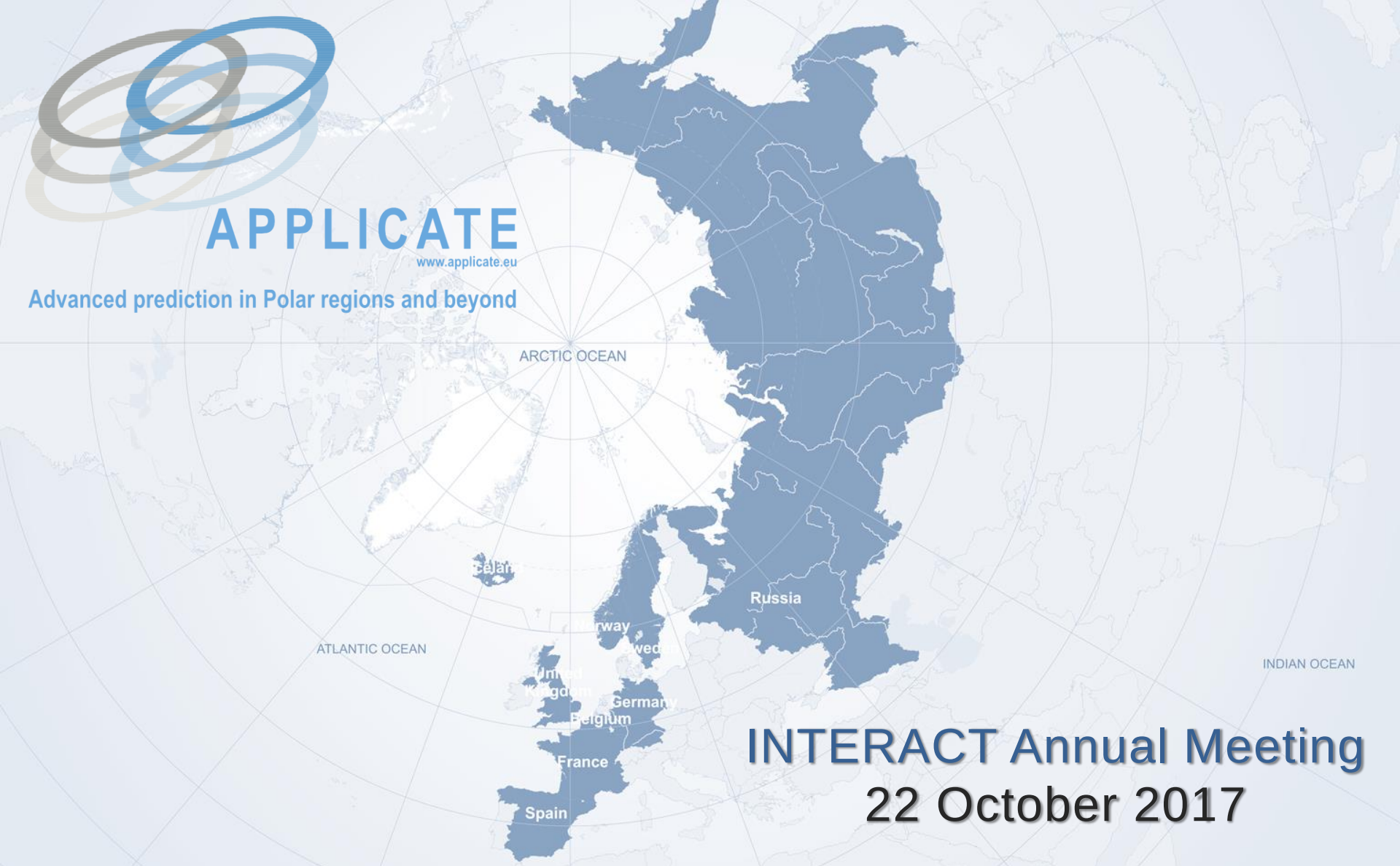
APPLICATE

www.applicate.eu

Advanced prediction in Polar regions and beyond



INTERACT Annual Meeting
22 October 2017

APPLICATE project has received funding from the European Union´s Horizon 2020 research and innovation programme under grant agreement No 727862.

