

# APPLICATE

**Advanced prediction in polar regions and beyond: Modelling, observing system design and linkages associated with a changing Arctic climate**

<http://www.applycate.eu>



## **Principal investigator**

Jung Thomas

Thomas.Jung@awi.de

AWI

## **Areas of contribution**

User-aspects and verification

Polar atmospheric processes

Oceanic processes

Modelling and forecasting

Polar-lower latitude linkages

Education

Sea ice processes

Land processes

Data assimilation

Data archiving

Outreach

Policy-relevant / cultural aspects

## **Summary**

APPLICATE will 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.

## **Description**

Arctic climate change increases the need of a growing number of stakeholders for trustworthy weather and climate predictions, both within the Arctic and beyond. APPLICATE will address this challenge and develop enhanced predictive capacity by bringing together scientists from academia, research institutions and operational prediction centres, including experts in weather and climate prediction and forecast dissemination. APPLICATE will develop a comprehensive framework for observationally constraining and assessing weather and climate models using advanced metrics and diagnostics. This framework will be used to establish the performance of existing models and measure the progress made within the project. APPLICATE will make significant model improvements, focusing on aspects that are known to play pivotal roles in both weather and climate prediction, namely: the atmospheric boundary layer including clouds; sea ice; snow; atmosphere-sea ice-ocean coupling; and oceanic transports. In addition to model developments, APPLICATE will enhance predictive capacity by contributing to the design of the future Arctic observing system and through improved forecast initialization techniques. The impact of Arctic climate change on the weather and climate of the Northern Hemisphere through atmospheric and oceanic linkages will be determined by a comprehensive set of novel multi-model numerical experiments using both coupled and uncoupled ocean and atmosphere models. APPLICATE will develop strong user-engagement and dissemination activities, including pro-active engagement of end-users and the exploitation of modern methods for communication and dissemination. Knowledge-transfer will also benefit from the direct engagement of operational prediction centres in APPLICATE. The educational component of APPLICATE will be developed and implemented in collaboration with the Association of Early Career Polar Scientists (APECS).

## **Timeline**

2016-11-01 - 2020-10-25

## **User relevant aspects**

The project has a work package dedicated to user engagement and dissemination. It integrates two main areas of action: communication and dissemination of the project results and user engagement. All the activities will be carefully targeted to different groups of potential audiences (e.g. research community, EU projects, general public) and stakeholders defined as key (business and governmental stakeholders in the Arctic within and outside the EU), primary (meteorological and climate national services, NGOs or local communities) and secondary stakeholders (business stakeholders from mid-latitudes). The interaction with this wide range of stakeholders will be also fostered by the actual involvement and contact of

APPLICATE partners with many of them.

### **Regional emphasis**

Northern hemisphere: Yes

Southern hemisphere: Yes

### **Key project deliverables**

Develop advanced metrics and diagnostics that will be used to observationally constrain weather and climate models.

Improve the representation of Arctic-specific processes in weather and climate prediction models.

Advance our understanding of the mechanisms by which the mid-latitude weather and climate could respond to the substantial Arctic climate change that is expected in the coming decades.

Guide the design of the future Arctic observing system in order to improve our capacity to reanalyse the Arctic climate system and enhance the predictive skill in the Arctic and beyond.

Deliver enhanced weather and climate forecast systems with improved predictive skill for the Arctic and beyond on daily to decadal time scales.

Provide the YOPP Analysis and Forecast Dataset

### **Data management**

APPLICATE is based on a metadata driven approach where datasets are documented in a standardised manner for sharing and preservation. This approach is aligned with relevant activities in the context of GEOSS, WMO, SAON, ICSU and EU (INSPIRE). Metadata will be exposed using machine interfaces, enabling visibility in the relevant catalogues. Through integration with the WMO Information System, information will be propagated to the GEOSS Common Infrastructure. Through application of standardised use of metadata and interfaces suitable for process oriented datasets, higher order services and simplified post-processing analysis in a common post processing environment will be ensured. APPLICATE will use standard formats used in the weather and climate prediction communities (GRIB, NetCDF and CMOR).

All relevant data will be made visible through the YOPP data portal.

### **Is data provided to WMO Global Telecommunication System**

No

**Real-time provision**

N/A