

Pre-storm Enhancements of foF2 above Europe

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Some geomagnetic storms are preceded by pre-storm enhancements of the F2 layer maximum electron density represented by enhancements of foF2 several hours before the geomagnetic storm onset. We have analyzed such foF2 enhancements for about one solar cycle, 1995-2005, using data from several European ionosondes. Only pre-storm changes of foF2 by more than 25% with respect to monthly median (i.e. events well above “natural noise”) were considered, and only strong geomagnetic storms were studied. We have analyzed altogether 65 strong geomagnetic storms, out of which 15 (i.e. 20-25%) were preceded by pre-storm enhancements. All observed pre-storm changes of foF2 exhibited positive deviation from the median, mostly in the range 25% to 40 %. Seasonally, the pre-storm enhancement occurrence peaks in summer and is minimum in winter. The enhancements tend to occur more often at decay branch of solar cycle. They are not a local effect, they occur roughly simultaneously and more or less pronounced at all European stations analyzed; they are at least of continental size. The pre-storm enhancements do not seem to display a clear latitudinal dependence, sometimes they are most pronounced even above southern Europe. A preliminary explanation of the pre-storm enhancement occurrence will be given.