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# Decadal climate predictions with the CMCC-CM coupled OAGCM initialized with ocean analyses.

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In this work the effects of realistic oceanic initial conditions on a set of decadal climate predictions performed with a state-of-the-art coupled ocean-atmosphere general circulation model (OAGCM), under the framework of the COMBINE (Comprehensive Modelling of the Earth System for Better Climate Prediction and Projection) EU Project, are investigated. The decadal predictions are performed in both retrospective (hindcast) and forecast mode. Specifically, the full set of prediction experiments consists of 3-members ensembles of 30-years simulations, starting at 5-years intervals from 1960 to 2005, using CMIP5 historical radiative forcing conditions (including greenhouse gases, aerosols and solar irradiance variability) for the 1960-2005 period, followed by RCP4.5 scenario settings for the 2005-2035 period. The ocean initial state is provided by ocean syntheses differing by assimilation methodologies and assimilated data, but obtained with the same ocean model. The use of alternative ocean analyses yields the required perturbation of the full three-dimensional ocean state aimed at generating the ensemble members spread. A full-value initialization technique is adopted. The predictive skill of the system is analysed at both global and regional scale as well as the processes underlying the enhanced predictability exhibited over specific regions (most notably, in the North Atlantic).