



## **Effect of storm surge and mean sea level future projections for the North Sea on insurance losses.**

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Losses of insurance industry from natural catastrophes and in particular extra-tropical storms have increased during last decades. Along with the population growth, redistribution of economic values and increase in insurance penetration, changes in storm climatology can be one of the reasons of such a behavior. This study focuses on the European coastal areas of the North Sea basin and damages associated with coastal floods. The influence of future climate change on the coastal flood risks and corresponding insurance losses is investigated for this region.

The future storm surge projections for years 2070-2100 based on A2 and B2 IPCC SRES scenarios (from CoastDat database) and scenarios for future mean sea level rise (plus 0.5m and 1m at the end of 21 century) are used as the climate change signal. As reference, the present day conditions, namely the control simulation for years 1960-1990 and current mean sea level are used. The methodology applied to this data is based on the operational insurance loss model and is adapted in the current study to quantify losses associated with coastal floods and to estimate changes caused by altered water level extremes for future scenarios. The estimates are made for each country (Denmark, Germany, Netherlands, Belgium, UK) separately, as well as for the entire European portfolio. The analysis showed that for all countries the increase of the future insurance losses can be detected for both storm surge scenarios and it is further enhanced by considering the rising sea level. The rate of change with respect to present day conditions varies significantly among the countries. On the one hand, the non-uniform changes in storm surge extremes along the North Sea coastline revealed for the future scenarios induce unequal hazards for different regions. On the other, this reflects the diversity of coastal protection conditions for different countries.