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Seasonal-decadal prediction with the EnKF and NorESM

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Skillful predictions on inter-annual to decadal timescales can fill the present scientific and mitigation gaps between the established fields of seasonal forecasting and future climate change projection. Up to decadal time scale, climate prediction skill depends on the accuracy of the initial conditions and in particularly of the ocean. Initialization of the ocean in a fully coupled system is challenging because sea surface temperature is the only ocean observation available over a sufficiently long period of time to demonstrate skill for decadal timescale. The Norwegian Climate Prediction Model (NorCPM) assimilates the stochastic HadISST2 product with the Ensemble Kalman Filter into the ocean part of a CIMP5 fully coupled ESM (Norwegian Earth System model, medium resolution). A modification of the state vector is applied to ensure conservation of the assimilation method with the Lagrangian coordinate ocean model. The system is demonstrated in hindcast mode for the period 1980-2005 when independent observations are available. The system shows skill for independent observations during analysis and prediction.