

Séminaire Vendredi 15 Septembre 2017 11h TE / Seminar Friday September 15th 2017
11h ET

Sujet/Subject: Impact of Ocean and Sea Ice Coupling on Global Medium-range Weather Forecasts: Proposition for an Operational Implementation of the Coupled GDPS-GIOPS Forecast Component

Conférencier/Lecturer: Greg Smith (RPN) , together with members of the GIOPS, GDPS and CONCEPTS teams.

Langue/language : Français avec diapositives en anglais (French with English slides)

Résumé/Abstract:

Under the auspices of the CONCEPTS initiative between EC, DFO and DND, an ambitious effort has been underway to develop Coupled Environmental Prediction System for forecasting lead times from hours to seasons. This effort gave rise to a first coupled prediction system for the Gulf of St. Lawrence, which has been running operationally at CCMEP since 2011. A second coupled prediction system for the Great Lakes has also been implemented.

The next step in this effort was the development of a Coupled Global Deterministic Prediction System (GDPS). To this end, the Global Ice Ocean Prediction System (GIOPS) has been developed and implemented operationally at CCMEP. This system provides global ice-ocean analyses and forecasts daily, and has been tailored specifically to provide high-quality surface conditions (sea surface temperature, sea ice concentration) similar to those used in the GDPS.

By combining GIOPS and the GDPS forecast model using the coupling infrastructure developed for the Gulf of St. Lawrence, a Coupled GDPS-GIOPS forecast system has been developed. This system was implemented experimentally in July 2016. The impact of coupling with the ocean and sea ice has been evaluated through a series of forecast trials for the summer 2014, winter 2015 and for September 2015 as well as over the 14 month experimental run. Results show definitive improvements in forecast skill at all lead times, with impacts growing at larger lead times. The largest benefits are focused initially in areas of significant Tropical Cyclone (TC) development (e.g. the West Pacific in summer) and are found to spread globally. Improved scores are associated mainly with the generation of a cold wake in TCs leading to reduced latent heat fluxes and reduced TC intensification. As a result, a significant impact is found on upper level humidity fields on large scales. Due to the inclusion of the physical cooling response of the ocean to TCs, a reduction in the number of unequivocal false alarms is also found. This system will be proposed for operational implementation to CPOP on September 19th to replace the existing GDPS-v5.2.0 (G1) forecast suite.