CPO Contributions to Sea-Ice Forecasting

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NOAA/OAR/Climate Program Office

CPO provides support and coordination to advance NOAA climate science and services involving the external community via grants

What’s relevant to sea-ice forecasting?

Areas

Observations and Monitoring

Process Studies and Understanding

Modeling and Prediction

Programs

Arctic Research Program (ARP, Mathis)

Climate Variability and Predictability (CVP, Lucas)

Modeling, Analysis, Predictions and Projections Program (MAPP, Mariotti)

Workshop relevance to CPO:

- The unified system will have CFS as the sub-seasonal to seasonal application.

- NWS/NGGPS program and OAR/MAPP are partnering to support and coordinate the unified model development.

- CPO observations and CVP process modeling are foundational to this development

Arctic Research Program

Serving as a focal point for NOAA's Arctic Observations

Activities include:

- Atmospheric climate observatories around the Arctic
- A long-term ocean and ecosystem observatory in the Bering and Chukchi Seas
- The International Arctic Buoy Program providing real-time observations of air temperature and pressure over the Arctic Ocean.
- A network of ice buoys that provide detailed information on sea ice thickness as well as atmospheric and ocean forcing of sea ice melt.
- Efforts to acquire and analyze climate data and model outputs to detect changes in Arctic climate.

Climate Variability and Predictability

Understanding Arctic Sea Ice Mechanisms and Predictability

CVP FY15 solicitation for proposals that advance the understanding of Pan-Arctic sea ice interactions in any of the following areas:

- Climatic mechanisms that affect Arctic temperatures and growth and/or loss of sea ice.
- Mechanisms, predictability and prediction of regional sea ice variation and change.
- Systematic predictability of the fully coupled climate-ocean-ice system, its driving factors, its state dependence as external forcings change, and whether such predictability can be achieved in operational-like predictions.

11 on-going 3-yr projects started Summer 2015:

- Conducting analysis and experimentation on teleconnections and sea-ice predictability; optimize use of predictability sources in forecast systems including addressing initialization issues.
- CMIP-5 class model settings: GFDL, NCAR and CFSv2.

Modeling and Prediction of sea-ice

MAPP Modeling, Analysis, Predictions, and Projections

Thrusts: Sea-ice data assimilation/analysis, modeling and predictions week-3 to seasonal, and long-term change; partially conditional on new funding availability.

On-going/future activities:

- Sea ice model inclusion in NEMS togother with NGPPS program.
- Seasonal sea-ice hindcasts/forecasts from models contributing to the North American Multi-Model Ensemble (NMME): EC/CMC and GFDL/FLOR for now (concentration and/or extent and or/thickness), CFSv2 and GEOS5 likely upcoming.
- Experimental sea-ice data assimilation for CFS (planned FY16).
- A controlled multi-model sub-seasonal prediction experiment (out to 45 days) with models that include sea-ice (planned FY16).

Questions?

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Backup Slides

Climate Variability and Predictability

Selected CVP Projects

Ding (U Washington), **L'Heureux** (CPC), and co-PIs will investigate how teleconnections between tropical SSTs and high latitude circulation patterns can be exploited for sea ice predictions.

Bitz (U Washington) and co-Pis will investigate methods and develop tools to address issues in building successful forecast systems such as data assimilation techniques, metrics to quantify skill, and will develop effective statistical post processing methods to deal with model biases.

Vecchi and **Winton** (GFDL) will assess the impact of model formulation and model resolution on Arctic sea ice variability and regional predictability.

Liu (SUNY-A) and **Grumbine** (NCEP/EMC) will examine improving seasonal predictability and prediction of Arctic sea ice and associated feedbacks on mid- and high-latitude climate in CFSv2.

Vavrus (Wisconsin), **Holland** (NCAR), and **Wang** (U Washington) will look at extreme Arctic sea ice variations in a rapidly changing climate.

Wanqiu Wang (CPC) and **Jinlun Zhang** (U Washington) will work towards improving initialization of arctic sea ice in NCEP's climate forecast system for advancing long-range predictions.