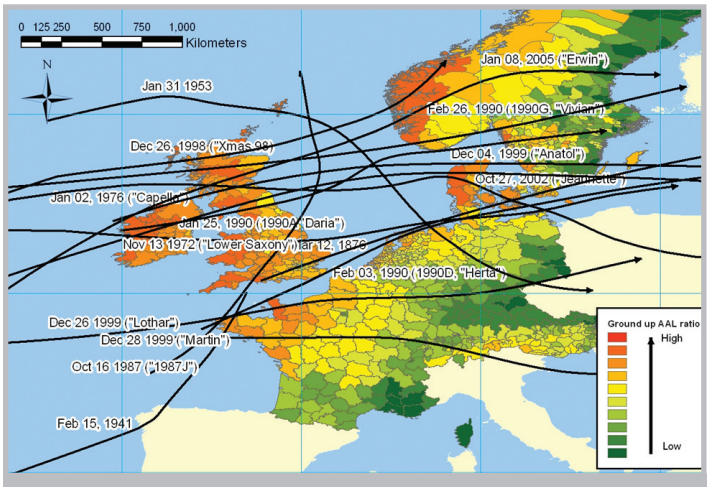
On average, annual accumulations of insured windstorm losses in northwestern Europe account for up to 80% of insured losses in the region, and globally come second only to U.S. hurricane-related losses. RMS estimates that the three great storms of 1999, Anatol, Lothar, and Martin, would together result in well over €10bn insured loss if they occurred today. This risk was more recently highlighted by windstorms Jeannette (2002) in the U.K., Netherlands, and Germany, and Erwin (2005), which resulted in claims throughout southern Scandinavia and countries bordering the Baltic Sea.

Europe Windstorm

Extra-tropical cyclone (ETC) risk in Northern Europe is one of the most complex climatic phenomena to model in the world. The generally swift-moving, broad-reaching storms affect wide areas with relatively low-levels of damage at individual sites compared to their tropical counterparts, and typically multiple countries experience damaging gusts. Due to their breadth and relatively high frequency of occurrence, losses can accumulate to extraordinary levels in any given year. The most exposed area to high wind speeds is the western edge of Europe, particularly Ireland and Britain.

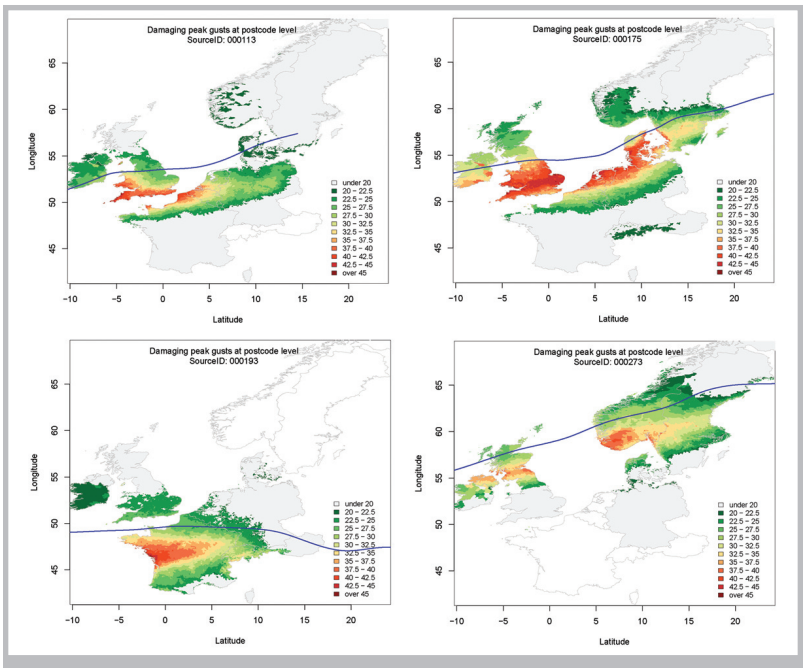


Tracks of key historical events and average annual loss ratio from windstorms in Europe

Complete Probabilistic Event Set

The core of the RMS Europe Windstorm hazard model is a complete basin-wide event-set, generated using an innovative blend of numerical and parametric modeling approaches that represents all possible North Atlantic winterstorms over a period of more than 30,000 years. As part of an extensive research effort, RMS has developed a unique historical storm track catalog back to 1869, used to create stochastic windstorm tracks with consistent spatial, temporal, and severity distributions. In addition, wind and pressure fields of almost 1,100 of these historical storms have been reconstructed using a very high resolution numerical model to capture small-scale features of the windfield as it evolves and moves across the region. These time-stepping wind footprints are analyzed and statistically modeled to create possible future windfields associated with stochastic tracks. This approach combines the advantages of numerical modeling in designing realistic and complex wind footprints with the advantages of statistical parametric sampling to create the widest possible range of realistic future outcomes.

Wind-related damage from summer thunderstorms is also explicitly represented within the RMS® Europe Windstorm Model. Such events cause frequent but localized losses, and can contribute significantly to short return period losses and the average annual loss (AAL).



Examples of stochastic storm footprints

Time-stepping Directional Windfield Model

To capture the changing impact of the cyclonic winds over time, the RMS model calculates 3-second peak gust and 10-minute mean wind speeds at each time-step in the lifetime of a modeled event across a fine grid of up to 1-km (0.6-mi) resolution, adjusting the wind values for upstream roughness and topography at each time step. The maximum adjusted 3-second peak gust in each grid cell is the parameter best correlated with insured loss. This wind speed value is then aggregated to Postcode and CRESTA for implementation within the RiskLink® risk analysis platform by applying exposure weights to the underlying cells, thus maintaining the benefits of high-resolution hazard calculations for loss analysis while minimizing the negative effect of high resolution loss calculation on performance.

To capture the effects of terrain on wind degradation, the RMS model also calculates the effect of terrain conditions up to 80 km (42 mi) upwind in 8 directions using satellite data and aerial imagery.

Regional Variations in Building Vulnerability

The European building stock is quite varied. The regional RMS vulnerability model that relates the performance of properties to the severity of the wind experienced is based on a detailed proprietary inventory of building stock, plus studies of building practices and codes, and of the performance of building components to wind loading under both natural and laboratory conditions. It is calibrated against extensive insurance loss data from recent storms. Unique functions differentiate loss by materials, occupancy usage, height, and age while secondary modifiers focus on roof type and construction.

Model Specs

History

Original release 1997, upgraded in 2006 for use in RiskLink® and RiskBrowser®

Geographic Scope

12 countries: Austria, Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Norway, Sweden, Switzerland, United Kingdom

Geocoding Resolution

Latitude/Longitude, Street Address, Postcode, Region/Province, County, or CRESTA Zone

Lines of Business and Coverages

23 residential, commercial, industrial and agricultural lines occupancies, including glasshouses, summerhouses and municipality buildings. Buildings, contents and time element losses are represented.

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