Modelling for the Year of Polar Prediction (YOPP)

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On behalf of the Polar Prediction Project Steering Group
Mission statement:

Enable a significant improvement in environmental prediction capabilities for the polar regions and beyond, by coordinating a period of intensive observing, modelling, prediction, verification, user-engagement and education activities.
YOPP Core Phase in the Arctic

Satellite snapshots

Extra modelling

Field campaigns

Special observing periods

Launch Event

2017 | 2018 | 2019 | 2020

Core modelling & prediction

Extensive buoy coverage

SOP1 (Feb-Mar) | SOP2 (Jul-Sep)

Launch Event

YOPP Core Phase
YOPP Core Phase in Antarctica

- Satellite snapshots
- Extra modelling
- Field campaigns
- Special observing periods

Launch Event


Core modelling & prediction

SOP
Nov-Feb
YOPP Modelling

A variety of modelling work will be carried out for the Year of Polar Prediction (YOPP). The modelling includes two broad categories:

- Production of Reference Datasets to support a range of YOPP scientific investigations.
- Modelling experiments to study particular scientific issues, in order to improve forecasting in polar regions in the future.
YOPP modelling datasets

Reference datasets

- YOPP Core
  - Dedicated e.g., ECWMF YOPP dataset
  - Operational e.g., AMPS, ECCC

- Datasets of opportunity e.g., TIGGE, S2S, ORA

Experimental datasets

- Modelling and process studies
- Predictability studies
- Teleconnections and linkages
- Observing System design
Reference Datasets

- **YOPP core datasets**
  - Analysis and forecast datasets produced specifically to support YOPP, e.g., ECMWF YOPP Dataset
  - Operational analyses forecasts made available to YOPP by operational forecast centres, e.g., ECCC, AMPS.

- **Datasets of opportunity**
  - Model datasets produced outside YOPP that will provide valuable data for YOPP investigations, e.g., TIGGE, S2S, reanalyses
(Selected) YOPP Core Datasets

**ECMWF YOPP dataset**
- EPS control forecasts (18 km)
- Coupled model from autumn (9 km)
- Process tendencies will be provided
- [http://apps.ecmwf.int/datasets/data/yopp/](http://apps.ecmwf.int/datasets/data/yopp/)

**ECCC YOPP datasets**
- CAPS-RIOPS (A: 2.5 km, IO: 3-8 km, 2 days)
- GDPS-GIOPS (A: 25 km, IO: 1/4°, 10 days)
- GIOPS ensemble (32 days, 20 members)
- Seasonal predictions (1°, 20 members)
- Available through World Mapping Service (WMS)
Experimental Modelling

➤ Modelling and Process Studies
  ➤ Experiments aimed at improving numerical models and their representation of physical processes. The main focus is on the lower atmosphere, sea ice and ocean modelling, and coupling processes.

➤ Predictability studies
  ➤ Studies of the predictability of weather systems in polar regions.

➤ Teleconnections and linkages
  ➤ Studies of the influences of polar regions on lower latitudes, and vice versa.

➤ Observing System Design
  ➤ The aim is to make recommendations to WMO and national meteorological services on the future configuration of the observing system in polar regions.
YOPP Modelling Plan - Components

- Reference datasets
- Experimental datasets
- Model Evaluation
- Outcomes
- Core datasets
  - Modelling and process studies
  - Verification research
  - Model output
- Datasets of opportunity
  - Predictability studies
  - Model diagnostics
  - Plans for consolidation phase
- Teleconnections and linkages
- Observing system design
  - Workshops and meetings
High-resolution model output @ YOPP Supersites

- Provide high-resolution model data at selected supersites
- Thorough model evaluation and verification
- List of sites available in YOPP Modelling Plan
  - Criteria: Location, extra observations etc.
- Period
  - Ideally mid-2017 to mid-2019 or
  - Special Observing Periods in both hemispheres
- Points of contact: Barbara Casati and Gunilla Svensson
Model Evaluation

Modelling teams are requested to output a core set of fields from their experiments in order to facilitate comparisons between models and consistent objection verification of forecasts against observation data, using WMO CBS standards.

To support process studies, output should include more detailed high-frequency output at key observation sites, including designated super-sites and the MOSAiC drifting laboratory.

- **Verification Research**
  - In polar regions, observations are sparse and inhomogeneous. YOPP provides an opportunity for research into new verification approaches. It is important to develop verification measures that account for the needs of users.

- **Model diagnostics**
  - Investment in development of diagnostics, including studies of physical tendencies, will make an invaluable contribution to future model development.
Conclusions

• WGSIP member centers are welcome to provide the output of the models

• Possibility of data denial experiments, especially during special observation periods.
Thank you for attention!