Geophysical Research Abstracts
Vol. 17, EGU2015-4052-2, 2015
EGU General Assembly 2015

Decadal predictability of SST in the Atlantic domain of the Nordic Seas in three CMIP5 models

Helene R. Langehaug (1,2), Daniela Matei (3), Tor Eldevik (2,4), Katja Lohmann (3), Yongqi Gao (1,2,5)

(1) Nansen Environmental and Remote Sensing Center, Bergen, Norway, (2) Bjerknes Centre for Climate Research, Bergen, Norway, (3) Max Planck Institute for Meteorology, Hamburg, Germany, (4) Geophysical Institute, University of Bergen, Bergen, Norway, (5) Nansen-Zhu International Research Center, Institute of Atmospheric Physics, Beijing, China

We have investigated the predictability of sea surface temperature (SST) in the Nordic Seas and Barents Sea, using initialized hindcast simulations performed with three state-of-the-art climate models (MPI-ESM-LR, CNRM-CM5, IPSL-CM5-LR). Initialization of the hindcasts follows the CMIP5 decadal prediction experimental protocol. These hindcasts have been compared with SST observations over the time period 1961 – 2010. Here we have a special focus on the so-called Atlantic domain of the Nordic Seas - the eastern part of the Nordic Seas - where Atlantic Water has its main imprint on the ocean surface. Only MPI-ESM-LR has significant skill in reproducing the observed SST variability in the Atlantic domain at both short and longer lead-time (1-3 yrs and 6-10 yrs, respectively). The two other models show significant skill at either short (CNRM-CM5, at 1-3 yrs) or longer lead-time (IPSL-CM5, at 4-6 yrs). Furthermore, the skill at these lead times is higher than the skill of the persistence forecast, underlining the potential role of ocean dynamics in bringing predictability to the Nordic Seas and Barents Sea. In order to understand why the three models differ, we have investigated spatial maps of predictive skill at different lead times. Regions of high skill appear to move as forecast time progresses from south to north within the Atlantic domain in MPI-ESM-LR and IPSL-CM5. This could be related to the northward advection of SST anomalies along the flow path of the Atlantic Water, contributing to higher skill at longer lead-time. In MPI-ESM-LR, there is a clear connection between predictability in the subpolar North Atlantic and the Nordic Seas. On the other hand, in the two other models this connection appears to be lost or less obvious.