



## Decadal to inter-annual variability of North Sea in a climate change scenario

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Decadal to inter-annual variability of the North Sea is studied using a high resolution regional model (HAMburg Shelf Ocean Model, HAMSOM), satellite derived SST, altimetry and in situ hydrographic surveys done in the North Sea in the summer months since 1999. In the recent decade the North Sea shows strong inter-annual variability in the SST and circulation. The results indicate that along with local barotropic forcing exerted by the winds, the exchange of water masses with the North Atlantic, the English Channel and Baltic Sea, play an important role in the sea level change along the North Sea coast. Even though a significant increasing trend is revealed in the satellite derived sea level, the data also shows high frequency variability associated with local wind forcing. Therefore refined processing of the satellite data is needed to remove the high frequency variability from the satellite altimetry, to be able to effectively study the sea level change in the North Sea with respect to a climate change scenario. The initial HAMSOM version tends to overestimate SST in the winter months along the Norwegian Coastal Current region and the Baltic Sea outflow region, indicating a need for better and more robust open boundary conditions, describing the Baltic outflow.