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## **APPLICATE: Advanced Prediction in Polar regions and beyond: Modelling, observing system design and**

### **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).

Barcelona Supercomputing Center - Centro Nacional de Supercomputación

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