The WWRP Polar Prediction Project

Progress report

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Chair of the WWRP Polar Prediction Project
Alfred Wegener Institute
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Outline

- Progress since the last ICSC
- Link with WCRP PCPI
- Issues
- Conclusions
3rd WWRP-PPP Steering Group Meeting

- 19 participants
- Collaboration with PCPI
- ICO planning
- Review of PPP Implementation and Science Plan
- Link with S2S
- Devise plans for YOPP
- Planning of workshop and YPM
- Agreement on strong involvement of ECS (APECS)
WWRP-PPP Plans

WWRP Polar Prediction Project
Science Plan

WWRP Polar Prediction Project
Implementation Plan
International Coordination Office (ICO)

- AWI agreed to host the ICO:
  - Administrative support
  - Scientific officer
- MoU signed by Michel Jarraud
- MoU to be signed by Karin Lochte
- Go live with ICO website
ICO Draft Website

Polar Prediction Project
A long-term initiative by the World Meteorological Organization’s (WMO) World Weather Research Programme (WWRP) together with the World Climate Research Programme (WCRP).

With the participation of research centres, universities, institutions and initiatives from all over the world.

Set up to understand and evaluate predictability and enhance prediction information and services in polar regions.

Mission Statement

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

Along with this Mission, it is important to note that:

“This constitutes the hours to seasonal research component of the WMO Global Integrated Polar Prediction System (GIPP3).”
# Presentation of WWRP-PPP

<table>
<thead>
<tr>
<th>Date</th>
<th>Meeting</th>
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<tbody>
<tr>
<td>5-9 Nov 2012</td>
<td>WGNE, Toulouse, France</td>
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<td>4-7 Feb 2013</td>
<td>CLiC SSG, Potsdam, Germany</td>
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<td>18-19 Mar 2013</td>
<td>THORPEX HIW planning meeting, Karlsruhe, Germany</td>
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<td>15-19 April 2013</td>
<td>WGNE workshop on systematic model error, Exeter, UK</td>
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<td>24 April 2013</td>
<td>Parliamentarian Lunch Event, Brussels, Belgium</td>
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<td>5-6 May 2013</td>
<td>IICWG workshop, Bremen, Germany</td>
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<td>22-23 May 2013</td>
<td>PSTG-3, Paris, France</td>
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<td>12-14 Jun 2013</td>
<td>THORPEX GIFS-TIGGE Working Group, Exeter, UK</td>
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<tr>
<td>24-27 Jun 2013</td>
<td>ECMWF-WWRP/THORPEX Polar Prediction Workshop, Reading, UK</td>
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ECMWF-WWRP/THORPEX Polar Prediction Workshop, 24-27 June 2013

- Participants
  - 21 speakers
  - ≈ 25 non-speakers
  - 11 early career scientists
- Dedicated poster session (ECS)
- 5 scientific sessions
  - Overview
  - Predictability
  - Observations/data assim.
  - Modelling
  - Verification(diagnostics)
- Breakout groups and plenary
Polar Verification

Comparison of TIGGE medium-range ensemble forecasts (Z500) +072 hr forecast skill (Arctic, 201112–201211)

Control run

wrt own analysis, 65*-90*N, 5-day running mean

Figure courtesy of Mio Matsueda (Univ. Oxford, JMA)
Polar Verification

Peter Bauer (ECMWF)
Stochastic Physics in the Polar Regions

Peter Bauer (ECMWF)
Benefits of high resolution
Example in the McMurdo region

12h forecast of 10m wind field for 12UTC 17 June 2013

David Bromwich (Byrd Polar Institute)
Impact of Polar Meso-scale Storms

The impact of polar mesoscale storms on northeast Atlantic Ocean circulation

Alan Condon¹ and Ian A. Renfrew²

Impact on deep convection in the Greenland Sea

Ian Renfrew (University of East Anglia)
Eurasian Snow Cover and NAO

21-yrs sliding correlations

SAI 20CR OCT vs AO DJF

(SA vs AO NCEP)
(SA vs AO 20CR)

