



The influence of the North Atlantic Oscillation on the sea level around the northern European coasts reconsidered: the thermosteric effects

M.N. Tsimplis(1), A.G.P. Shaw(1), R. A. Flather(2) and D.K. Woolf(1)

(1) James Rennell Division for Ocean Circulation and Climate, Southampton Oceanography Centre, Docks, SO14 3ZH, U.K. , (2) Proudman Oceanographic Laboratory, 6 Brownlow Street, Liverpool, L3 5DA , U.K. (Contact: mnt@soc.soton.ac.uk)

The thermosteric contribution of the North Atlantic Oscillation (NAO) to the North Sea sea level for the winter period is investigated. Satellite sea surface temperature as well as in situ measurements are used to define the sensitivity of winter water temperature to the NAO as well as to determine the trends in temperature. The sea surface temperature sensitivity to the NAO is about 0.85 °C per unit NAO which results in thermosteric sea level changes of about 1- 2 cm per unit NAO. The sensitivity of SST to the NAO was strongly time dependent. Model data from a 2d hydrodynamic tide + surge model are used in combination with the estimated thermosteric anomalies to explain the observed sea level changes. The discrepancies between the model and the observed data are partly due to the steric effect. However, it is plausible that the coarse spatial resolution of the model also contributes to the discrepancies by underestimating sea level variability.