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16 partners from nine countries

ARCTIC PORTAL

VOEIKOV MAIN GEOPHYSICAL OBSERVATORY

INSTITUTE OF OCEANOLOGY OF RUSSIAN ACADEMY OF SCIENCES

Met Office

UNIVERSITAS BERGENSIS

uni Research

ECMWF

UNIVERSITY OF TROMSØ

Stockholm University

University of Reading

Norwegian Meteorological Institute

AWI

cnrs

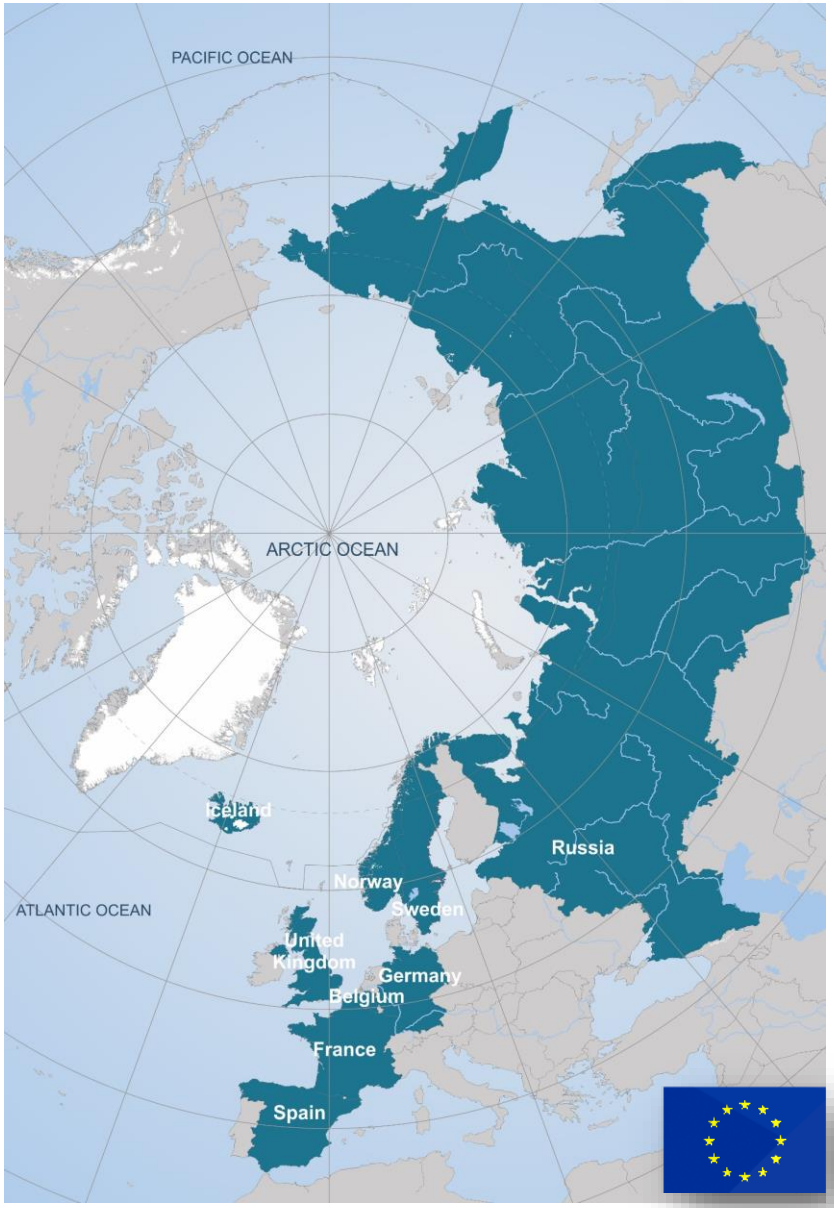
UCL Université catholique de Louvain

CERFACS

METEO FRANCE

BSC Barcelona Supercomputing Center Centro Nacional de Supercomputación

... and many collaborators!



