

NORTH SEA STORM SURGE STATISTICS DERIVED FROM EXTENDED MODEL SIMULATIONS

Hans von Storch

Institute for Coastal Research, GKSS Research Centre
Geesthacht, GERMANY
storch@gkss.de

A major environmental problem along the North Sea coasts are storm surges. In historical times very severe storm surges have caused significant loss of land and many lives. Thus, statistics of storm surges are socio-economically most relevant for planning and risk assessment purposes. Of particular importance is the question, whether these statistics are changing in time, a phenomenon which has been obvious in the historical past of this region.

Statistics of storm surge heights may be affected by a wide array of processes. Local modifications of the morphology is one factor, increasing mean sea level or land sinking is another. Also the statistics of storms is far from being a constant but undergoes variations on time scales of decades and centuries of years. Finally, the recorded statistics may be contaminated by various inhomogeneities introduced by relocating and replacing tides gauges.

Dynamical models, run over decades of years with detailed weather analyses, are a suitable method for reconstructing such statistics. Using DNMI-, ECMWF and NCEP weather re-analyses, several such extended simulations were done with different dynamical models. Consistently a slight increase in storm surge height extremes was found in the past decades, which is related to increasing mean sea levels as opposed to intensified storminess. Calculations for business-as-usual carbon dioxide emission scenarios indicate an increase for future climatic conditions.