Year of Polar Prediction (YOPP)

Photo: S. Hendricks, AWI

Thomas Jung
Chair of the PPP steering group

Alfred Wegener Institute, Germany
YOPP Summit, 13-15 July 2015, Geneva

Background

- CAS recommends IPY legacy project (Nov 2009)
- WWRP and WCRP hold planning workshops (Oct 2010)
- EC-PORS formulates proposal for GIPPS (Oct 2010)
- Endorsement of Polar Prediction Project (PPP) through THORPEX ICSC (Sep 2011)
- 1st meeting of the PPP steering group (Nov 2011)

Background

1st meeting of the PPP steering group:

- Formulate project goals and activities (2013-2022)

PPP Steering Group, Geneva 2011

Polar Prediction Project (PPP):

Promote cooperative international research enabling development of improved weather and environmental prediction services for the polar regions, on time scales from hourly to seasonal

PPP

WWRP

WMO
OMM

Background

1st meeting of the PPP steering group:

- Formulate project goals and activities (2013-2022)
- YOPP was born

PPP Steering Group, Geneva 2011

Year of Polar Prediction:

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.

PPP

WWRP

WMO
OMM

Why?

Arctic amplification of climate change

Photo from Llodys report

Photo by Chilean Navy/Reuters

PPP

WWRP

WMO
OMM

Why?

