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Influence of the North Atlantic Oscillation on the North Sea and the Baltic Sea

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We present an analysis of the effects of climate variability in the Northeast Atlantic (inflow region at ∼60 °N), North Sea and Baltic Sea from a simulation with the coupled climate model MPIOM/REMO/ECHAM5 (ocean model of the Max-Planck-Institute, Hamburg) for the A1B scenario. The particular grid structure of the MPIOM allows for the combination of a global ocean model with a regional high resolution area and resolves scales of 5-15 km in the North Sea. Furthermore, the MPIOM can be run in a regionally coupled mode using the REMO regional atmosphere model and includes a module for ocean tides. Accordingly, the model simulations allow us to explore how the currently observed warming and freshing trend in the North Sea and the Baltic Sea evolves during the 21st century.

The distribution of temperature and salinity on the shallow shelf sea shows a substantial warming and freshing in future throughout the seasons with considerable regional variability. The change visible in the whole water column in the North Sea and the Baltic Sea is affected by changes in atmospheric forcing. The main driver the North Atlantic Oscillation impacts on the circulation, the sea level and water mass properties of the North Sea and the Baltic Sea. To determine the influence of the model results the monthly winter NAO + and NAO – composites have been calculated, to investigate the relation.