Statistical analysis of extreme ionospheric disturbances and their relation to geomagnetic and meteorological activity 555 561

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We study statistics of extreme ionospheric disturbances at Irkutsk (52N, 104E) and Kaliningrad (54N, 20E). The statistics is based on the datasets of F2 peak electron density (NmF2) from Irkutsk and Kaliningrad ionosondes. The NmF2 disturbances are the percentage of differences between the observed NmF2 (NmF2obs) and the 27-day sliding median value (NmF2med): dNmF2(%) = (NmF2obs - NmF2med)/NmF2 med 100%. As extreme NmF2 disturbances we consider cases when dNmF2 > 150%, i.e. the observed NmF2 is larger than the median by at least 2.5 times. As a rule, such extreme events are observed during winter (November-February) nights, not more than one night per month (the exception is January 2005, when 4 extreme nights were observed during the month). The purpose of this study is to find the relation of extreme ionospheric events to manifestations of geomagnetic and meteorological activity. As sources of meteorological activity we consider sudden stratospheric warmings that mainly occur in January-February. As sources of geomagnetic activity we consider recurrent storms that mainly occur about 3 times per month (the exception is January 2005, when 6 recurrent storms were observed during the month). It was found that the extreme ionospheric disturbances are often observed during recurrent ionospheric storms but not every recurrent storm is accompanied by the extreme ionospheric disturbances.

Keywords: ionosphere, recurrent storms, meteorological activity