

Impact of Ocean Observations on the ECMWF Ocean DA System and Medium-range Weather Forecasts

Hao Zuo (hao.zuo@ecmwf.int)
Kristian Mogensen (Kristian.Mogensen@ecmwf.int)
Eric de Boisseson (eric.boisseson@ecmwf.int)
Sarah Keeley (sarah.keeley@ecmwf.int)
Linus Magnusson (linus.magnusson@ecmwf.int)

European Centre for Medium-Range Weather Forecasting (ECMWF)

Abstract

Ocean in-situ observations provide information on observed sea states from the surface to a certain depth range and form a vital input for the ECMWF ocean and sea-ice (re)analysis system, providing essential ocean and sea-ice initial states for ECMWF's coupled forecasting system. For medium-range time scales, it is well recognised that prediction skill is largely an initial-state problem. For longer forecast ranges, information from the sub-surface ocean is expected to become increasingly important for the quality of coupled forecasts. However, in specific situations, such as tropical cyclones, the upper ocean can also influence coupled predictions.

In this study, the impact of ocean observations on ocean reanalysis has first been evaluated using observing system experiments (OSEs), in which different ocean observations are withheld from the data assimilation system. The impact of ocean observations on ECMWF's coupled forecasting system has then been assessed by initialising the ocean and sea-ice states from different OSE reanalyses, using a setup similar to that of the operational ECMWF model. We will present results on both the overall impact on medium-range forecasts and the specific impact on tropical cyclone predictions.