

SOLAR ACTIVITY INFLUENCE ON EARTH ROTATION

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Abstract. The goal of this paper was to reconsider the existing astronomical, meteorological and other geophysical indicators about solar influence on global atmospheric circulation, geomagnetic field and Earth rotation. The existence and temporal stability of the common oscillations were analyzed, and special attention was paid to investigate the mutual correlation between the solar and geophysical data and the statistical significance of obtained results. The outstanding peaks in the results of spectral analysis, as well as the values of correlation coefficient and cross-correlation function maxima, indicate the fact that there is a significant influence of solar activity on Earth rotation. Some possible physical mechanisms explaining that influence were suggested, and the most important are: a) an interaction between the variable UV radiation, atmospheric ozone and tropospheric circulations, b) variations of cosmic X-ray intensity due to solar activity, causing the variations in air particles ionization that is responsible for cloud appearance and Earth's albedo changes, c) variation of interplanetary magnetic field structure, connected with sunspot evolution and cyclonic activity variations. In all mechanisms, geomagnetic field and atmosphere have the intermediary role between the processes on the Sun and the corresponding disturbances in Earth rotation. According to obtained results, the intermediary role of the atmosphere is more likely, although an analogous role of geomagnetic field cannot be discarded.