mixed Layer Thermal Properties Interacting with the Decaying Ice Pack
  - Shoreline / Bathymetric Stresses
  - Wind Loading and Shear
- Atmospheric Feedbacks
  - Leads and Open Water (Aviation, Freezing Spray, etc)

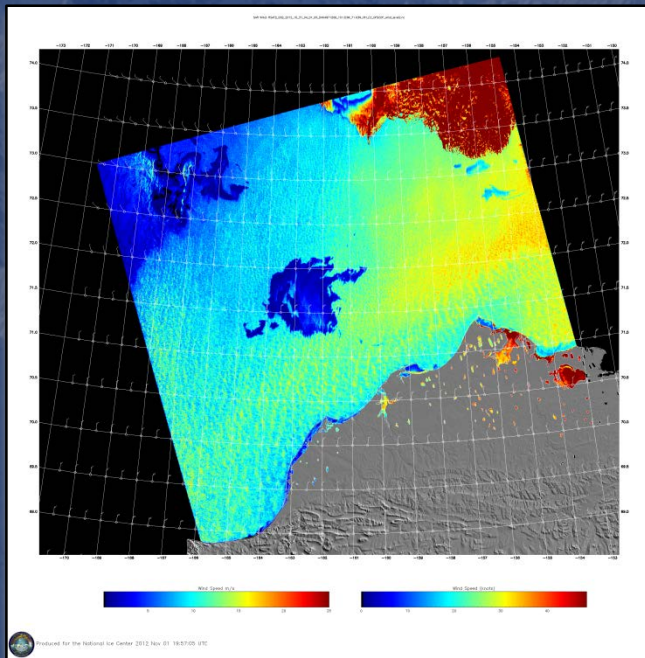






### Verification From the Operational DSS Perspective

- A subset of Verification Schemes may be developed to measure model performance for specific operational requirements
  - First ice/Last ice Ice
  - Concentration / Thickness at certain points and navigable routes
  - Ice distance from the coast (Is the Seaway Navigable?)





# NWS Alaska Region Sea Ice Services

## Verification

### What Should Ground Truth Be?

There are Pros and Cons to All

- SAR
  - Good - High Resolution
  - Good - Capture Thin New Ice
  - Bad - Cost, Availability, Coverage
- AMSR2
  - Good - Long term trends
  - Good - Capture Pack Ice
  - Bad - New Ice
  - Bad - Isolated low concentrations
- Human Analysis
  - Good - Relevant Details
  - Good - Daily dataset
  - Bad - Consistency & Human Interpretation

