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Hindcast simulation with a hydrodynamic shelf sea model for the period of 1948 to 2007 – a model study about temperature and heat content.

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A challenging question is whether there is a systematic temperature change in the North Sea and which physical processes play an important role. To study this topic numerical model runs are done for the period from 1948 to 2007. For the simulations the 3-dimensional baroclinic shelf sea model HAMSOM with a spatial resolution of 20' x 12' and 19 levels is applied. The simulation is forced with the NCEP/NCAR Reanalysis 1 data set which included air temperature, humidity, cloud cover, precipitation, sea level pressure and wind components. The boundary conditions for the open seas are provided by a Northwest-European Shelf model, which is driven also by NCEP winds and a climatological T/S-data set (Levitus, 1982), also eight partial tides are included. Model results show good agreement with long-term measurements. Results and trends for temperature and heat content will be discussed. Model results show a positive trend for temperature and heat content for the entire North Sea over the last 25 years.
The impact of changing atmospheric forcing parameter on the temperature and the heat content in the North Sea is investigated by specifically designed experiments. They show that air temperature has the dominant influence on the heat content.