

DEVELOPMENT OF SUBSTORM BULGES DURING STORMS OF DIFFERENT INTERPLANETARY ORIGINS

IRINA DESPIRAK 1, Andris Lubchich 1, Veneta Guineva 2

1. Polar Geophysical Institute, Apatity, Russia,
email: despirak@pgia.ru
2. Solar-Terrestrial Influences Institute, Stara Zagora, Bulgaria,
email: v_guineva@yahoo.com

Different structures in solar wind are observed depending on the type of solar activity: magnetic clouds (MC), recurrent streams (RS), and regions of their interaction with undisturbed solar wind (Sheath and CIR). Three of these structures, namely, Sheath, CIR, and MC, are the sources of geomagnetic storms. Furthermore, the storms originating from these three sources differ in intensity, recovery phase duration, etc. We have searched for distinctions in the development of substorm bulges occurring during geomagnetic storms connected with the MC, Sheath and CIR. Solar wind parameters were taken from the Wind spacecraft observations and the auroral bulge parameters were obtained by data from the Ultra Violet Imager onboard Polar. We determined the longitudinal and latitudinal dimensions of the auroral bulges, the poleward aurora propagation and the onset latitude of auroral bulge. It is shown that auroral bulges “geometry” is different for these types of storms. The largest sizes of auroral bulge are found for CIR- and Sheath-storms situations. The latitudinal size of the auroral bulge during MC-storms is smaller, but the longitudinal size is larger. As consequence, the ratio between longitudinal and latitudinal sizes for substorms during MC is also larger. We suggest the this latter feature is explained by different configuration of the near-Earth magnetotail during CIR- and MC-storms.

storms, auroral bulge, solar wind streams

IRINA DESPIRAK, Polar Geophysical Institute, Apatity, Russia,
email: despirak@pgia.ru