

The Correlations of Particles Density with Geomagnetic Activity and Solar Dynamic Pressure in Cusp Region

J.K.Shi (1), J.G.Guo (1,2), T.L.Zhang (3), Z.X.Liu (1), A.Fazakerley(4), H.Reme (5), I.Dandouras (5), E.Lucek (6)

(1)Key Laboratory for Space Weather,CSSAR,Chinese Academy of Sciences,Beijing,China; (2)Graduate University of Chinese Academy of Sciences,Beijing,China; (3)Space Research Institute,Austrian Academy of Sciences,Graz,Austria; (4)MSSL,University College London, UK;(5)CESR,Toulouse,France; (6)Imperial College London,UK. (jkshi@center.cssar.ac.cn)

The correlations of particles density with geomagnetic activity K_p index and Solar Dynamic Pressure (P_{dyn}) in the cusp region respectively are investigated. We use the same criterion as that for Polar satellite data analysis to identify the cusp region. The data are from the FGM, CIS and PEACE on board the Cluster encountering the mid-altitude cusp in the late summer and fall in year 2001-2003. We examine the particles dependences on the K_p index and P_{dyn} by corresponding analysis of correlation. The main results are that:(1) of the terrestrial ions, O^+ ion responses in a significant way to K_p index, and He^+ ion is not correlated with K_p index, both of them have significant positive correlation with P_{dyn} ; (2) H^+ ion originating from both the solar wind and the terrestrial ionosphere is observed to increase with P_{dyn} ; (3) of the solar wind origin, He^{++} ion is weakly positive correlated with P_{dyn} , but not correlated with K_p ; (4) electron has positive correlation with P_{dyn} , but no correlation with K_p ; (5) when variation in ions due to P_{dyn} are limited by using low K_p value ($K_p < 2+$), the electron, H^+ ion and He^{++} ion are more positive correlated with P_{dyn} than that by high K_p value ($K_p > 3-$), whereas there is no change for He^+ ion, and less positive correlation for O^+ ion.