

Possible use in Space Weather of new geomagnetic activity indices based on minute values

Michel Menvielle
Centre d'études des Environnements Terrestre et
Planétaires
4, Avenue de Neptune
F-94100 Saint Maur,
France

Chantal Lathuillère
Laboratoire de Planétologie de Grenoble
Bâtiment D de Physique
BP 53
F-38041 Grenoble Cedex 9
France

Annick Blusson
CLS
Parc Technologique du Canal
8-10, rue Hermès
F-31526 Ramonville Saint-Agne
France

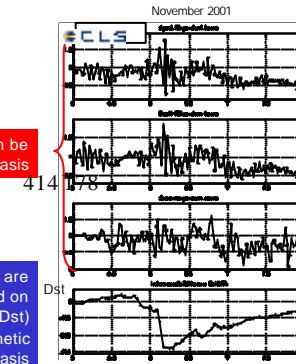
- A need
- A proposed new family of indices
- Perspectives

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There is a need

The drag coefficients can be estimated on a half-hour basis

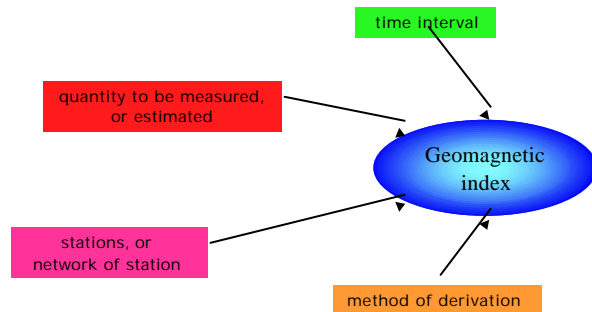
The present geomagnetic indices are derived on a 1-hour (Dst) or 3-hour (planetary geomagnetic indices: am, aa, Kp) basis



(F. Arbib, CLS)

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How to build an index



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The aa index

• K indices;

• 3-hour values;

• Network: 2 antipodal stations at subauroral latitudes;

• K codes are converted into range amplitude;

aa is the average of the two amplitude values (unit: nT).

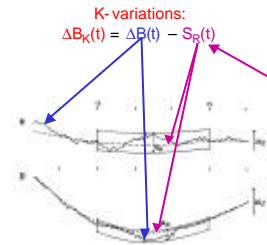


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The K index

The K index is deduced from **ranges** in the K-variations during a given **3-hour** interval, ...

... and it is a **proxy of the magnetic energy density** provided it is measured at **sub-auroral latitudes**.



Analogue era

K-indices hand-scaled on analogue magnetograms.

Estimated on a 24-hour basis

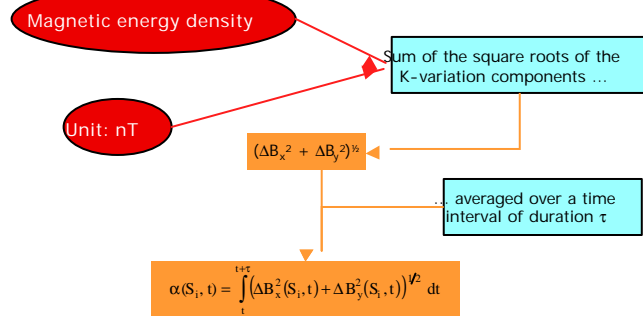
The routine on-line availability of digital minute values makes it possible to **compute the K-variations**.

Present time

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Which proxy of the magnetic energy density



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The αa index

• rms;

• Values over any t -minute interval;

• Network: **2 antipodal** stations at subauroral latitudes;

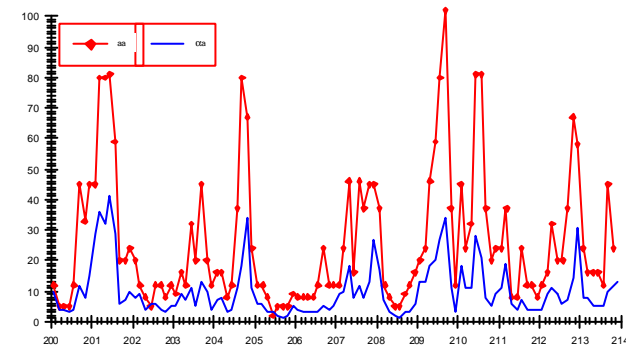
• αa is the average of the two rms (unit: nT).



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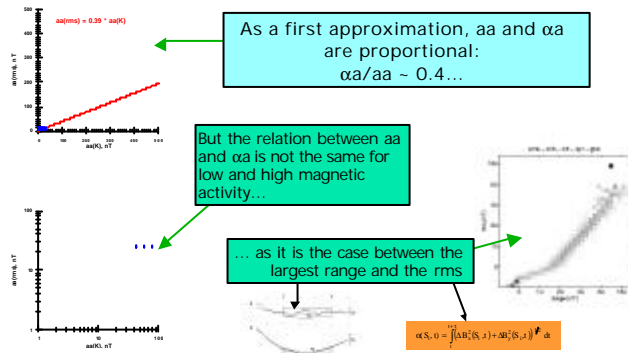
αa versus aa: $\tau = 180$ min. (1)



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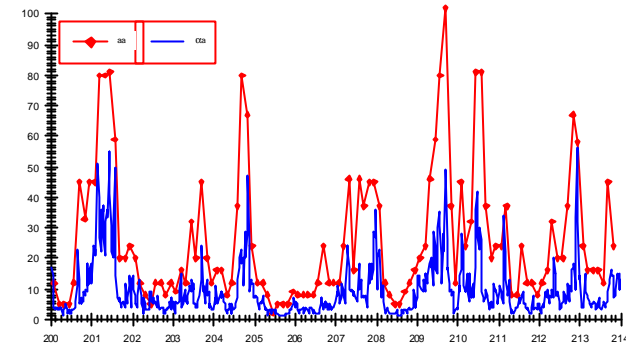
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αa versus aa : $\tau = 180$ min. (2)



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αa versus aa : $\tau = 30$ min.



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Perspectives

Statistical properties of rms-based indices should be investigated

Their efficiency should be assessed on relevant Space Weather situations
 e.g.: thermosphere temperature disturbance related to geomagnetic activity;
 operational orbitography
 operational magnetic activity monitoring and prediction

rms-based indices can be derived on the basis of am and ΔI schemes

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