Coupled Canadian Arctic Prediction System version 2 – A multidisciplinary approach for coupled forecasting in the Arctic

The Canadian Arctic Prediction System (CAPS) was developed at Environment and Climate Change Canada for the Year of Polar Prediction (YOPP). It started running in March 2018 (June 2018 in coupled mode) before being decommissioned in December 2021. The ocean-sea ice component included tides and a representation of landfast ice at 2-4km resolution in the Arctic Ocean and was coupled to a 3 km resolution atmospheric component. Currently, efforts are being made to reinstate an updated version of this fully coupled atmosphere-ice-ocean system. A multidisciplinary team was set up to suggest improvements to the different components of the system. The atmospheric component will be updated with cloud recycling and a modified radiation transfer scheme. The ice-ocean components will take advantage of an improved initial condition where RadarSat Constellation Mission data is now assimilated. The reinstatement of the system follows new requirements from the Canadian National Defense for better surface visibility, sea ice variables and acoustic detection, but is also expected to be of interest to Canadian agencies providing forecast products to local communities and support to emergency environmental response and transportation in the high Arctic. CAPS serves as well as a testbed for very high-resolution coupling earth systems (e.g., storm surge, wave-ice-ocean interactions) and will take advantage of the observational campaigns carried out during YOPP, namely the MOSAiC expedition, the Iceland-Greenland Sea Project and more recent observational campaigns.

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