Geophysical Research Abstracts, Vol. 9, 04849, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-04849

On the geomagnetic activity change from 1900 to 2000

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Abstract

The Aa indices series (Mayaud 1971, 1972) is well recognized as the signature of the geomagnetic activitiy. In this paper we analyse the variation of the Aa indices series by using the work of Legrand and Simon (1989) and Simon and Legrand (1989) who classified the geomagnetic activity in terms of solar activity (solar cycles and solar events). We found that during the last century (1900 to 2000) the number of quiet days (Aa $<$20 nT) drastly diminishes from a mean annual value greater than 270 days a year to a mean value of 160 quiet days a year . This decrease is mainly due to the decrease of very quiet days (Aa $<$13nT). As a consequence the number of disturbed days (Aa $>$=20 nT) increases during the same period from 90 days a year to 210 days a year. The level of the geomagnetic activity is multiply by a factor 3 and the Joule energy dissipated in the Earth's upper atmosphere by a factor 9. This change can be interpreted as due to long term evolution of the solar coronal field topology, for instance the increase of the magnitude of the solar dipole and a decrease of the heliosheet thickness.