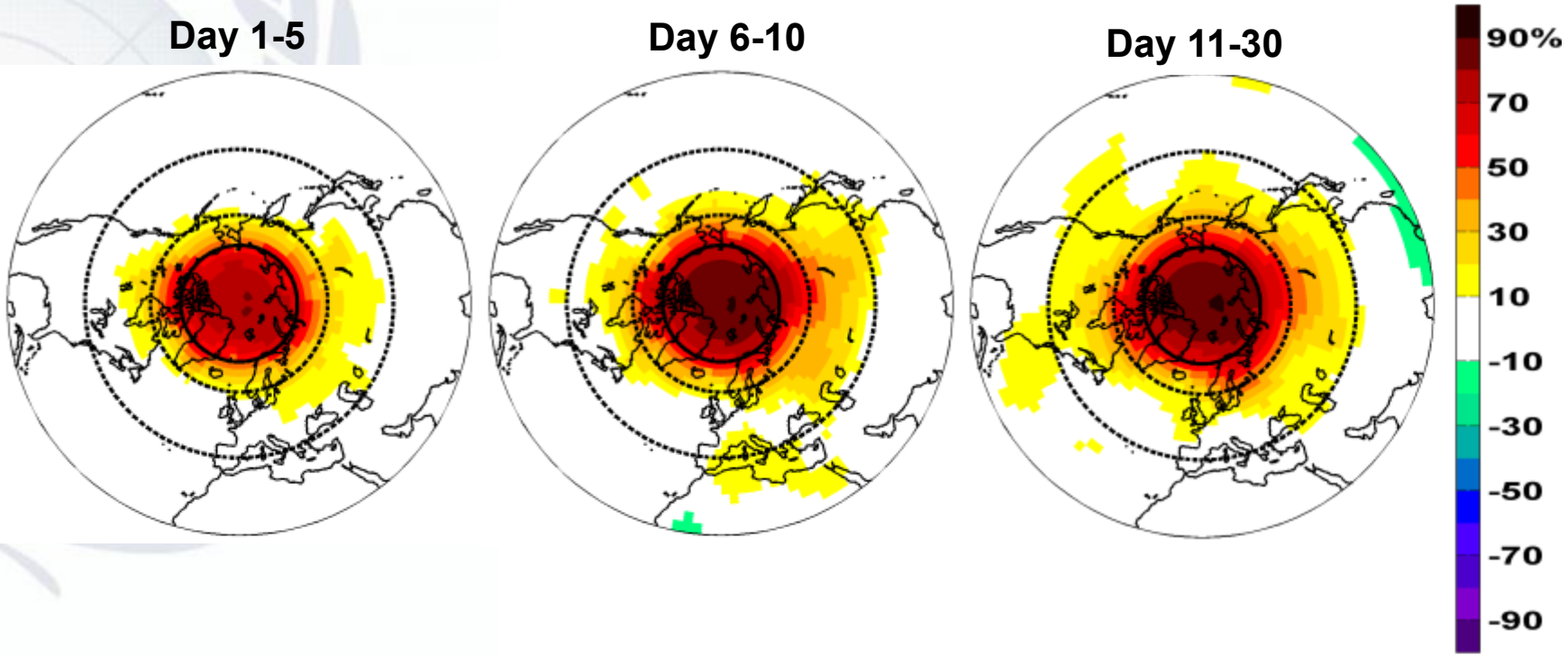
Antarctic Logistics and Safety

- Antarctica is a harsh environment
- Logistical support for research is expensive – more accurate predictions are needed
  - Typical cost is USD100k if a flight from NZ to McMurdo Station has to turn around because of unforecast poor weather at McMurdo
- Tourist expeditions are vulnerable to weather and ice

PPP
WWRP
WMO
OMM

Why?

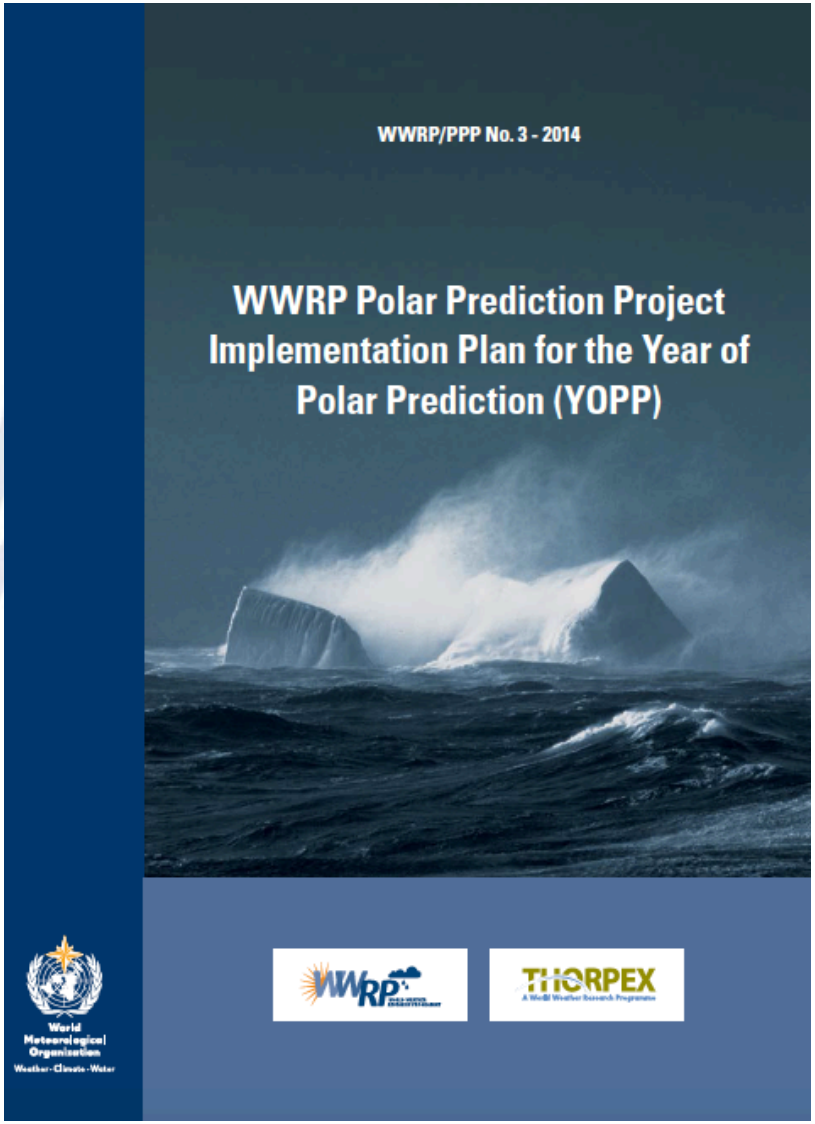
Implications for predictions in lower latitudes



Jung et al. (2014), Geophys. Res. Lett.

