

Interactive comment on “Prediction and variation of auroral oval boundary based on deep learning model and space physical parameters” by Yiyuan Han et al.

Anonymous Referee #1

Received and published: 2 July 2019

The reviewed manuscript contains some interesting statistical findings based on advanced machine learning methods.

My main concern is that the mathematical correlations between the position and size of the auroral oval and some physical variable describing the near-Earth space environment are not interpreted in physical terms. It's been known for a long time that the auroral oval represents the open/closed field boundary of the Earth's magnetosphere which is responsive to the solar wind driver and reflects the dynamics of the Dungey substorm cycle. A careful discussion of these physical processes in the context of the reported machine learning results is required before this manuscript can be considered

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for publication. What do the machine learning correlations show? Do they support or challenge the existing substorm models? Do they enable a more accurate prediction of substorm magnitude and timing? To make this analysis more informative it would be important to differentiate between the southward and northward IMF directions associated with drastically different solar wind driving conditions.

The presentation style is clear but there are multiple typing errors; I encourage the authors to proofread their manuscript before resubmitting.

Interactive comment on Nonlin. Processes Geophys. Discuss., <https://doi.org/10.5194/npg-2019-28>, 2019.

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