Overview

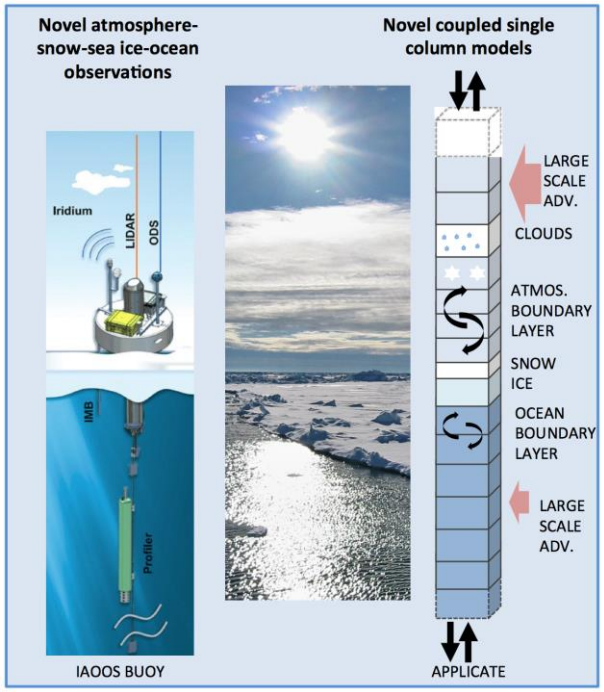
- Budget: €8 Mio + separate Russian contribution
- 1 November 2016 – 31 October 2020 (4 years)

Mission Statement

Develop enhanced predictive capacity for weather and climate in the Arctic and beyond, and determine the influence of Arctic climate change on Northern Hemisphere mid-latitudes, for the benefit of policy makers, businesses and society.

General approach

- Bring together the NWP and climate communities
- Involve experts on the Arctic and midlatitudes
- Engage operational centres for maximizing impact
- Effectively combine models and observations



