

NEW RMS-BASED PLANETARY GEOMAGNETIC ACTIVITY INDICES

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Planetary geomagnetic indices aa, am, and Kp are based upon K indices measured at subauroral geomagnetic observatories. K indices are directly related to the range during 3-hour intervals of the irregular variations in the horizontal components of the magnetic field.

Various geophysical problems such as e.g., the precise monitoring of the main magnetic field from satellite magnetic data need information on the longitude modulation of the geomagnetic activity. Others such as, e.g., the monitoring of the thermosphere/ionosphere response to geomagnetic storms need information with a time resolution smaller than 3 hours.

Therefore, the International Service of Geomagnetic Indices, now hosted by LATMOS, has developed new geomagnetic activity indices:

- The longitude sector geomagnetic activity indices based upon K indices from subauroral latitude observatories are well suited to provide the magnetic activity variation with longitude during a given UT time interval.

- The rms planetary indices are based on another proxy of the magnetic energy, namely the root mean square (rms) of the irregular variations in the magnetic horizontal components. Using such proxy does not put constraints on the length of the time interval over which the indices are derived. Local rms indices can be computed at each observatory, and rms planetary indices derived following algorithms similar to those used for am, or aa planetary geomagnetic indices derivation. Such indices are computed over time intervals significantly shorter than 3 hours (typically few tens of minutes).

The contribution of longitude sector indices and planetary rms indices will be illustrated by means of examples taken from studies of the thermosphere response to geomagnetic activity forcing.

Geomagnetic indices, digital observatory data

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