



Verification of Flare Forecasts at the Met Office Space Weather Operations Centre

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Space weather forecasting has become increasingly important in recent years due to the potential impacts a severe space weather event could have on human technology on the ground and in near-Earth space. One essential component of operational space weather forecasting is prediction of solar flares. The Met Office Space Weather Operations Centre (MOSWOC) produces a Sunspot Region Summary every six hours, including flare predictions for numbered active regions, as well as a full-disk four-day Radio Blackout Forecast twice daily. Verification of these predictions provides an understanding of the strengths and weaknesses of the flare forecasting process.

Here we present verification of flare probability forecasts since data archiving began in 2014. To evaluate forecast resolution, Relative Operating Characteristic curves are calculated to show the ability of a forecast to discriminate between events and non-events. To understand forecast bias, reliability diagrams are plotted to show how well forecast probabilities of an event correspond to observed frequencies. The Ranked Probability Skill Score is also calculated to quantify the extent to which the forecast improves predictions with respect to the flare climatological benchmark forecast.

The flare verification process is implemented automatically in near-real-time at MOSWOC, which enables forecasters to improve subsequent predictions. The results of this verification study highlight the value of forecaster experience, with human-edited forecasts outperforming model results, as well as the difficulty forecasting beyond 24-hour forecast lead times.