MOSAiC
The International Arctic Drift Expedition

YOPP
YEAR OF POLAR PREDICTION

Strategy

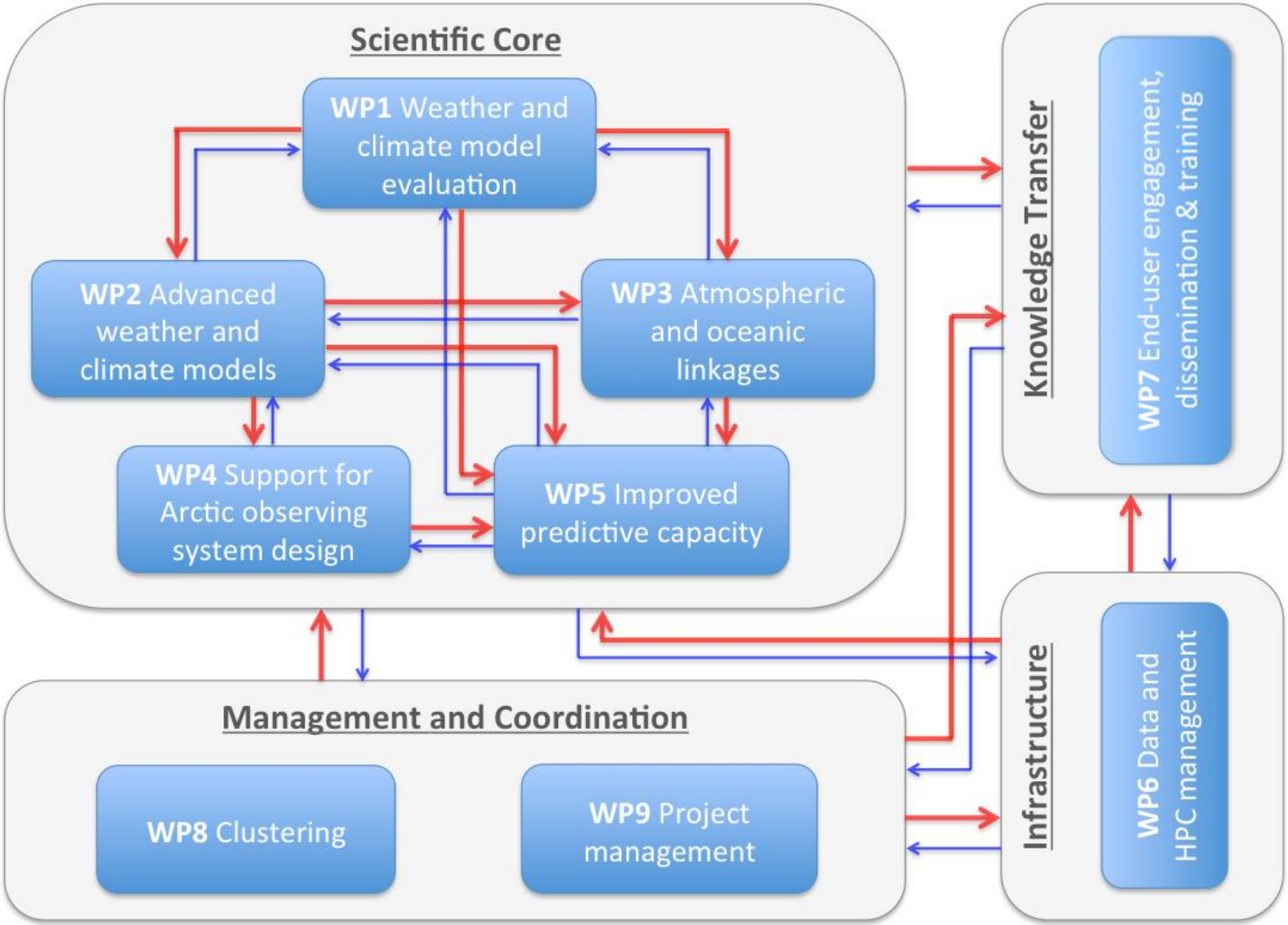
Understanding Arctic-Midlatitude Linkages

- Coordinated multi-model approach
- Employ atmosphere-only *and* coupled models
- Study linkages also from a short-term prediction perspective
- Repeat with enhanced models

Knowledge Exchange

- Focus on three key areas:
  - User engagement
  - Dissemination
  - Training
- Exploit exisiting “channels“ from APPLICATE partners

WP structure



WP1: Weather + Climate model evaluation

Leads: Thomas Jung and Len Shaffrey

So far…

- Developed a Model Assessment Plan
- Progressing with the list of user-relevant parameters for model evaluation
- APPLICATE representative has joined the ESMValTool core development team and linkages to other relevant groups (e.g. SIMIP) established

Upcoming activities:

- Development of process-based and user-relevant metrics for the Arctic and implementation in the ESMValTool
- Evaluation of CMIP5 models and first CMIP6 experiments

WP2 Enhanced weather + climate models

Leads: Gunilla Svensson and Matthieu Chevallier

So far…

- Inventory of planned developments, identification of commonalities (parametrizations, bibliography)
- First case study with the coupled atmosphere-ocean single column model (AOSCM)
- Coordination with YOPP modelling plan

Upcoming activities:

- Further developing components (sea ice features, atmosphere, etc.)
- Finalise and submit description of the AOSCM (GMD)
- Co-sponsored workshops to be held soon (e.g. November in Stockholm)

WP3 Atmospheric + Oceanic Linkages

Leads: Doug Smith and Helge Drange

So far…

- Coordinated experiment design discussed at two international meetings
- Resulted in a new CMIP6 project - Polar Amplification MIP (PA-MIP), to investigate the causes and consequences of polar amplification
- Application submitted to CMIP6 panel for endorsement

Upcoming activities:

- Test experimental design
- Write GMD paper documenting PA-MIP

WP4 Support for Arctic Observing System Design

Leads: Peter Bauer, Thierry Fichefet

So far…

- 1st results from observation impact monitoring of operational ECMWF analysis for the period 2014-2016
- Started assessment of the quality and reliability of existing reanalyses of natural climate variability in the Arctic
- Produced ensemble dataset of sea-ice reanalysis (1979-2016) for generation of initial conditions.

