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Global water cycle and solar activity variations

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Water cycle is the most active and important component in global mass and energy circulation of the earth system. As well as, water cycle's parameters such as: evaporation, precipitation and precipitable water vapor, play a major role in global climate change. So, in this work we are trying to found any impact of the solar activity on global water cycle. We used for analysing the global monthly values of perceptible water vapour as given by the International Satellite Cloud Climatology Project (ISCCP-D2) dataset, precipitation as given by the Global Precipitation Climatology Project (GPCP-Version 2.2) dataset, and the Solar Modulation Potential in 1983−2008. Numerical simulation of water cycle parameters (precipitation and evaporation) with the help of climate model Planet Simulator for 10 years length was carried out.
The first object of the study is calculation of the global evaporation for period 1983-2008. For this purpose we determine water cycle rate from the satellite data, and precipitation/evaporation relation from Planet Simulator model. The second object of our study is investigation of relationship between solar modulation potential (as solar activity index) and evaporation for period 1983-2008. Results showed that there is a relationship between modulation potential and evaporation values for the period of study. So, we can assume that the solar activity effects on the global water cycle.