Geophysical Research Abstracts
Vol. 13, EGU2011-4707, 2011
EGU General Assembly 2011

Solar activity as manifestation of magnetic field development

Elena Vernova (1), Marta Tyasto (1), and Dmitry Baranov (2)

(1) IZMIRAN, SPb. Filial, Laboratory of Magnetospheric Disturbances, St.-Petersburg, Russian Federation (helena@ev13934.spb.edu), (2) A.F. Ioffe Physical-Technical Institute, St. Petersburg, Russia

Development of the photospheric magnetic fields of the Sun is studied on the basis of the synoptic maps for 1976–2003 (NSO/Kitt Peak). The following groups of magnetic fields are considered separately: B=0–5 G, B=5–20 G, B=20–100 G and B>100 G. For each of these groups, the summary synoptic maps are constructed for the whole period of observations (1976–2003). It is shown that different groups have their own particular regions of latitudinal concentration. The weakest fields (0–5 G) occupy the equatorial region from -10° to +10°, as well as the latitudes from 30° to 60° in each hemisphere. Fields from 5 to 20 G occupy the polar regions. Strong fields from 20 to 100 G and greater than 100 G occupy the royal zone. A narrow strip of enhanced flux of the 20–100 G fields can be seen at latitudes around 65°–75°.

A close connection can be seen between changes of fluxes for these groups of fields and the changes of the solar activity during the 11-year solar cycle. The strongest fields (B>100 G) are concentrated in the latitudinal range 10°–30° of both hemispheres. The flux of these fields varies in accordance with the sunspot cycle. On the other hand, the polar faculae (Kislovodsk Solar Station of the Pulkovo Observatory RAS) show connection with the fields of 20–100 G in the latitude range 65°–75°. These fields develop in antiphase to the solar cycle. It is shown that in the polar faculae zone the leading role belongs to the fields of the same polarity as that of the global magnetic field in this hemisphere.