Geophysical Research Abstracts, Vol. 9, 05370, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-05370

Active longitudes and the magnetic field of the Sun

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Asymmetry of the solar magnetic field distribution and its change in the course of 11-year solar cycle was considered. Observed peculiarities were compared with the asymmetric features of the sunspot distribution. Synoptic magnetogram maps produced by National Solar Observatory/Kitt Peak were used to study the longitudinal distribution of the photospheric magnetic field of the Sun. The data covered the period from 1976 to 2003, i.e. more than one Hale cycle. Superposition of synoptic maps was used as the method of data treatment to emphasize regular features of the magnetic field pattern. Resulting maps differed for the ascending phase and maximum of the solar cycle on one hand and for the declining phase and minimum on the other. Latitude averaged distribution of the magnetic field modulus showed maxima around two roughly opposite Carrington longitudes (180 deg. and 0/360 deg.) for the two characteristic periods. Similar behavior was found by us earlier for the sunspot distribution during 1917-1995. A possible connection of the observed change of active longitude with the polarity changes of Sun's magnetic field in the course of 22-year magnetic cycle is discussed.