

Response of the ionosphere to the supper geomagnetic storms during 1985-2005

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Following geomagnetic storms, the electron density in the ionosphere often increases/decreases very much from its average level. These are known as positive/negative ionospheric storms. The negative ionospheric storms are more or less understood in terms of the indirect effects of the storm-time thermospheric meridional neutral wind that makes the thermosphere richer in molecular (nitrogen) concentration and poorer in atomic (oxygen) concentration so that chemical recombination becomes faster than normal. The causes of the positive ionospheric storms are not yet understood.

In this paper we present the response of the ionosphere to the supper geomagnetic storms that occurred during 1985-2005, covering two solar cycles. More than 15 supper geomagnetic storms occurred during this period, frequently at solar maxima. The ionospheric peak height, peak electron density and total electron content data from a number of stations around the world are analysed to understand the response of the ionosphere to the supper storms. The positive and negative ionospheric responses are discussed in terms of the (1) direct and indirect effects of the storm-time neutral wind, and (2) penetration and disturbed dynamo electric fields.