Upcoming activities:

- Start satellite and SYNOP OSE at ECMWF; continue surface pressure buoy OSE including optimal sampling study
- Start optimal sea-ice sampling study: derive coverage and the frequency of sampling needed to achieve skillful predictions
- Continue reanalysis efforts and explore different techniques of initialization by assessing impacts on predictive skill.

WP5 Improved Predictive Capacity

Leads: Virginie Guemas and Morten Køltzow

So far…

- Experimental protocol for stream 1 / stream 2 defined and stream 1 experiments started
- State-of-the art model / forecast quality assessment started (shows larger forecast errors in the Arctic than at lower latitudes)
- Extreme events of particular interest identified: record low winter 2016 sea ice extent and record low precipitation in central Europe

Upcoming activities:

- Stream 1 experiments completed
- Build atlas of prediction scores / score card for stream 1 and other forecast systems / CMIP simulations
- Process analysis – understanding sources of predictability for Arctic sea-ice and its linkages with the mid-latitude climate

WP6 Data + HPC management

Leads: Øystein Godøy and Thomas Jung

So far…

- Development of a Data Management Plan
- Provision of the ECMWF-YOPP Analysis and Forecast Dataset
- Launch of the YOPP Data Portal

Upcoming activities:

- Revision of the Data Management Plan
- Going live with the post processing environment at met.no
  - Hardware is allocated and setup, currently undergoing internal testing to ensure data throughput
  - Developing user guidelines
- Going live with the APPLICATE Data Portal
  - Linking post processing storage environment to the data portal for data publication

WP 7 End-user Engagement, Dissemination + Training

Leads: Halldor Johannsson, Isadora Jimenez, Gerlis Fugmann

So far…

- Established working framework: Communication and dissemination plan / User engagement plan / Training plan
- APPLICATE website, https://applicate.eu/ and other outreach material available and constantly updated
- Polar Prediction Matters (PPM) blog, jointly developed and maintained with YOPP and Blue Action. Launched: 1 September
- Active participation in the EU Arctic Cluster development

Upcoming activities:

- Face-to-face meeting of the User Group at the Arctic Circle Assembly, followed by participation in the APPLICATE General Assembly in Barcelona in January 2018 (6-10 people)
- Encouraging contributions from stakeholders to the PPM blog
- Polar Prediction School 2018 (Abisko, April 2018)

WP8 Clustering

Leads: Thomas Jung and Peter Bauer

So far…

- Coordination related to PA-MIP
- Good collaboration within the EU Arctic Cluster
  - Agreement to coordinate stakeholder engagement
  - Joint organisation of (side) events
- EU Model Evaluation Workshop in Brussels

Upcoming activities:

- Organize EU Model Development Workshop
- Side events at major upcoming meetings (e.g. COP23)
- Scientific session at Arctic Frontiers 2018 with MOSAiC, YOPP, etc.
- Make progress in EU Arctic Cluster Task Teams:
  - Stakeholder
  - Data management
  - Communication

APPLICATE GA 2018: Basic info

15-17 January 2018, Barcelona

Mon 15 Jan AM:

- User Group meeting

Mon 15 Jan PM:

- WP progress reports
- EU-Arctic Cluster session
- Stakeholders talks
- Ice breaker

Tue 16 Jan AM:

- SAB keynote lectures (2x)
- Early career scientist presentations

Tue 16 Jan PM:

- WP breakout groups
- Conference dinner

Wed 17 Jan AM:

- Reports from breakout sessions
- SAB concluding statements
- Joint EB and SAB meeting
- Early career scientist meeting (parallel)

Summary

- In general, APPLICATE is on course
- Some delays in the coming months expected (e.g. hiring, PA-MIP protocol)
- APPLICATE General Assembly 2018 will be next opportunity of getting together

