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Extreme storm tides in the North Sea and their consequences in the Ems estuary.

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Storm tides are one of the major natural hazards for the safety of the German North Sea coasts. For coastal protection planning information about possible extreme events is important. Observations over the past decades provide limited amount of information about very severe events. It is argued that unprecedented storm tides are possible already under present-day conditions, moreover changes in the probability of such events may emerge in relation with future climate change.
In the research project EXTREMENESS “Extreme North Sea storm surges and their consequences” extreme events which are highly unlikely but physically plausible and which may have significant consequences are in the scope of the study. In particular, extreme storm tides and corresponding meteorological conditions were identified from a large set of modeled data, including reanalysis, hindcasts and climate change projections. Possible amplification mechanisms such as different constellations of tides and atmospheric conditions but also a mean sea level rise were investigated with the aim to assess the potential of such events to become more severe within the physical limits.
For the region around Emden used for the case study a methodology of an impact assessment was developed. Consequences of the most severe events were analyzed under the assumption of various scenarios of coastal protection failures. A Stakeholder-Science Collaboration Forum established within the project provided valuable contributions to the development of the scenarios and evaluation criteria as well as to the understanding the interlinkage between socio-economical, infrastructural and environmental conditions in the focus region.