



Climate Projections of Sea state for the North Sea

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KLIWAS is a research program of the German Federal Ministry of Transport, Building and Urban Development to study the impacts of climate change on waterways and navigation and to provide options for adaptations. One aspect of the Research task is to analyse climate scenarios for the sea state, eg. Sea wave height (SWH), wave direction and wave periods for the North Sea. In addition, the prospective development of periods with wave heights below a certain threshold (periods of beneficial weather conditions) is discussed. Such periods of low sea state are important for offshore industry. The scenarios together with the wave climate of the recent years will give an approximation of projected changes of the sea state in coastal and open sea areas.

Here we show the results for projected changes of sea state in the North Sea for the period 2000-2100 in comparison to 1961-2000, based on the wave model WAM4.5. The wave model is driven with wind data from two different regional atmosphere-ocean-models (DMI-HIRHAM and MPI-REMO) in the scenario A1B. The wind data are delivered in a horizontal resolution of about 20 km and a time resolution of one hour, while the wave model provides data of the calculated sea state with a horizontal grid of 5 km and the time resolution of one hour.

It is seen, that in the eastern part of the North Sea and especially in the German Bight there is a trend to a increasing of the 99th percentile of SWH, in particular for the DMI wind data. In accordance with this increasing, there is a rotation of strongwind events from mainly north-west to mainly south-west directions for both regional models (DMI and REMO). As a consequence of this rotation, a decreasing of the 99th percentile of SWH is found in the western part of the North Sea. While there is a clear trend of SWH (positive in the eastern part, negative in the western part of the North Sea), there is not found any significant change of beneficial weather conditions.