

Recurrent ionospheric storms

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Recurrent magnetic storms are produced by fast solar wind streams from coronal holes, which co-rotate with the Sun with ~ 27 -day periodicity. The storms accompanied by various ionospheric disturbances with amplitudes of 20 TECU of various temporal and spatial scales. The analysis of these so-called recurrent ionospheric storms was based on global ionospheric maps of vertical total electron content derived from the ground based GPS network. It was found that positive ionospheric storms were developed predominantly in the noon and postnoon sector and they have very large latitudinal and longitudinal extensions of up to 70 and 180 degrees, respectively. Negative ionospheric storms occur mainly in the evening sector and they have ~ 2 time smaller latitudinal and longitudinal extensions. The different location and spatial scales can be explained by different origin of the ionospheric storms. The large-scale positive ionospheric storms are generated by the mechanism of prompt penetration electric field, operating on the dayside. The negative storms can be related to the mechanism of disturbance dynamo electric field, operating in the evening sector, and to the changing of the thermospheric neutral composition, operating on sunlight side.

Keywords: ionospheric storms, recurrent magnetic storms, spatial and temporal scaling