Strategy

Delivering enhanced predictions

- New metrics and diagnostics
- NWP
- Subseasonal to seasonal prediction
- CMIP5/6

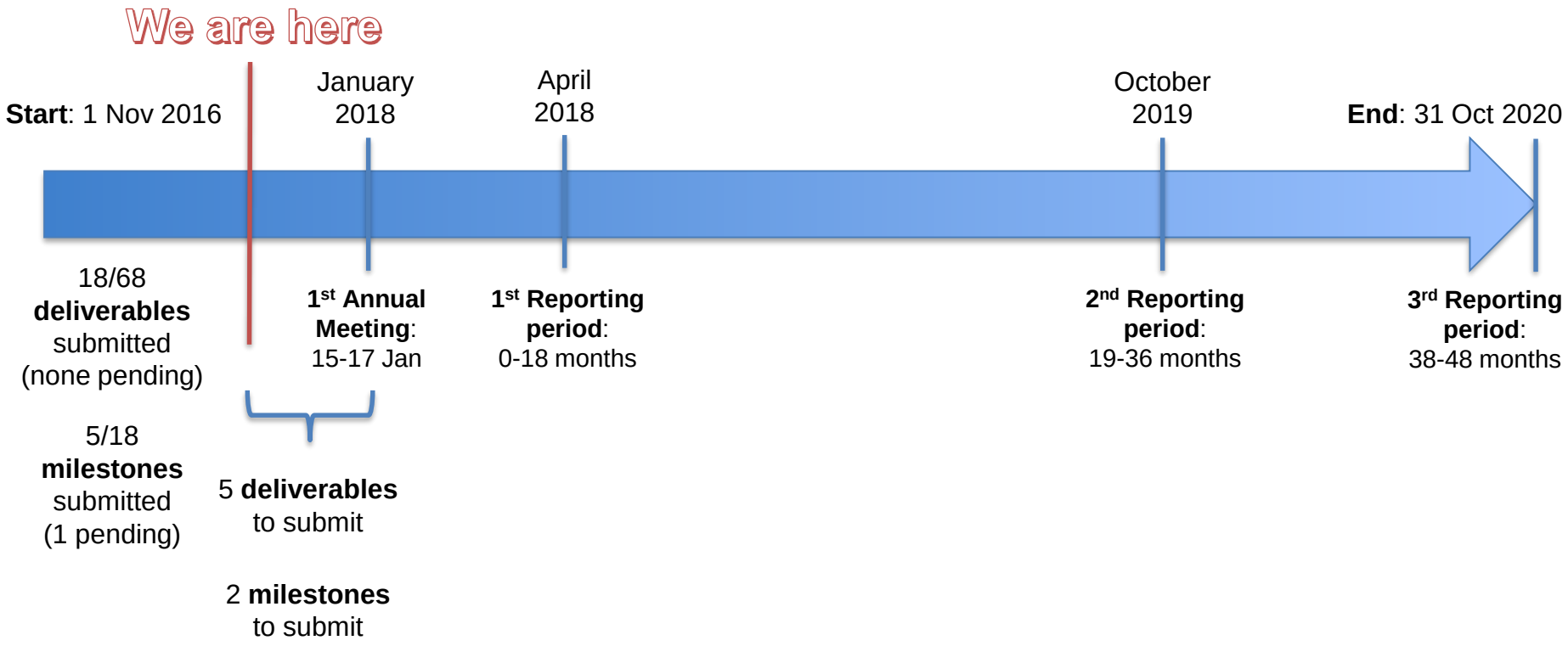
- Enhanced models
- Optimized Arctic observing systems
- Improved initial and boundary conditions

