



Regional High-resolution Coupled Atmosphere Ocean Modelling in the North Sea Region

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The analysis of climate projections in the North Sea area is one of the research tasks of the research programme KLIWAS of the German Federal Ministry of Transport and Digital Infrastructure. A multi-model ensemble of three coupled regional atmosphere-ocean models was set up comprising very high resolution simulations for the German coastal regions of the North Sea and the Baltic to represent the complex land-sea-atmosphere conditions in the region. The ensemble consists of simulations made in cooperation with the Swedish Meteorological and Hydrological Institute, the Climate Service Centre and the Max-Planck-Institute for the period of 1950 to 2100. The KLIWAS project thereby adds coupled models to the band-width of possible future climate conditions in the atmosphere as given by the ENSEMBLES project, which were also analyzed. The coupled results are evaluated for present-day climate using a North Sea climatology of maritime conditions at a matching high resolution. In the future climate, while air and water temperatures will rise to the year 2100, the mean wind speed does not show a significant trend, but large decadal variability. The frequency of occurrence of westerly wind directions increases in the majority of simulations and results in an increase of significant wave height in the eastern parts of the North Sea. In an interdisciplinary approach, these results are used to provide regional to local information for the development of adaptation strategies for the estuary, and climate-proofing of infrastructure in the wider context of the project.