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EXPERIENCES OF FORECASTING THE MAGNETIC STORMS OF MARCH AND JUNE 2015 AND ANALYSIS OF THE RESULTING GROUND EFFECTS IN THE UK

S J Reay^{1}, L A Billingham¹, G S Kelly¹, and A W P Thomson¹*

*¹British Geological Survey, West Mains Road, Edinburgh, EH9 3LA, United Kingdom
Email: sjr@bgs.ac.uk*

Since the 1990's the British Geological Survey (BGS) have issued a daily (Monday to Friday) three-day geomagnetic activity forecast. Recipients of this service have included the Met Office, as part of the UK's 'National Hazards Partnership' that provides government with data and analysis, and power companies concerned about geomagnetic induced currents (GIC).

The St. Patrick's Day storm of 17th March 2015 was the first magnetic storm since August 2005 with a daily $A_p > 100$. By this measure it could be considered to be the largest magnetic storm of solar cycle 24 (so far). The magnitude of the geomagnetic activity was surprising as the solar event signatures preceding it were not considered that remarkable. The magnetic storms of 21st – 24th June, caused by a series of Earth-directed coronal mass ejections, resulted in further significant geomagnetic activity. This time daily A_p reached a peak of 73 on the 23rd June 2015. In each case the magnetic storms reached a peak of G4 in the NOAA Space Weather scale for geomagnetic storms. Both these events are described from the viewpoint of BGS operational space weather forecasters.

In the UK BGS operate three magnetic observatories continuously recording the Earth's magnetic field. Additionally since 2013, BGS also monitor changes to the geo-electric field at all three observatories. These geomagnetic and geo-electric data are used to model and research the impact of GIC on the UK power grid. Observational and modeling results from both the March and June storms are presented and discussed.