PPP
WWRP
WMO
OMM

How?



http://polarprediction.net

YOPP Objectives

- Improve the polar observing system to provide better coverage of high-quality observations in a cost-effective manner.
- Gather additional observations through field programmes aimed at improving understanding of key polar processes.
- Improve representation of key-processes in uncoupled and coupled models used for prediction.
- Develop improved data assimilation systems that account for challenges in polar regions (e.g. coupled processes, sparse data, steep orography).
- Explore the predictability of the atmosphere-cryosphere-ocean system, with a focus on sea ice, on time scales from days to a season.

YOPP Objectives

- Improve understanding of linkages between polar regions and lower latitudes and assess skill of models representing these.
- Improve verification of polar weather and environment predictions to obtain quantitative knowledge on model performance, and on the skill of operational forecasting systems for user-relevant parameters; and efficiently monitor progress.
- Improve understanding of the benefits of using prediction information and services in the polar regions, differentiated across the spectrum of user types and benefit areas.
- Provide training opportunities to generate a sound knowledge base on polar prediction related issues.

YOPP Strategy

- Strenghten linkages between academia, research institutions and operational forecasting centres.
- Establish and exploit special research data sets that can be used by the wider research community and forecast product users.
- Establish a common data archive.
- Link with space agencies.
- Promote YOPP with funding agencies.
- Develop strong linkages with other initiatives.
- Promote interactions and communication between research and stakeholders.
- Foster education and outreach.

Year of Polar Prediction

PPP

WWRP

WMO OMM

YOPP YEAR OF POLAR PREDICTION

MOSAiC

Preparation Phase 2013 to mid-2017	YOPP mid-2017 to mid-2019	Consolidation Phase mid-2019 to 2022
Community engagement	Intensive observing periods & satellite snapshot	Data denial experiments
Alignment with other planned activities	Dedicated model experiments	Model developments
Development of Implementation Plan	Coupled data assimilation	Dedicated reanalyses
Preparatory research	Research into use & value of forecasts	Operational implementation
Summer school Workshops	Intensive verification effort	YOPP publications
Fundraising & Resource mobilization	Summer school	YOPP conference

Year of Polar Prediction

PPP

WWRP

WMO OMM

YOPP YEAR OF POLAR PREDICTION

MOSAiC

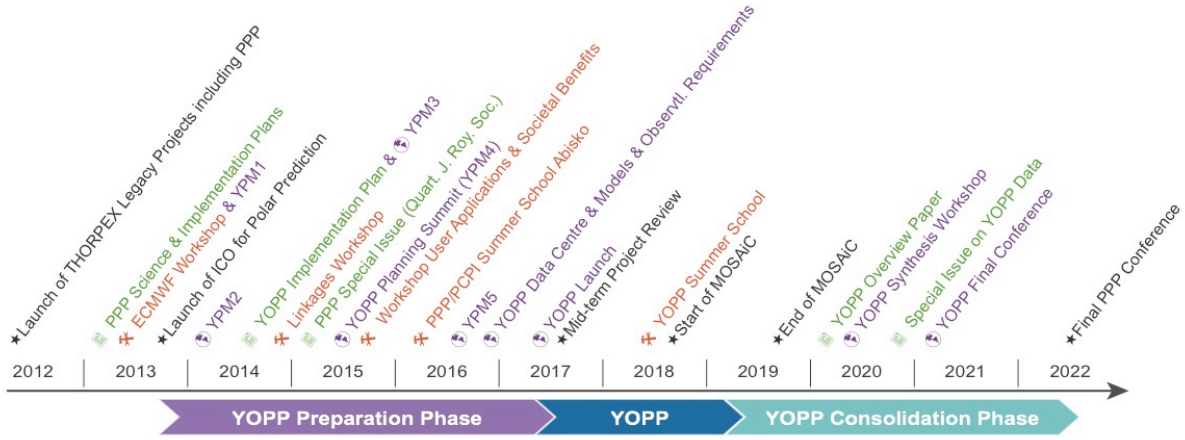
Preparation Phase 2013 to mid-2017	YOPP mid-2017 to mid-2019	Consolidation Phase mid-2019 to 2022
Community engagement	Intensive observing periods & satellite snapshot	Data denial experiments
Alignment with other planned activities	Dedicated model experiments	Model developments
Development of Implementation Plan	Coupled data assimilation	Dedicated reanalyses
Preparatory research	Research into use & value of forecasts	Operational implementation
Summer school Workshops	Intensive verification effort	YOPP publications
Fundraising & Resource mobilization	Summer school	YOPP conference

