A SUBSTORM IN MIDNIGHT AURORAL PRECIPITATIONS

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On the basis of DMSP F7 satellite observations for the whole of 1986 the empirical model of the midnight auroral precipitation during a substorm was constructed. The model includes the dynamics of different auroral precipitation boundaries during all substorm phases together with simultaneous changes in both an average electron precipitation energy and energy flow in different precipitation zones as well as the IMF and solar wind plasma behavior during the substorm. The analysis of the model shows two important features of precipitations. (1) During the magnetic quietness and just before the beginning of the substorm expansive phase the latitudinal width of the auroral precipitation in the nightside sector is about 5°-6° CGL. (2) Just before the substorm onset time a decrease of the precipitating electron energy in the equatorward part of auroral precipitations was observed simultaneously with an increase in the average precipitating electron energy and energy flows in the poleward part of auroral precipitations.

The analysis of interplanetary medium parameters shows that on the average during the substorm in the progress the solar wind dynamic pressure was about 1,5 that during the period of magnetic quietness. Substorms occurred, generally, during the southward IMF orientation and the substorm onset is not connected with the northern turn of the southward interplanetary B_z. In the winter season substorms were observed mainly during the positive interplanetary B_y and in the summer season they were observed when the interplanetary B_y was negative.