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The CONCEPTS Global Ice-Ocean Prediction System: Establishing an Environmental Prediction Capability in Canada

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Here we describe a new system implemented recently at the Canadian Meteorological Centre (CMC) entitled the Global Ice Ocean Prediction System (GIOPS). GIOPS provides ice and ocean analyses and 10 day forecasts daily at 00GMT on a global 1/4° resolution grid. GIOPS includes a full multivariate ocean data assimilation system that combines satellite observations of sea level anomaly and sea surface temperature (SST) together with in situ observations of temperature and salinity. In situ observations are obtained from a variety of sources including: the Argo network of autonomous profiling floats, moorings, ships of opportunity, marine mammals and research cruises. Ocean analyses are blended with sea ice analyses produced by the Global Ice Analysis System..
GIOPS has been developed as part of the Canadian Operational Network of Coupled Environmental PredicTion Systems (CONCEPTS) tri-departmental initiative between Environment Canada, Fisheries and Oceans Canada and National Defense. The development of GIOPS was made through a partnership with Mercator-Océan, a French operational oceanography group. Mercator-Océan provided the ocean data assimilation code and assistance with the system implementation. GIOPS has undergone a rigorous evaluation of the analysis, trial and forecast fields demonstrating its capacity to provide high-quality products in a robust and reliable framework. In particular, SST and ice concentration forecasts demonstrate a clear benefit with respect to persistence. These results support the use of GIOPS products within other CMC operational systems, and more generally, as part of a Government of Canada marine core service. Impact of a two-way coupling between the GEM atmospheric model and NEMO-CICE ocean-ice model will also be presented.