



## **Estimation of time propagation of disturbances from geoeffective solar flares**

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We analyze the optical, X-ray and radio data for the solar flares with purpose to determine the time of maximum energy output and generation of energetic particles and shock waves propagating to the Earth. We estimate the onset of disturbance formation at the Sun: the maximum of HXR, appearance of CME and radio bursts of III, II and IV types. We evaluate the duration of propagation of the disturbances for several geoeffective events using the arrival time of large-scale interplanetary disturbances (magnetic clouds, IP-shocks) as well as energetic protons.