Evaluating auroral forecasts against satellite observations

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During periods of high geomagnetic activity, particles precipitating into the upper atmosphere can cause auroral emission and affect long-range radio communications, whilst the accompanying geomagnetic storm could potentially induce strong currents in oil pipelines and electricity transmission lines at ground level. These effects may impact industry sectors such as aviation, energy and defence. Forecasting the location and probability of aurora is therefore of interest to many end users. In addition, forecasting when the aurora may be visible can also be a key tool in promoting public awareness and engagement with space weather.

The OVATION Prime-2013 auroral precipitation model (Newell et al., 2014) is currently in operation at the UK Met Office and delivers a 30-minute forecast of the probability of observing the aurora in the polar regions of the northern and southern hemispheres. Using techniques developed for terrestrial weather forecast verification, we evaluate the performance of this operational implementation of OVATION against the boundaries of auroral emission regions determined by the far-ultraviolet (FUV) observations of the auroral oval captured by the IMAGE satellite over the period 2000-2002.