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Near-Equatorial Zone: Proton Flux Dependence On L, B

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In this work the features of low-energy proton flux increases in near-equatorial region (McIlvein parameter L<1.15) are investigated. Since Azur satellite measurements at the end of 60th [1,2] the proton flux (with energy from tens keV up to several MeV) increases are registering regularly. However modern proton flux models (for example AP8 model) works at L>1.15 only and does not take into account near-equatorial protons. These fluxes are not too big, but the investigation of this phenomenon is important in scope of atmosphere-ionosphere connections and mechanisms of particles transport in magnetosphere.

In according to double charge-exchange model presented in [1] the proton flux in near-equatorial region does not depend on geomagnetic local time (MLT) and longitude. However the Azur satellite data [2] and Kosmos-484, MIR station and Active satellite data [4,5,6] revealed the proton flux dependence on longitude. The other feature of near-equatorial proton flux is the dependence on geomagnetic local time revealed in the Sampex satellite experiment and other experiments listed above [3,4,5,6].

In this work the dependences on MLT and longitude are investigated using the Active satellite (30-500 keV) and Sampex satellite (>800 keV). This data confirms that main sources of near-equatorial protons are radiation belts and ring current. The other result is that near-equatorial protons are quasitrapped. The empirical proton flux dependences on L, B at near-equatorial longitudes are presented.

Keywords: near-equatorial; low-energy; protons; ring current..

References

[1] Moritz J., Energetic protons at low equatorial altitudes: A newly discovered radiation belt phenomenon and it's explanation, *Z. Geophys*., 38, 701, (1972).

[2] Hovestadt D., B. Hausler, and M. Sholer, Observation of energetic particles at very low altitudes near the geomagnetic equator, *Phys. Rev. Lett*., 28, 1340, (1972).

[3] Greenspan M.E., G.M. Mason, and J.E. Mazur, Low-altitude equatorial ions: A new look with SAMPEX, *J. Geophys. Res*., 104, 19,911, (1999).

[4] Grachev E., O. Grigoryan, J. Juchniewicz, S. Klimov, K. Kudela, A. Petrov, J. Stetiarova, Low energy protons on L<1,15 in 500 – 1500 km range, *Adv. Space Res*, vol 30, No 7, (2002).

[5] Grachev E., O. Grigoryan, J. Juchniewicz, S. Klimov, K. Kudela, A. Petrov, J. Stetiarova, Low energy protons on L<1,15 in 500 – 1500 km range, *Adv. Space Res*, vol 30, No 7, (2002).

[6] Grigoryan O., A. Petrov, K. Kudela: Near-equatorial protons: the local time dependence, *WDS'02 Proc. of Contr. Papers: Part II - Physics of Plasmas and Ionized Media, ed. by J. Safrankova, Praha, Matfyspress*, p. 263-268, (2002).