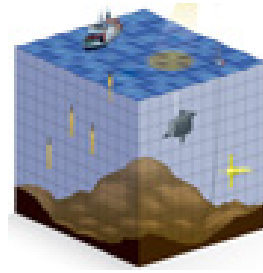


Joint ECMWF/OceanPredict workshop on Advances in Ocean Data Assimilation



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Coupled reanalyses of NorCPM1 contributed to CMIP6 DCP

The Norwegian Climate Prediction Model version 1 (NorCPM1) is a new research tool for performing climate reanalyses and seasonal-to-decadal climate predictions. It has been used for contributing output to the Decadal Climate Prediction Project (DCPP) as part of the Climate Model Intercomparison Project phase 6 (CMIP6). It combines the Norwegian Earth System Model version 1 (NorESM1) with the Ensemble Kalman Filter (EnKF) assimilating SST and T/S-profile observations. NorCPM1 contributed two reanalyses based on anomaly assimilation (AA) to CMIP6 DCP: the first (assim-i1) uses a 1980-2010 reference climatology for computing anomalies and AA only updates the physical ocean state; the second (assim-i2) uses a 1950-2010 reference climatology and additionally updates the sea ice state via AA. First, we demonstrate that the AA successfully synchronises model variability without much affecting the model climatology. Compared to the historical experiment without assimilation, the reanalyses generally have lower RMSE and higher correlation coefficient for both assimilated and unassimilated variables with respect to observations. The model bias in the reanalyses is practically unchanged by AA, even for the biogeochemistry, apart from a reduced sea ice thickness bias in assim-i2 caused by the sea ice update. The two reanalysis products overall show comparable performance, except for the trend of AMOC. To attribute the differences in AMOC trends to the assimilation settings, we consider a new reanalysis (assim-i3) that uses a 1950-2010 reference climatology and does not update the sea ice state via AA. By comparing assim-i1 with assim-i3, we assess the impact of the reference climatology on the reanalysis; by comparing assim-i2 with assim-i3, we assess the impact of the AA update of the sea ice state.

Which theme does your abstract refer to?

Ocean and coupled reanalysis

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