



## Forecasting Weather Impacts on the UK Telecommunication Network

Alan Halford (1), David Brayshaw (2), Stefan Thor Smith (1), and Kjeld Jensen (3)

(1) University of Reading, TSBE Centre, Reading, United Kingdom (a.halford@pgr.reading.ac.uk), (2) University of Reading, Meteorology, Reading, United Kingdom, (3) British Telecommunications, London, United Kingdom

Telecommunication networks have become an integral part of a competitive and secure society where commercial and critical services have developed on the basis of reliable communication networks. Ensuring reliability, or continuity of service, requires an understanding of system threats and the measures that can be taken to maximize resilience to those threats. Climate and weather have been linked with telecommunication faults in the UK but little work has been done to quantify the effect or prediction of these faults.

By establishing an understanding of the relationship between weather and fault rates, weather forecasting can provide a means of improving planning for fault repair that can improve system performance. Using linear regression, a statistical impact model has been developed with historical data that relates a range of weather variables to fault rates with a correlation coefficient depending on system line type and spatial scales. A range of different meteorological data sets along with cross-validation and boot strapping have been used to build a robust impact model.

Historical reanalysis data in combination with the impact model can be used to construct a probabilistic representation of the impact weather variability has on the network. Also, Ensemble forecasts up to 2 weeks ahead have been used in with the impact model to provide a probabilistic representation of forecasted fault rates. This study shows how the weather data and forecasts can be used in the decision-making for network management.