Understanding the impacts of the St Jude’s Day Storm

Challenge
On 28 October 2013 a storm, named the St Jude’s Day storm by the media, crossed southern England causing widespread damage, including major disruption to electricity networks. Almost 700,000 properties in the UK Power Network’s region were left without electricity, mostly in Essex and Suffolk.

To understand the reasons for the damage that the storm caused, UK Power Networks asked the Met Office to analyse the storm’s main features, including the track and the wind speeds. Our challenge was to detect any unusual features within the storm that may have resulted in a greater impact on the electricity network, thereby helping UK Power Networks to anticipate and accurately report the possibility of future damage to Ofgem, the energy sector regulator.

Solution
The first phase of the work involved of collating all the relevant material that visually represented the track and severity of the storm. This included time series maps and plots, wind and gust maps, data analysis and forecasts leading up to the storm.

The second phase of the work involved a more detailed analysis focusing on wind speeds and gusts in the Essex and Suffolk area. We assessed wind speed measurements from four weather stations in the area; two coastal and two inland, and made comparisons going back to 1969. Although the hourly mean wind speeds were not particularly strange, the gust speeds at the two inland sites were unusual as revealed by minute-by-minute analysis of the data. Further analysis on the return period of such an event provided some evidence of the existence of ‘sting jets’ within the storm. The impact of rainfall on soil moisture and tree felling was also considered in the final analysis. The results showed that the storm was comparable with other major storms of recent times as the combination of the storm’s features and the time of year meant there was an extreme risk of multiple fallen trees and extreme disruption.

Benefits
An increased knowledge of the storm provided significant benefits to UK Power Networks. Using our work, UK Power Networks could communicate the power of the storm in comparison to other events and demonstrated why it had such a detrimental impact on the electricity network. This was not only useful in communicating with the regulator and its senior management team but also of benefit to UK Power Networks in planning network operations and improvements in its response processes.

The storm inspired ongoing research into the risks a range of weather factors pose to the power infrastructure. We are developing greater insight into the interactions between high wind speeds, rainfall, soil moisture, local tree species, tree leaf density, and proximity of trees to power lines. Many early autumnal storms, like the St Jude’s Day storm, are particularly damaging because trees still have most of their leaves. Further research will provide greater understanding of storms in particular environments, thereby helping UK Power Networks, and other electricity distribution companies, better prepare for potential damage to their infrastructure.

“... analysis has aided our understanding of the storm. In my experience there is always learning from adverse weather events and the Met Office post event analysis report is a key component in the identification of learning to enable the continuous improvement of our preparedness and response to these events.”

Bill D’Albertanson
Emergency Planning Manager,
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