

## **Regional meteo-marine reanalyses and climate change projections: Results for Northern Europe and potentials for coastal, offshore and terrestrial applications**

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A compilation of coastal weather analyses and climate change scenarios for the future for Northern Europe from various sources is presented. They contain no direct measurements but results from numerical models that have been driven either by observed data in order to achieve the best possible representation of observed past conditions or by climate change scenarios for the near future. A comparison with the limited number of observational data points to the good quality of the model data in terms of long-term statistics such as multi-year return values of wind speed and wave heights. These model data provide a unique combination of consistent atmospheric, oceanic, sea state and other parameters at high spatial and temporal detail, even for places and variables for which no measurements have been made. In addition, coastal scenarios for the near-future complement the numerical analyses of past conditions in a consistent way. The backbones of the data are regional wind, wave and storm surge hindcasts and scenarios mainly for the North Sea. We briefly discuss the methodology to derive these data, their quality and limitations in comparison with observations. Long-term changes in the wind, wave and storm surge climate are discussed and potential future changes are assessed. A variety of coastal, offshore and terrestrial applications taking advantage of the data is presented. Examples comprise applications in ship design, oil risk modeling and assessment, or the construction and operation of offshore wind farms.