Year of Polar Prediction – Few months left until the YOPP Southern Hemisphere (YOPP-SH) Special Observing Period Commences (Part II)

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Year of Polar Prediction

Coordinated by the World Meteorological Organization (WMO)


Goal: Improving predictions of weather and environmental conditions in polar regions and beyond

- International collaboration between academia, operational forecasting centres, and stakeholders
- Improving the polar observing system, as well as weather and climate prediction models in polar regions

YOPP Infographic available at polarprediction.net
YOPP Core Phase in Antarctica

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

Core modelling & prediction

2017 2018 2019 2020

YOPP Core Phase

WMO OMM
YOPP-Endorsed Projects

YOPP-Endorsed Projects/Initiatives & Institutes
as of 13 July 2018

Legend
- blue: observations
- red: modelling
- green: social sciences
- project
- network / initiative

Institutional Endorsement

86 endorsements
80 project endorsements
6 institutional endorsements
YOPP-Endorsed Projects – Nations involved

THE NUMBER OF PROJECT OF EACH COUNTRIES

- Germany: 12
- USA: 10
- France: 6
- Sweden: 2
- Switzerland: 3
- Spain: 2
- South Korea: 2
- Russia: 1
- Norway: 5
- New Zealand: 1
- Italy: 8
- Iceland: 1
- Canada: 3
- China: 1
- Finland: 1
- Belgium: 4
- Australia: 2
- Chile: 1

(8 June 2018; Juyeon Bae, WMO)
YOPP-Endorsed Projects – Personnel

Personnel Involved in YOPP-endorsed projects: almost 2,000 people.

Antarctic projects: 336 people.

8 Projects didn’t respond to survey

(8 June 2018; Juyeon Bae, WMO)
YOPP-Endorsed Projects – Budget

Total budget YOPP-endorsed projects: $ 360 Million

(8 June 2018; Juyeon Bae, WMO)
YOPP Explorer

http://www.polarprediction.net/yopp-activities/yopp-explorer/

Additional Upper Air Soundings from Neumayer, RV Polarstern and AWIPEV

Alfred Wegener Institute for Polar and Marine Research

To contribute to the special observing efforts of YOPP we plan to increase our radiosounding activity. The three AWI research platforms Neumayer (Antarctica), Polarstern (research vessel) and AWIPEV (Ny Alesund, Spitsbergen) routinely launch one sonde per day. During the "Special Observing Periods" SOP-NH1, SOP-NH2 and SOP-SH we plan to increase the soundings to 4 per day on the platforms in the respective hemisphere. Additionally, we plan to maintain our two automatic weather stations (AWS) in Antarctica throughout SOP-SH. One station is located on Sørøya in the Dronning Maud Land, and one is located on the Fildshuo ice shelf. Both stations report hourly to the GTS.

Additionally to the content in this graphic: the German research vessel will launch four radiosondes from its cruise within the Antarctic Ocean from 15 Dec 2018 to 15 Feb 2019.

Get more information here, visit the website of the project/institute or contact the principal investigator/focal point Helge Schmithusen.
YOPP-Endorsed Project Campaigns

Display projects with a project period in a certain time span or observations during the Special Observation Period:

Start date: 01/11/2018  End date: 28/02/2019

http://www.polarprediction.net/yopp-activities/yopp-explorer/
Extra Radiosonde launches during YOPP-SH SOP

Arctic Special Observing Periods SOP1 & SOP2

SOP1: 1,990 extra sondes from 16 different sites Involving 7 nations

SOP2: almost 2,300 expected extra sondes from Arctic sites and YOPP campaigns
ca 2,380 extra radiosonde launches during YOPP-SH Special Observing Period
More Observational Commitments for YOPP-SH SOP

- Ship observations from the Southern Ocean (Isa Rosso presentation)
- Automatic Weather Stations (Matthew Lazzara)
- Drifting buoy deployments in the Southern Ocean (Ignatius Rigor, remote presentation)
# YOPP-SH Supersites