Sliding Correlations

Years


(Peings et al., 2013)
Teleconnections

Control Integration
RMSE MSLP DJF D+10-D+14

Arctic Relaxation
RMSE MSLP DJF D+10-D+14

Jung et al. (AWI)
Teleconnections

MSLP DJF D+10-D+14

MSLP MAM D+10-D+14

MSLP JJA D+10-D+14

MSLP SON D+10-D+14

Jung et al. (AWI)
Teleconnections: Flow-dependence

500 hPa difference day01-day15

Jung et al. (AWI)
ECMWF-WWRP/THORPEX Workshop: Selected Recommendations

- Development of coupled prediction systems (by 2018)
- Develop integrated approach to PBL parametrizations (testing with LES)
- Start now using the observational data that are there (e.g. SHEBA)
- Quantify predictive limits of sea ice (various aspects)
- Workshops (e.g. mixed-phase clouds, sea ice prediction)
- Summer school on Polar Prediction
- Engage shipping community (e.g. obs in North-East Passage)
- Measure ocean properties under sea ice (e.g. salinity)
1st YOPP Planning Meeting

- 23 participants
- Purpose
  - Review and revise existing plans (prioritize)
  - Identify key partners
- Outcome
  - Revised and expanded YOPP plan
  - List of key partners
Year of Polar Prediction (YOPP)

Aims:
- Intensive observational and modelling period to advance polar prediction capabilities
- Research into forecast-stakeholder interaction
- Enhanced verification
- Education of students and early career scientists (APECS)
YOPP: Time line

Preparation Phase
2012-2016

YOPP
2017-2018

Consolidation Phase
2018-2022
1st YOPP Planning Meeting: Some Outcomes

- A total of 51 action items
- Align PPP with MOSAiC
- YOPP period: mid 2017-mid 2019
- Carry out pre-YOPP experiments with SHEBA data
- Provide YOTC-type data set
- Observations: Engage commercial and scientific communities
- YOPP data centre crucial part of the preparation phase
- Verification: Emphasis on sea ice verification
- Education: YOPP summer school (2015?)
- SERA: ???
- Treat *teleconnections* as a separate PPP flagship topic
WCRP Polar Climate Predictability Initiative

**Leads:** Ted Shepherd and Cecilia Bitz

- **Improve knowledge and understanding of past polar climate variability:** Julia Jones and Sarah Gille

- **Assess reanalyses in polar regions:** Dave Bromwich and Jim Renwick
  
  *Jointly with PPP*

- **Assess performance of CMIP5 models in polar regions:** Hugues Goosse and Jennifer Key

- **Model error in polar regions:** Gunilla Svensson and Markus Jochum
  
  *Jointly with PPP*

- **Improve understanding of polar climate predictability:** John Fyfe and Ed Hawkins
  
  *Jointly with PPP*

- **Improve understanding how jets and non-zonal circulation influences the Southern Hemisphere:** Marilyn Raphael and Gareth Marshall
## Next steps

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<tr>
<th>Month</th>
<th>Milestones</th>
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<tbody>
<tr>
<td>Aug 2013</td>
<td>YOPP brochure</td>
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<td>Oct 2013</td>
<td>YOPP planning draft document</td>
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<td>Oct 2013</td>
<td>4&lt;sup&gt;th&lt;/sup&gt; steering group meeting (Boulder)</td>
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<td>Dec 2013</td>
<td>Deadline for special issue on polar prediction in QJ</td>
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<tr>
<td>Spring 2014</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; YOPP planning meeting</td>
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<td>2015</td>
<td>YOPP summer school</td>
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Issues

- Delay in the establishment of the ICO
- Contributions to the Trust Fund
Conclusions

- PPP is on full steam
- ICO to be established very soon
- Very successful workshops
- Long-term funding of PPP is an issue
Thank you!