



## **Response of ionosphere and thermosphere during radial interplanetary magnetic field**

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The configurations of ionosphere and thermosphere have been investigated by using high-resolution measurements of CHAMP satellite. During the period IMF  $B_y$  and  $B_z$  components are weak and  $B_x$  keeps pointing to the Earth for almost 10 hours. The geomagnetic indices Dst is about -40 nT and AE about 100 nT on average during the interest period. The CPCP (cross polar cap potential) output by AMIE and calculated from DMSP observations have average values of 15-20 kV. Obvious hemispheric differences are shown in the configurations of FACs on the dayside and nightside. In the south pole FACs diminish in intensity with magnitudes below  $0.25 \mu\text{A}/\text{m}^2$ , the plasma convection retains its quiet time two cell flow pattern, and the air density is quiet low. However, there are obvious activities in the north cusp FACs. One pair of FACs emerges in the north cusp region, which shows opposite polarities to DPY FACs. The new type of currents is accompanied by sunward plasma flow channels. These ionospheric features might be manifestations of the magnetic reconnection processes occurring in the north magnetospheric flanks. The enhanced ionospheric current systems have deposited large amount of energies into the thermosphere, causing enhanced air densities in the cusp region, which subsequently propagate equatorward both on the dayside and nightside. Although the radial IMF is considered as geomagnetic quiet condition, the present study has demonstrated for the first time there are prevailing energy inputs from the magnetosphere to both the ionosphere and thermosphere in the polar cusp region.