K indices and K-derived magnetic activity indices: context’s reminder

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The K index was devised by Bartels et al. (1939) to provide an objective monitoring of irregular geomagnetic activity at subauroral latitudes. K indices are based upon geomagnetic disturbances, measured in horizontal geomagnetic components at magnetic observatories, after « eliminating » the regular daily variation. An individual K index is an integer in the range 0 to 9 corresponding to a class that contains the largest range of geomagnetic disturbances (in either of the two horizontal components) during a 3-hour UT interval. Limits of range vary from one observatory to another since they depend on the corrected geomagnetic latitude of the observatory.

A great number of Space Weather applications rely on K-derived magnetic activity indices at subauroral latitudes. These historical indices, endorsed by IAGA such as Kp, aa and am, represent unprecedented homogeneous time series, up to more than 150 years, highly valuable for all studies related to long-term geomagnetic activity.

However, one has to keep in mind that local K indices and subauroral related ones (K-derived) were developed during other time, under specific societal and technological conditions.

We recall the local K indices derivation processes and characteristics to enlight possible nowadays drawbacks and their simple mitigations.