International workshop on seasonal to decadal prediction
Toulouse, France, 13-16 May, 2013

Towards prediction of climate variability in the Nordic Seas with NorCPM (NorESM+EnKF)

Ingo BETHKE

Bjerknes Center for Climate Research, Norway, ingo.bethke@bjerknes.uib.no
Francois Counillon, Mats Bentsen, Laurent Bertino, Tor Eldevik, Noel Keenlyside, Øystein Skagseth
Presenter : Ingo Bethke

Climate change on interannual to decadal time scales is dominated by the evolution of unforced, internal climate variability. Observation-based initialisation of model internal variability is therefore key to successful short-term climate predictions. We present the first steps towards such predictions with the Norwegian Climate Prediction Model (NorCPM), the Norwegian Earth System Model (NorESM) with added capability for advanced data assimilation using the Ensemble Kalman Filter (EnKF). Early results from a model-model prediction experiment with synthetic SST assimilation show particularly high potential for predicting decadal heat content variability in the Nordic Seas. Climate variability in this region is of key interest due to its modulating influence on large-scale ocean circulation and sea ice extent, with the latter potentially being important for extreme winter events over Europe. The skill of the EnKF initialised prediction is benchmarked against the following: an ensemble of free runs; an ensemble of perfectly initialised, potential predictability runs; and a persistence forecast. The EnKF initialised prediction for upper ocean heat content outperforms persistence and comes close to the skill of the perfectly initialised predictions in the Nordic Seas region. Benefits from the SST assimilation are seen in hydrography, ice concentration and atmospheric temperature up to a forecast lead of 5 years.