YOPP Data Archive

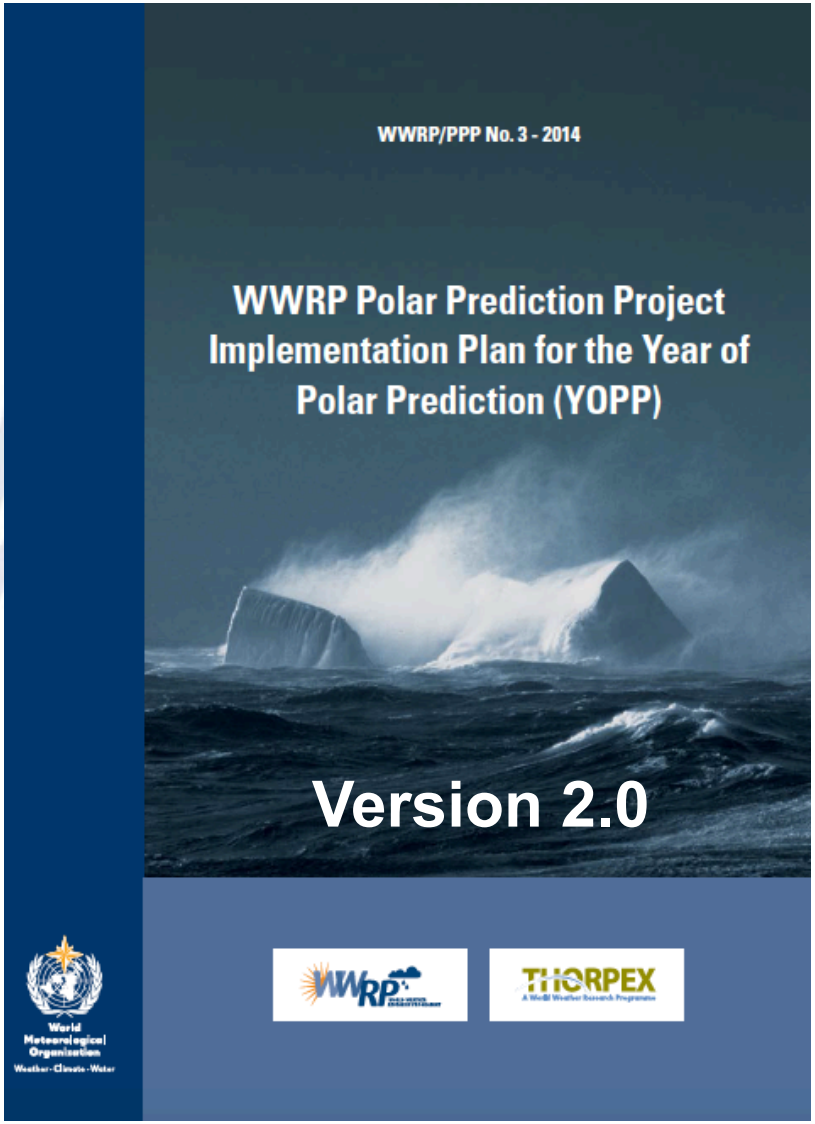
- Allow access to observational, model and forecast data
- Likely to be in the form of a portal with consistent meta data and pointer to other online location, where data can be retrieved
- Mandatory to make data available through the GTS/ WIS, using WMO standards including BUFR
- There should be a special issue on YOPP in the data publishing journal Earth System Science Data
- Data centres such as PANGAEA, that are willing to archive YOPP data, should be identified
- Take into account existing expertise (e.g. IPY)
- For model data, follow the YOTC model

Remarks

- YOPP is a community effort
- Seamless effort is needed
- Engage with stakeholders
- IOPs: When? How many? How long?
- YOPP data legacy
- Identify commitments
- Develop plan for the post Summit period (deadlines, planning workshops...)



