

Regional climate variability in the North Sea

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Marine and coastal projections for the North Sea are to date limited and are presented as single scenarios which provide plausible illustrations of a future that might be realised under a given emission scenario. On the regional scale it has to be expected that model dynamics will be an important issue that will influence the climatic change. Therefore two types of high resolution regional climate models are developed and validated in the context of the German KLIWAS project for the North Sea area. One type consists of a global coupled ocean/atmosphere model with a regional focus (highest resolution) of the ocean model over the North Sea. The corresponding coupled regional atmospheric model is nested into a global atmospheric model. The second type model combination involves a high-resolution shelf model coupled to the same regional atmospheric model. Both coupled ocean/atmosphere models will be validated against intensive observation sets for the period 1947-2009. Model projections will be performed for the A1B scenario for the time period up to 2100. The study is aimed at understanding the factors influencing regional climate change in the North Sea and to develop an understanding of the imprint of the deep connecting North Atlantic and its variability on the shelf. One of the major societal concerns about climate change in the North Sea area is rising sea level and the potential for increased storm surges. Sea level rise in the North Sea as estimated from tide gauges has already accelerated during the last decades and ranges between 2-3 mm/year in the southern North Sea. Both models show a strong influence of atmospheric variability on properties such as temperature and sea level. A significant positive correlation is found with the North Atlantic Oscillation in the validation runs. In the analysis of the future scenarios special attention will therefore be paid to the regional atmospheric circulation and its NAO cycles