In a concerted effort of a series of quasi-realistic models of the regional atmosphere, the hydrodynamics of the North Sea and of the wave conditions, the global re-analyses of NCEP are downscaled to a high-resolution grid presentation of storminess, currents, water levels and wave heights in Northern Europe and particularly the North Sea area. In this way, the past development is described with an hourly time increment for more than 40 years (1958-2004).

The characteristics of storm surge heights and wave heights followed this trend in marine windiness, with an increase of only a few centimeters in terms of storm surge heights but up to 80 cm in high waves during the past four decades in the German Bight.

Even if not all events are reproduced in detail, the statistics as conditioned by the large scale atmospheric state compare favorably with the limited instrumental evidence, in particular with respect to all aspects related to marine windiness.

The resulting hourly, high-resolution data set forms one of two major components of the data set coastDat, which is provided by the Institute for Coastal Research at GKSS to a variety of clients dealing with changing ecological conditions, coastal defense and offshore activity in the North Sea.