**Theoretical models for describing ultra-low-frequency oscillations with periods of about 30 min on the dayside of the magnetosphere**

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The issue of the nature of ultra-low-frequency oscillations with periods of about 30 minutes on the dayside of the magnetosphere during the recovery phase of a geomagnetic storm is considered. Such pulsations were recorded by the GOES geostationary satellites on January 7, 2015. Various theoretical models are considered that can explain such long periods of observed oscillations. Since these oscillations were not recorded by ground-based magnetometers or in the solar wind, only models of intra-magnetospheric generation of oscillations were considered. The simulations were performed using plasma parameters observed by the CCE satellite mission in the geostationary orbit region and under similar geomagnetic conditions, since the GOES satellites have only a limited set of detectors.

Based on the very low frequencies of the observed oscillations, we excluded the interpretation of them by the Alfvén wave from consideration. Three possible interpretations of the observed oscillations were considered: drift-mirror mode, drift-compression mode and ballooning instability. It is shown that the existence of the drift-mirror mode requires a large anisotropy of the transverse and longitudinal pressures, which is not observed on the dayside of the magnetosphere. The existence of the drift-compression mode with the observed periods is possible, but unlikely, since the wave frequency should change following the decrease in the ring current, which is not observed. We assumed that the most likely explanation for the observed oscillations is registration on a geostationary satellite of a stationary azimuthal periodic structure that resulting due to the ballooning instability in the ring current.

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