1 Modeling of variations of ionospheric parameters in East Asia during the moderate geomagnetic disturbances

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In the frames of collaborative Russian-Chinese project the investigations of ionosphere manifestations of magnetic storms along a meridian are continued in three directions: quiet ionosphere, weak and moderate storms, and great storms. In this study the bulk attention is focused on the difference of ionospheric responses to weak and modern storms in different seasons. The morphological analysis is carried out according to the data of ionosheric stations located within the longitudinal sector of 90-130˚E at latitudes from auroral zone to equator. For the purpose to interpret the observed variations of ionosphere structure the modeling three storms observed in different seasons is carried out using the global model describing the auroral, mid-latitude and equatorial ionospheres. Calculations are made with correction of the input parameters according to the available data of different ground observations. A theoretical analysis of the processes controlling the mid-latitude ionosphere response to geomagnetic storm showes a good agreement between the modeling results and measurements, as well as makes it possible to ascertain the crucial role of the neutral composition variations in the observed variations of ionospheric parameters. There is shown that modeling of mid-latitude ionosphere response to the geomagnetic storms should be made for the unfilled plasmasphere. Besides the correction of the thermospheric model MSIS-86 is made which is of the opposite character for summer and winter seasons. At auroral and subauroral stations the electron density variability during the storm is much more pronounced. The discrepancy between the model and measured values of electron density in the evening and night hours at high latitudes is much more. According to the results of analysis of the ionospheric plasma convection trajectories, this variability of ionosheric storm parameters is caused by the combined effect of convection and energetic electron precipitation. At low latitudes the results of calculation of the electron concentration for the weak storms also show a satisfactory agreement with observation.

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