Outcomes



http://polarprediction.net

Outcomes

ANNEX 2

Activity Contribution Table

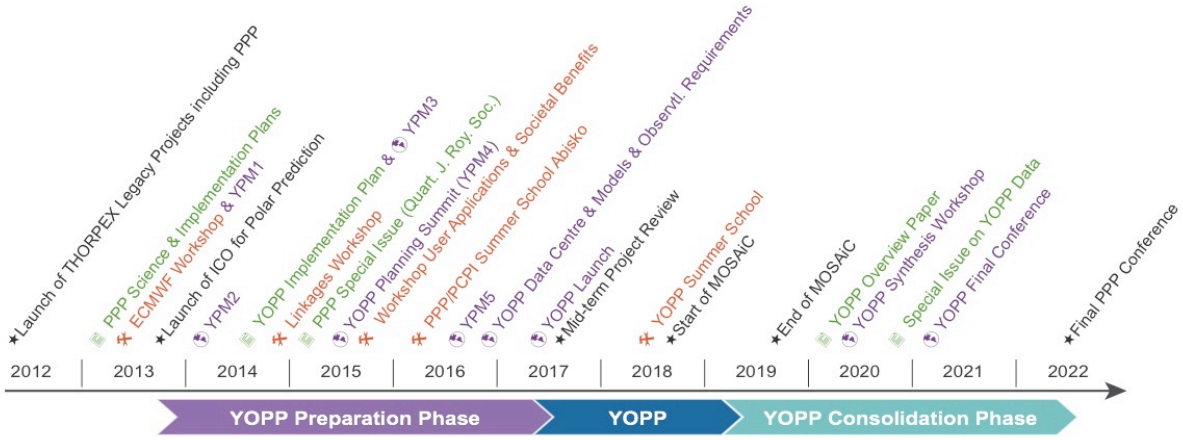
The following is a list of planned contributions to YOPP. These are in *addition* to the existing and very valuable routine operational observational (including research sites in both northern and southern polar regions) and modelling infrastructure.

Importantly, unless otherwise stated, these activity contributions are *indicative* only, and do not represent in any way a binding obligation on the Contributors listed.

This list will be regularly maintained and updated, as planned activities evolve, as the status of commitments can be confirmed, and as additional contributions (which would be most welcome) are offered.

Contributor	Activity	Status
Met Office UK[5]	The Met Office is interested in the scientific investigations planned for YOPP and PPP due to the expected improvements to Met Office models through participation in these projects. There are several operational analysis and prediction systems used at the Met Office for predicting global atmospheric and oceanic weather and seasonal to centennial scale climate. As these models extend into the high latitudes, and atmospheric and ocean processes at high latitudes may impact weather and ocean at mid-latitudes, the performance of these models at high latitudes is important to assess through efforts such as the Polar Prediction Project. In addition the global climate forecasting models are used to investigate possible future climate regimes that could be influenced by and will influence polar processes. Further understanding of the validity of these operational and climate models at high latitude is hoped to be achieved by participation in the modelling and observational components of PPP.	Approved statement, May 2014

British Antarctic Survey	Gather additional observations through field programmes and develop improved representation. Upcoming campaigns and proposals are:
	• MAC (Microphysics of Antarctic Clouds).
	  ○ 2014-2015: BAS.
	• ACRE (Antarctic Clouds and Radiation Experiment).
	  ○ 2017-2018: Australian Antarctic Division – in collaboration with BAS.
	• SOCRATES (Southern Ocean Clouds, Radiation and Aerosol Transport Experimental Studies).
		Suggestions by BAS representative at YPM-2 meeting on 8 April 2014.

Remarks

- YOPP is a community effort
- Seamless effort is needed
- Engage with stakeholders
- IOPs: When? How many? How long?
- YOPP data legacy
- Identify commitments
- Develop plan for the post Summit period (deadlines, workshops....; support through the ICO)