

# EXPERIMENTAL Sea Ice Forecasts



The Arctic region is experiencing greater environmental changes than any other place on Earth and at unprecedented rates, including: record-setting, high winter temperatures; annually increasing areas of open ocean in summer; and reductions in sea ice extent, age, and thickness.

SWIPA 2017

## THE NEED

In response to environmental changes, access to the Arctic ocean has increased. Additional presence and activity in the Arctic requires reliable weather and environmental information. Improved ice-ocean-atmosphere, short-term forecasts are critical for many sectors including transportation, energy, tourism, fisheries, and ecosystem, community and emergency management.

## THE SCIENCE

The main objective is to improve predictions of Arctic sea ice by identifying critical (large-scale and local) physical processes, characterizing process-level model deficiencies, and improving model representation of key processes.

## A UNIQUE MODEL SOLUTION

### **Predicting a Dynamic, Complex, and Inter-Connected Ice, Ocean, and Atmosphere**

The NOAA ESRL Physical Sciences Division (PSD) produces 0-10 day forecast guidance products from a coupled model, which takes into account

interactions between Arctic sea ice, ocean, and atmosphere. The model is run daily and a variety of products, such as sea ice extent and thickness, atmospheric winds and pressure, and sea surface temperatures, are posted online each day.

## TESTING 1-2-3

Since 2015, PSD has produced these experimental short-term Arctic sea ice and weather forecasts. The primary research goal was to compare the modeled processes to observations, assess forecast skill, and improve model accuracy.

## PRIORITIES, PARTNERS, AND PROJECTS

Arctic observations are sparse but crucial for understanding the interwoven processes linking the ice, ocean, and atmosphere. Obtaining high-quality measurements is a continuing priority in concert with model improvements and forecast skill assessment.

Comparisons of ice, ocean, and atmospheric measurements obtained by PSD and international partners are being used to analyze and improve

the representation of processes critical for predicting the timing of ice melt and advance.

Access to these experimental forecast products is being provided to forecasters at the National Weather Service Alaska Region Sea Ice Program.

These experimental forecast products are also being evaluated within the NOAA Arctic Testbed to assess the usefulness of ensemble forecasts in predicting sea ice conditions.

These experimental forecast products are being provided as tactical information targeted to support a number of national and international Arctic field campaigns and Year of Polar Prediction projects.

PSD uses the development and improving of an experimental ocean, sea ice, atmosphere coupled modeling system to guide operational forecast system development.

PSD is collaborating with the National Weather Service to 1) evaluate NOAA's Unified Forecast System performance, 2) gain insight into forecaster use of these experimental guidance products for decision making, and 3) assess the skill and utility of providing ensemble model and uncertainty information.

## CONTACT FOR MORE INFORMATION

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