

Statistical Sunspot and Active Region Analysis of the Solar Cycle 23 with the Solar Feature Catalogue

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(oral)

The statistical properties of sunspots and active regions (distribution with sizes and latitudes/longitudes) during 9 years of the solar cycle 23 (1996-2005) will be presented based on the results of automated feature detection used in SFC <http://solar.inf.brad.ac.uk/> . The distributions of sunspot and active region numbers versus their areas are a well defined power-law functions that decreases logarithmically with the area increase. The results for the whole period of observation show that only a total number of sunspots rises and decreases with the rise and decline of the cycle while the shape of the area distribution of sunspots is independent of the cycle while revealing a decrease in the number of sunspots towards the cycle decline with a constant scaling factor for all areas. There is a strong North-South asymmetry in areas and magnetic fields of sunspots and active regions that is associated with a global activity wave predicted by the turbulent dynamo theory, a period and a decayparameter of the wave is defined.

An existence of active longitudes is confirmed during the solar cycle 23. As expected from the other cycles, there are largest active complexes of activity located at the active longitudes being separated by 180°. However, in addition, there are also the smaller activity complexes having periods of 300 and 600 that were not reported in the previous cycles.