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Assimilation of sea ice in an Earth system model and its impacts for climate prediction

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Here, we aim at testing the added value of assimilating sea ice concentration within the Norwegian Climate prediction Model (NorCPM) that combines the Norwegian Earth system model with the Ensemble Kalman filter data assimilation method. We first employ an idealised twin experiment to identify the optimal strategy to assimilate ice concentration in a fully coupled Earth system model that is using the multi-category CICE model. It is found that: 1) updating the concentration of each individual category can yield large improvements of concentration and thickness without introducing a drift 2) joint coupled update of the near surface ocean and sea ice enhances the performance of the ocean and sea ice component. This setting is tested in real framework in combination with assimilation of SST and sub-surface data. The performance of the reanalysis covering the period 1980-2010 and of seasonal prediction will be presented.