

Séminaire vendredi le 10 juin 2016 10:00 / Seminar Friday June 10th 2016 10:00h

Sujet/Subject: Impact of Ocean and Sea Ice Coupling on Global Medium-range Weather Forecasts: Proposition for a Coupled GDPS

Langue/language : Anglais/English

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

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 CMC since 2011. A second coupled prediction system for the Great Lakes has recently been implemented as well.

The next step in this effort is 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 CMC. 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 using the coupling infrastructure developed for the Gulf of St. Lawrence, a Coupled GDPS system has been developed. The impact of coupling with the ocean and sea ice is evaluated through a series of forecast trials for the summer 2014, winter 2015 and for September 2015. 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 as a new experimental system to CPOP on June 14th. The experimental pass will permit a deeper evaluation of the impact of coupling on global medium range forecasts over the next year. It is expected that following the

HPC migration that this system will become the next GDPS-G1 forecast suite. In addition to improved forecast skill, this will permit a recalibration of GEM physics based on the inclusion of coupled marine interactions and will facilitate initial research into coupled data assimilation. Coupling with the ocean will also help to avoid over-intensification of TCs as the resolution of the GDPS is increased.