Geoscientific
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Discussions

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**Interactive
comment**

Interactive comment on "Forecasting auroras from regional and global magnetic field measurements" *by* K. Kauristie et al.

Anonymous Referee #2

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GENERAL COMMENTS

This manuscript presents a method to forecast or nowcast aurora. The forecast method is based on global geomagnetic activity alerts issued by NOAA, which are statistically correlated to expected regional magnetic activity levels during the following 0-48 hours and thereof to occurrence probability of visual aurora.

At first glance the proposed forecast method seems to rely on duct tape and haywire, as it builds several layers of semi-empirical models and alert services on top of each other. However, a closer inspection reveals that the forecast method is well defined and quite logical. Also the technical implementation is relatively straightforward, once the statistical correlations and other empirical relationships have been obtained.

The manuscript is written in a clear and logical manner. The forecast method is ade-

quately explained and the presented results indicate that it works reasonably well.

In summary, this is an interesting paper, and is suitable for publication in EPS after some relatively minor modifications.

SPECIFIC COMMENTS

P1 L18-23: This explanation makes the abstract bit unclear, first you say RAF use one dataset, then you say that it's based on some other datasets. Please clarify this (I think P11 L6-9 could be good start).

P2 L13-18: You should make it more clear that this is a direct quote from Lilensten et al.

P5 L17: The definition of "bright" may be somewhat subjective, but where you base the assessment "no bright auroras were observed"? I did not read the report completely, but in their section 6.1, tables 1 and 2, Malkki et al. indicate that in about 13-18% of the cases "the system missed clear auroras".

P5 L21: In addition to interpolation, also extrapolation is needed for the northernmost stations. You should at least mention if not properly discuss the reliability of extrapolation from a marginally auroral station (SOD) to auroral stations (KEV, MUO). It's clear that the linear extrapolation must break down somewhere.

P6 point 3: How you handle cases where alerts are separated by less than 48 hours? Has this some effect on your analysis or results?

P9 L1, maybe also elsewhere: If I understood correctly, this is the probability of exceeding the dB/dt threshold, which may be different from the probability of observing aurora.

P9 L10-17: What about the noon curve, how well it indicates aurora during the following night?

P9 L26: You mean that the bands are positioned around the geomagnetic pole at the

magnetic latitudes +-2 deg...?

P9 L30: I assume that the curves obtained by UT binning are used?

TECHNICAL COMMENTS

P3 L2: For typing the opening and closing quotation marks in English, see https://en.wikipedia.org/wiki/Quotation_marks_in_English or chapter 2.4.1 in the not so short introduction to latex (http://www.ctan.org/tex-archive/info/lshort/english/). This also applies to the apostrophes in hours' (P2 L29) and 1980's (P3 L9).

P3 L2: You mean "solar wind structure"?

P5 L3: Do you mean the year 2000 or the decades 2000's?

P9 L29: Inclusion of ALTPX appears here out of nowhere and is explained only much later.

P10 L4+7: I believe many forecasters avoid the word "promise", but that's up to you.

P10 L19: level in the case

P12 L6: What you mean by "may appear to be challenging"? You do not yet know how it appears to be?

NON-SERIOUS COMMENT

P11 L12: Your offhand remark, that auroral images can occasionally suffer from cloudiness and moonlight, reminds me of an anecdote about the book Principia Mathematica by Whitehead and Russell. They set out to derive all of mathematics from the axioms of formal logic, and when they at page 379 prove that 1+1=2, they remark that this result is occasionally useful.

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., doi:10.5194/gi-2015-33, 2016.