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Evaluating Auroral Forecasts Against Satellite Observations

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The aurora is a readily visible phenomenon of interest to many members of the public. However, the aurora and associated phenomena can also significantly impact communications, ground-based infrastructure and high-altitude radiation exposure. Forecasting the location of the auroral oval is therefore a key component of space weather forecast operations. A version of the OVATION-Prime 2013 auroral precipitation model was implemented for operational use at the UK Met Office Space Weather Operations Centre (MOSWOC), delivering a 30-minute forecast of the auroral oval location and the probability of observing the aurora.

Using weather forecast evaluation techniques, we evaluate the ability of the operational version of the OVATION-Prime 2013 model to predict the location of the auroral oval and the probability of aurora occurring. We compare the forecasts with auroral boundaries determined from data from the IMAGE satellite between 2000 and 2002. Our analysis shows that the operational model performs well at predicting the location of the auroral oval, with a relative operating characteristic (ROC) score of 0.82. We analyse the model performance in detail during different levels of geomagnetic activity levels and in different spatial locations.