- Enhanced NWP
- Enhanced Subseasonal to Seasonal Prediction
- Enhanced CMIP6

- Presentations
- Reports
- Publications
- Contribution to assessment reports

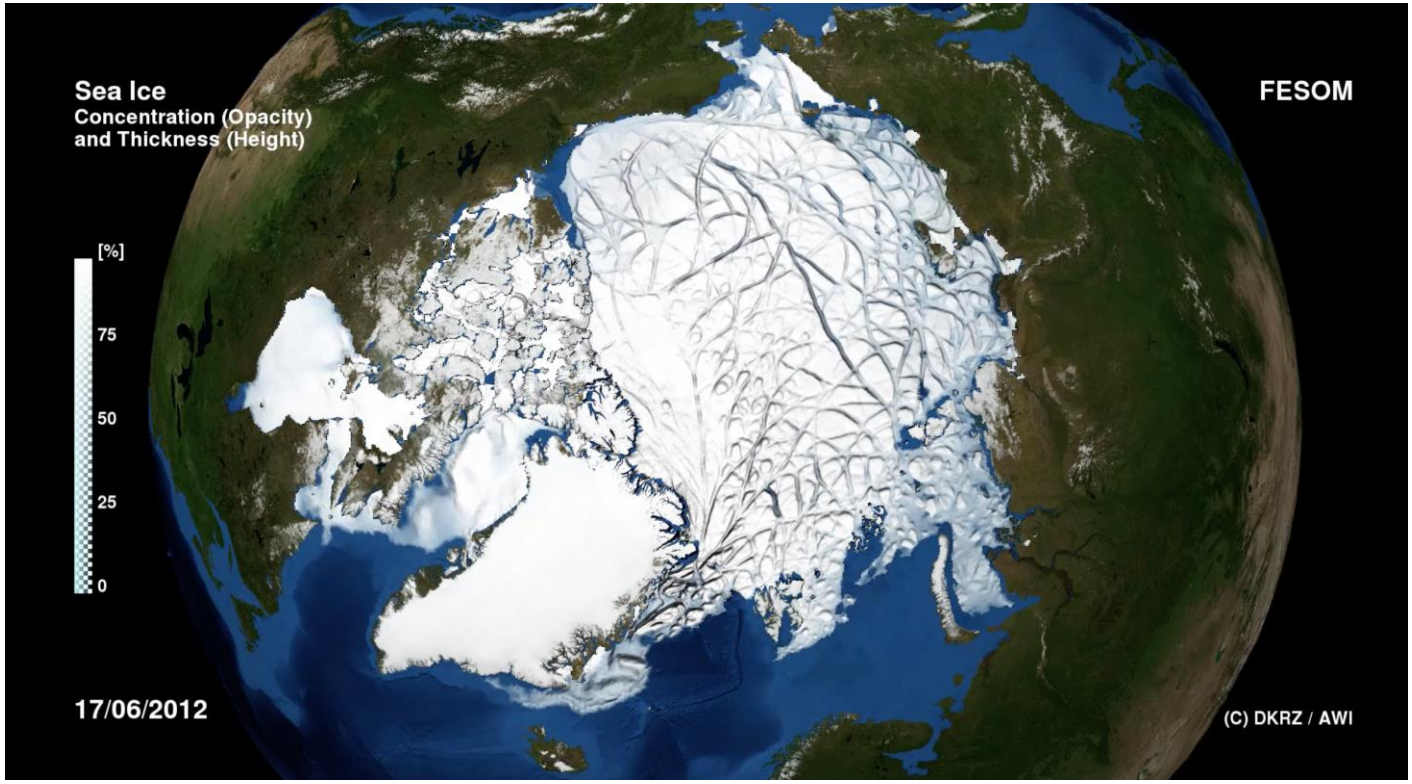
- CMIP6-Interim and CMIP7
- Enhanced operational:
  - NWP
  - Subseasonal to Seasonal Prediction
  - Interannual to Decadal Prediction

Progress


We are here
Start: 1 Nov 2016
January 2018
April 2018
October 2019
End: 31 Oct 2020
18/68 **deliverables** submitted (none pending)
5/18 **milestones** submitted (1 pending)
1st Annual Meeting: 15-17 Jan
1st Reporting period: 0-18 months
2nd Reporting period: 19-36 months
3rd Reporting period: 38-48 months
5 **deliverables** to submit
2 **milestones** to submit

