Geophysical Research Abstracts
Vol. 21, EGU2019-8073, 2019
EGU General Assembly 2019

New Global High Cadence Geomagnetic Indices: Hp90, Hp60 and Hp30

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Global geomagnetic indices are widely used to characterize and parameterize the geomagnetic disturbance level (data analysis and reanalysis, physical and empirical modelling of the magnetosphere-ionosphere-thermosphere system). An example is the 3-hourly Kp index that is derived and disseminated as definitive and as nowcast version by the German Research Centre for Geosciences (GFZ). More information about Kp and the related geomagnetic indices that are based on the same 13 geomagnetic observatory measurements can be found at https://www.gfz-potsdam.de/en/kp-index/.

Hp90, Hp60 and Hp30 denote new global high cadence geomagnetic indices based on the Kp index algorithm. These indices are developed within the Space Weather Atmosphere Models and Indices (SWAMI) project of the H2020 European Union research activity. The numbers 90, 60 and 30 denote the temporal resolution (in minutes) of the respective index. These indices will provide improved determination of onset and duration of geomagnetic activity. In this study, we compare the Hp90, Hp60 and Hp30 indices with the 3-hourly Kp index in terms of frequency distribution and correlation analysis. The advantages and integrity of these indices (Kp, Hp90, Hp60 and Hp30) are also analysed and discussed.

Towards the end of the SWAMI project, the evaluated and validated Hp indices will be disseminated to the user community. Since contributing observatories provide digital 1-minute data starting from the year 1995, Hp indices also will be reconstructed back to that date.