

K-type geomagnetic index nowcast with data quality control

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Abstract

A nowcast system for operational estimation of a proxy K-type geomagnetic index is presented. The system is based on a fully automated computer procedure for real-time digital magnetogram data acquisition that includes screening of the dataset and removal of the outliers, estimation of the solar regular variation (SR) of the geomagnetic field, calculation of the index, and issuing of an alert if storm-level activity is indicated. This is a time-controlled (rather than event-driven) system that delivers the regular output of: the index value, the estimated quality flag, and eventually, an alert. The novel features provided are first, the strict control of the data input and processing, and second, the increased frequency of production of the index (every 1 h). Such quality control and increased time resolution have been found to be of crucial importance for various applications, e.g. ionospheric monitoring, that are of particular interest to us and to users of our service. The nowcast system operability, accuracy and precision have been tested with instantaneous measurements from recent years. A statistical comparison between the nowcast and the definitive index values shows that the average root-mean-square error is smaller than 1 KU. The system is now operational at the site of the Geophysical Centre of the Royal Meteorological Institute in Dourbes (50.1°N, 4.6°E), and it is being used for alerting users when geomagnetic storms take place.

Keywords

geomagnetic activity index, real-time computing, nowcast system

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References

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
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