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National flood risk mapping of the Danish coastline

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Ocean flooding related to extreme storm surges poses a large damage potential for society. With future climate changes such as sea level rise and increased storminess, ocean flooding becomes one of the largest challenges for Denmark, due to its many islands and long low-lying coastline.

At The Danish Coastal Authority under the Ministry of the Environment we are carrying out a rapid screening of the areas vulnerable to ocean flooding throughout the whole of Denmark; today, in 2065 and in 2100, respectively, to determine hazard areas and vulnerabilities towards floods. With this information we can estimate the future requirement for sea defences along the Danish coastline now and into the future.

While carrying out this screening we have to assess the factors influencing the flood level. This includes changes in the topography from glacial isostasy and subsidence along with future mean sea level and storminess. Once the flood levels are estimated the coastline can be separated into areas of high and low hazard.

The coastline can also be separated into areas with different vulnerabilities, depending on the expected direct and indirect damages. In these areas the tangible and intangible losses will be compared, e.g. a nature area compared with a power station, or, a summerhouse area compared with a hospital. Together with the hazard map, the risk of flooding along the entire coast of Denmark is then calculated.

This rapid screening and risk mapping provides an effective tool to develop adaptation and mitigation plans for the coastal areas for local and national governments on both short term and on a longer timescale. It can be used to decide where to protect and where to allow nature and natural processes to dominate.