## Antarctic

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexander Tall Tower</td>
<td>79.012°S, 170.723°E</td>
<td>55m</td>
<td></td>
</tr>
<tr>
<td>Casey</td>
<td>66.281°S, 110.528°E</td>
<td>30m</td>
<td></td>
</tr>
<tr>
<td>Davis</td>
<td>68.577°S, 77.967°E</td>
<td>~ 12m</td>
<td></td>
</tr>
<tr>
<td>Dome-C</td>
<td>75.08°S, 123.34°E</td>
<td>3233 m</td>
<td></td>
</tr>
<tr>
<td>Dumont d'Urville</td>
<td>66.66°S, 140.01°E</td>
<td>0-50 m</td>
<td></td>
</tr>
<tr>
<td>Halley IV</td>
<td>75.58°S, 26.66° W</td>
<td>130 m</td>
<td></td>
</tr>
<tr>
<td>King Sejong (King George Island)</td>
<td>62.22°S, 58.79° W</td>
<td>10m</td>
<td></td>
</tr>
<tr>
<td>Georg von Neumayer</td>
<td>70.65°S, 8.25°W</td>
<td>42 m</td>
<td></td>
</tr>
<tr>
<td>Mawson</td>
<td>67.603°S, 62.874°E</td>
<td>15m</td>
<td></td>
</tr>
<tr>
<td>Syowa (Showa)</td>
<td>69.005°S, 39.589°E</td>
<td>18-29 m</td>
<td></td>
</tr>
<tr>
<td>Jang Bogo (Terra Nova Bay)</td>
<td>74.624°S, 164.229°E</td>
<td>36m</td>
<td></td>
</tr>
<tr>
<td>Amundsen-Scott South Pole</td>
<td>90°S, 0°E</td>
<td>2835 m</td>
<td></td>
</tr>
<tr>
<td>Byrd</td>
<td>80.011°S, 119.438°W</td>
<td>1538.582 m</td>
<td></td>
</tr>
<tr>
<td>Rothera</td>
<td>67.5684°S, 68.1258° W</td>
<td>4m</td>
<td></td>
</tr>
<tr>
<td>Vostok</td>
<td>78.4639°S, 106.83757°E</td>
<td>3,489 m</td>
<td></td>
</tr>
<tr>
<td>McMurd / Scott base</td>
<td>77.846323°S, 166.668235°E, 77.849132°S, 166.768196°E</td>
<td>10m / 10m</td>
<td></td>
</tr>
<tr>
<td>Troll</td>
<td>72.011662°S, 2.535138°E</td>
<td>1,275 m</td>
<td></td>
</tr>
</tbody>
</table>
Model centres provide **model output** for **comparison** with high-frequency **observations** at **YOPP Supersites** (remote talk by Barbara Casati)
ECMWF Operational Ensemble Forecasts
- Period: July 2017 to June 2019
- Analysis fields (fc step 0)
- Coupled forecasts out to day 15
- Tco639 (≈18km) + 91 levels
- Data available on native mesh
- Available through the YOPP Data Portal: yopp.met.no

Sea Ice Forecasts (Arctic and Antarctic) from U.S. NRL
- Period: 1 Feb 2018 to 15 Feb 2019
- Navy Earth System Model (NESM): fully coupled atmosphere-ocean-sea ice model
- Each week, a time-lagged 4 member ensemble starting on Sat-Sun-Mon-Tue is run out 45 days
User Engagement

- Investments in polar observation, modelling and forecasting does not automatically benefit users
- A more contextual understanding of use needed

➢ Presentation Daniela Liggett (PPP-SERA)

after M. Lamers, POLAR2018
YOPP Consolidation Phase

1. Carry out research (SOPs, MOSAiC etc.)
2. Publish key findings
3. Develop overall YOPP synthesis
4. Translate YOPP research into operations and services
5. Finish YOPP
6. Determine the success of YOPP
7. Ensure YOPP legacy
8. Communicate YOPP findings (e.g. ECSs and stakeholders)
Items for Discussion

• Winter SOP in Antarctica
• YOPP-SH Paper after YOPP-SH SOP
• Operational support for YOPP-SH SOP
• extra RS at Dome C (4 RS/day for limited period)?
• next year meeting
The Year of Polar Prediction (YOPP): Improving Polar Weather and Sea Ice Forecasts

Predictive skill is lagging behind in polar regions. And what happens at the poles affects the entire globe. That is why the World Meteorological Organization and partners have launched the Year of Polar Prediction to advance polar prediction capabilities. During Special Observing Periods between mid-2017 and mid-2019, the polar observing gaps will be filled. Researchers and forecasting centres worldwide will analyse the unique data with the goal to better predict, navigate and protect the pristine polar environment and its inhabitants.

Observing Platforms
- Open Water Buoy
- Radio Station
- Argo Float
- Automatic Weather Station
- Sea Ice Buoy
- Satellites

Environmental Forecasting
- Forecasting Centres
- Universities
- Forecast

Forecast Users
- Commercial Ships e.g. Cargo ships and буксерики
- Planes
- Research Icebreakers
- Local communities

Weather and Sea Ice Modelling
To predict weather and sea ice, scientists use weather and climate models - computer programs that divide the Earth’s atmosphere, ice, land and oceans into a network of grid boxes. After being fed with actual meteorological and oceanographic observations, the models calculate how the physical state changes step-by-step into the future.
Year of Polar Prediction (YOPP)

**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.

See [polarprediction.net](http://polarprediction.net) for more introductory materials
YOPP Time Line

**Preparation Phase**
2013 to mid-2017

- Community engagement
- Alignment with other planned activities
- Development of Implementation Plan
- Preparatory research
- Summer school Workshops
- Fundraising & Resource mobilization

**YOPP Core Phase**
mid-2017 to mid-2019

- Special Observing Periods, field campaigns & satellite snapshots
- Dedicated model experiments
- Coupled data assimilation
- Research into use & value of forecasts
- Intensive verification effort
- Summer school

**Consolidation Phase**
mid-2019 to 2022

- Data denial experiments
- Model developments
- Dedicated reanalyses
- Operational implementation
- YOPP publications
- YOPP conference

YOPP Core Phase in the Arctic

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

Extensive buoy coverage

Core modelling & prediction

SOPs:
- SOP1: Feb-Mar
- SOP2: Jul-Sep
- SOP3: Feb-Mar

Years:
- 2017
- 2018
- 2019
- 2020

YOPP Core Phase in the Arctic

WMO OMM
YOPP Special Services Periods (SSPs)

Special Services Periods (SSP)
- Arctic
  - SOP1: Feb-Mar
  - SOP2: Jul-Sep
- Antarctic
  - SOP3: Feb-Mar

YOPP Core Phase
- Core modelling & prediction: Nov–Feb

Launch Event
- 2017

Preparation Phase
- YOPP Core Phase
- YOPP Consolidation Phase

MOSAiC
- 2020