

## IN32A-05: High-cadence nowcast of a proxy K-type index of the local magnetic activity for improved space weather monitoring applications



**Wednesday, 14 December 2016**



**11:20 - 11:35**

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The K index is a quasi-logarithmic index characterizing the 3-hourly range in the transient geomagnetic field activity at a certain location relative to its regular “quiet-day” variation. It is a popular choice among researchers; however, the 3-hour time scale is much larger than the characteristic time of various phenomena associated with an elevated geomagnetic activity. These include disturbances in the ionosphere that are of particular interest because of their (adverse) effects on present-day radio communications and navigation practices. From this aspect, there is an on-going demand for services providing real-time assessment of the (local and global) magnetic activity and alerting the users for the purpose of taking mitigating actions. An obstacle to the real-time estimation of the K index stems from the fact that the original definition of this index postulates the use of measurements from both sides of the abovementioned 3-hour interval. We offer a method for estimating, in real time, the local magnetic activity via a K-type index ( $K^*$ ) which closely resembles the “classical” K index. The main difference is in the way of determining the solar regular variation of the geomagnetic field -- the new, real-time approach uses data from past measurements only. Another difference is that the concept of fixed 3-hour time periods (0-3, 3-6, ..., 21-24), each characterized with a single K value, is abolished; instead, in the new approach, a  $K^*$  value is derived at any time using data from the most recent 3 hours. Following this approach, a novel nowcast system was developed based on a fully automated computer procedure for real-time digital magnetogram data acquisition, data screening, establishing the field's regular variation, calculating the  $K^*$  index, and issuing an alert if storm-level activity is indicated. The nominal cadence is envisaged to be as high as one  $K^*$  value per minute. Another important feature of this nowcast system is the strict control on the data input and processing, allowing for an immediate assessment of the quality of output. The quality control employs the fact that a complete and sound dataset provides the ideal platform for reliable, closest-to-definite index production.

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