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A stormy end to winter: Loss estimates and storm science

By Geoffrey Saville (https://www.wtwco.com/en-US/Insights/all-insights#sort=%40fdate13762%20descending&f:@authors=[Geoffrey%20Saville]) **| March 25, 2022**

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A stormy February cost lives and left the insurance industry and governments across Europe with a large repair bill. How bad were these storms, what were the impacts and how do they compare to some past events? Ongoing scientific research can advance our understanding of risk and increase resilience when clusters of storms occur.

A tale of three storms

It's been just a few weeks since Northern Europe was hit by a string of severe storms. The impacts are still being felt by those worst affected by the cluster of three major storms, the first such cluster since the winter of 2015/2016.

The Met Office, Met Eireann and the Dutch national meteorological service, KNMI, together name severe storms with a specific level of risk to public safety, in an effort to improve public awareness. Storms Dudley and Storm Eunice were both named on the 14th of February, their fates already determined by a powerful jet stream in the upper atmosphere seen in forecast models, and predicted to bring severe weather for the UK a few days later. Storm Dudley reached Scotland on the 16th of February, followed a couple of days later by Eunice which passed over the UK further south. Eunice was a relatively rare storm going through explosive cyclogenesis, meaning that the central pressure of the storm dropped rapidly, in this case around 30mb in 18 hours as it approached the west coast of Ireland. Upper winds driving this rapid development of the storm were blowing at more than 200mph. Frontal systems brought further rain and strong winds over the next few days as Storm Franklin was waiting in the wings, before it arrived in the west of Scotland on the 21st of February, bringing more widespread wind and rain.

Eunice brought the most severe conditions, with a rare Red warning issued by the Met Office in the UK. Four people were killed by falling trees, and power lines were brought down leaving millions of homes without electricity, some for several days. Transport was disrupted with flights cancelled, roads blocked and shipping ports too dangerous to use. Widespread damage to homes and commercial properties was reported, including severe damage to the roof of the Millennium Dome in London. The timing was unfortunate for coastal regions too as the storm surge coincided with spring tides, leaving western coastlines and the Severn Estuary battered and damaged. While Dudley and Franklin either side of Eunice were severe storms in their own right, it was the compound effect of successive storms hampering preparation and recovery efforts which made matters worse. While the storms tended to move relatively quickly, their associated frontal systems brought a significant amount of accumulated rainfall through the week.

Insurance sector impact

After the first storm, the insurance industry got to work assessing losses, helping customers with impacts and managing claims. European storm season is hopefully winding down as we head through spring, allowing post-event analyses to continue and for catastrophe modelers to muse over the return periods of these events, both individually and as a group. Early UK loss estimates for Storm Eunice were between £200 and £350 million (PwC estimate), but it will be a while before the industry settles on a final figure. The last storms to create a similar loss were Ciara and Dennis which led to around £360 million in 2020.

Estimated insured loss for the three storms including neighboring European countries also severely affected (Germany and the Netherlands) are expected to reach between €3 and €4.5 billion (RMS estimate), and around 80% of that estimate is attributed to Eunice, making it one of the most damaging storms to hit Europe in the last couple of decades.

The most severe storms tend to arrive in clusters, a research area the WTW Research Network embarked upon in its early days in the mid-late 2000s. This followed major impacts from storms in the 1990's. The winter of 1989/90 saw eight storms hit Europe in just a few weeks, with the most severe being Storm Daria, also known as the Burn's Day Storm leading to the highest insured losses recorded at around $8.2 billion (indexed to 2012). Another cluster followed in 1999 with Lothar and Martin also leaving the insurance industry reeling from major losses. This provided a strong rationale for further research into the concept of storm clustering and a deeper dive to retrieve answers from science to enable the industry to quantify and represent the enhanced risk of storms arriving in quick succession.

Advances in science and storm modelling increase financial resilience

As the dust settles, the scientific and catastrophe modelling communities will analyze the meteorological characteristics of this most recent cluster of storms, the statistics of the losses associated with the cluster, and how these events fit with the cloud of possible stochastic events represented in the various hazard event sets used in risk modelling. The WTW Research Network has tackled some of these problems over the years, leading research into the nature by which storms tend to cluster, and when they do, how they also tend to be more severe. Representing these phenomena in catastrophe models became essential, and ended up being encoded into regulatory requirements so that insurers were mandated to understand the effect of clusters of storms on their portfolios. Had this research been available and so embedded in industry back in the 1990s, perhaps losses would have been better modelled and regulations would have been in place to enable greater financial resilience in the insurance market.

In the last few years, the WTW Research Network has also been investigating the use of latest skillful seasonal forecasting techniques. Seasonal forecasts use climate models that can represent the variability in the climate system on a seasonal to decadal timescale, to make estimates of the likelihood of greater than, or less than, average conditions. This can be extended to make some comments about storminess, and by understanding the average pressure pattern over the Atlantic, we can suggest whether conditions for a coming winter will be stormier or more settled than normal.

Our research partners at the University of Exeter are experts in these fields, and have helped WTW navigate these complex areas since the beginning of the WTW Research Network. With new research work underway with the University of Exeter, we will continue our academic exploration into European Windstorm risk for many years to come. It will enable us, our clients and society to be better prepared through an advanced understanding of risk and development of science applications in the finance sector.

Further reading

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Author

Geoffrey Saville (https://www.wtwco.com/en-US/Insights/all-insights#sort=%40fdate13762%20descending&f:@authors=[Geoffrey%20Saville])
Head of Weather and Climate Risks Research

Email (mailto:Geoffrey.Saville@willistowerswatson.com)

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