



New 67-year long wave hindcast for the North Sea

Nikolaus Groll, Tobias Teich, Iris Grabemann, and Ralf Weisse

Institute of Coastal Research, Helmholtz-Zentrum Geesthacht, 21502 Geesthacht, Germany

The knowledge of long-term changes and statistics of the wave climate is not only important for climate studies but also for a variety of marine applications, such as off-shore wind farms, operational shipping and coastal infrastructures. For analysing long-term wave climate variability long consistent wave datasets are necessary. Observations normally cannot provide long enough time series and are spatially too heterogeneous to investigate long-term climate variability. Numerical simulations forced by consistent atmospheric conditions are able to provide such information.

Here we present a new high spatial (3-by-3 NM) and temporal (hourly) resolved wave hindcast for the entire North Sea for the period 1948-2014 performed within the framework of coastDat. This wave simulation is based on a regional atmospheric hindcast driven by the NCEP1 reanalysis with a spectral nudging of the large-scale wind fields. A comparison of the wave hindcast with buoy and satellite data indicate a relatively good agreement. First analysis of the decadal variability of mean and extreme wave conditions of the North Sea show an increase of the significant wave height with the largest increase during the 1990s and a small decline afterwards.