Geophysical Research Abstracts
Vol. 15, EGU2013-6044, 2013
EGU General Assembly 2013

The influence of NAO on sea level and thermodynamics of the North Sea: results from HAMSOM simulations.

Nikesh Narayan (1), Xinping Chen (2), Birgit Klein (1), Bernhard Mayer (2), Holger Klein (1), and Thomas Pohlmann (2)

(1) Bundesamt Für Seeschifffahrt und Hydrographie, Operational Oceanography, Hamburg, Germany (nikesh.narayan@bsh.de), (2) Institute of Oceanography, University of Hamburg, Germany

Changes in thermodynamics and sea level of the North Sea are studied using both 3-D and 2-D (tide/surge) simulations performed using the HAMSOM (Hamburg Shelf Ocean Model ;1952-2001). The model results are validated against both in situ and satellite derived datasets. The decadal pattern of SST suggests that the North Sea was warming gradually over the later part of 20th century, with the strongest warming in the last decade and the coolest decade being the 1960s. During a positive phase of the North Atlantic Oscillation (NAO), a winter time warming is observed in the North Sea with warm waters penetrating east of 6º E. Results from the two models vary substantially, especially with respect to the relation of sea level with NAO. In the 3-D model, there is a strong positive correlation between the NAO and the sea surface height along the Western European Coast and a negative correlation along the Eastern English coast, which is also reflected in the correlation maps of NAO and satellite derived sea surface topography. During the positive (negative) phase of NAO, the coastal currents along Western Europe are strengthened (weakened) and a 'pile up' of water is observed in the simulation results, causing elevated sea levels along Western European coast and a corresponding decrease of sea level along Eastern English coast. The inability of the 2-D model to capture this effect emphasises the importance of understanding baroclinic processes in disentangling the relation between NAO and sea level of the North Sea.