General approach

- Bring together the NWP and climate communities



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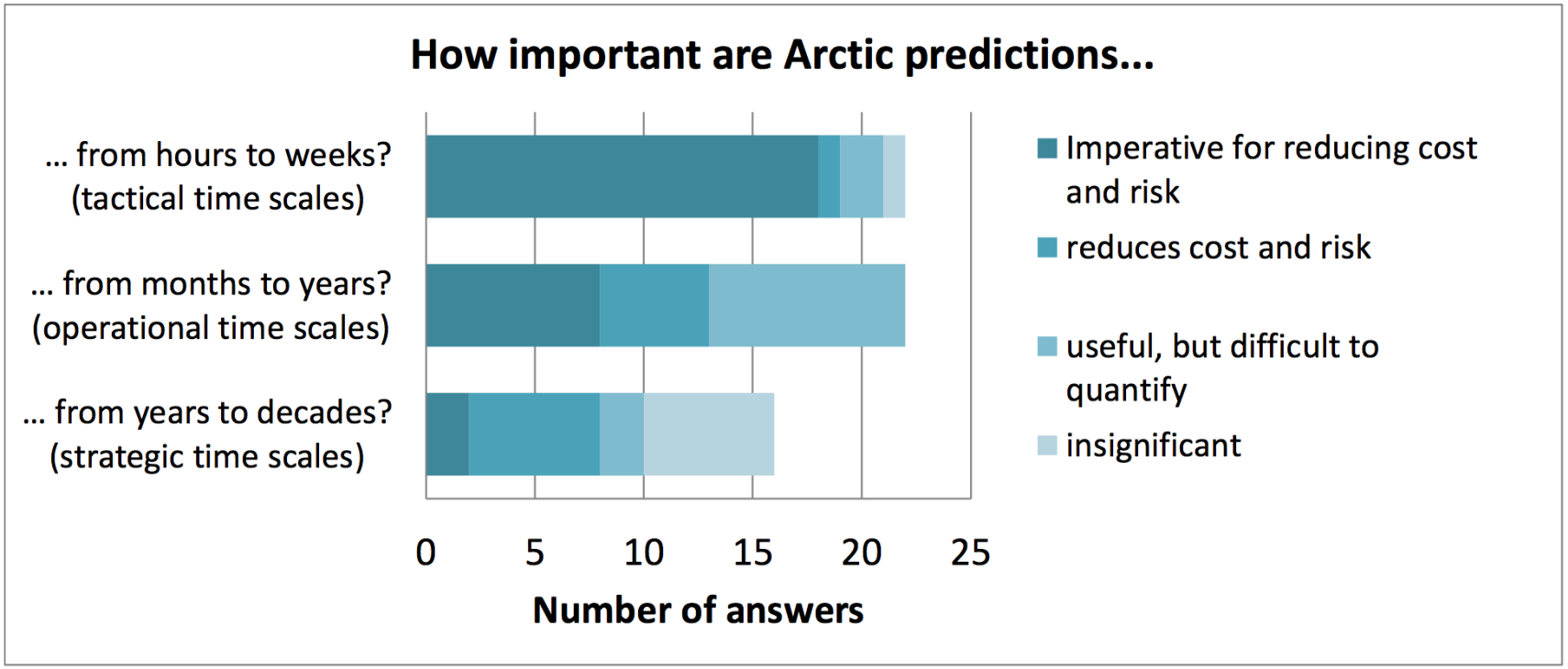

APPLICATE Advisory Board

Name	Area of expertise	Country
Cecilia Bitz	Model developent and sea ice prediction	USA
Gilbert Brunet	Weather and climate prediction	Canada
Clara Deser	Arctic-midlatitude linkages	USA
Veronika Eyring	Model evaluation and CMIP	Germany
Inger Hansen-Bauer	Climate and weather services	Norway
Jean-Noel Thepaut	Copernicus Climate Change Services	UK
Tero Vauraste	Stakeholder representative	Finland