

The size and shape of the North Sea basin, wide areas of forcing winds, and extensive regions of low-lying coastal land combine to make Europe's North Sea coastline particularly susceptible to storm surge flooding events driven by winter storms. The RMS® U.K. Storm Surge Model allows companies to evaluate coastal flood risk along the most vulnerable East Coast of England, from the Humber to the Thames Estuary.

## U.K. Storm Surge



Modeled 1,000-year return period storm surge flood depths in the U.K.

Storm surges are caused by strong winds that drive seawater against the shore. In conjunction with certain tidal states, these coastal flooding events can cause significant property damage and loss of life. Despite measures to protect exposed coastlines, there is also an increasing risk of severe flooding from storm surge events as sea levels rise due to both existing natural trends and the expected impact of global warming.

The storm surge event that struck the East Coast of England and the southwest coast of the Netherlands in January 1953 caused the worst natural disaster in northern Europe over the past two centuries. RMS estimates that a recurrence of this event today, assuming the same flood extent, would cost the insurance industry £5–7 billion in loss, highlighting the need for sophisticated, high-resolution modeling tools.

### COMPLETE PROBABILISTIC EVENT SET

The RMS® U.K. Storm Surge Model combines over 1,000 stochastic storm surge events along the U.K. East Coast with associated windfields and their probabilities, allowing a complete view of risk to be assessed. Different tidal states are applied to capture the interaction

of the tide with the storm surge. For example, a modest storm that coincides with the highest spring tide of the year may cause a higher water level than a strong storm that occurs on the lowest neap tide of the year.

A sophisticated sea defense failure model allows for the possibility of failure of even the strongest defenses, including the Barking, Dartford Creek, and Thames barriers. Floodwaters propagate inland using a time-stepping inundation model that accounts both for seawater volume and the duration of high water levels along the coast. Flood depths are calculated using the proprietary RMS variable resolution grid with up to 50-meter resolution for modeling storm surge flood risk in the most densely populated areas along the coast. Property damage is calculated using a component-based vulnerability module that incorporates the storm surge damage to each element of the building to develop comprehensive building damage functions, and also includes vulnerability modifiers such as basements or flood protection that may mitigate or augment the losses.