



Sources of mixed cusp precipitation patterns at high altitudes

J. Simunek (1), J. Safrankova (2) and Z. Nemecek (2)

(1) Institute of Atmospheric Physics, Prague, Czech Republic, (2) Charles University, Faculty of Mathematics and Physics, Prague, Czech Republic (jsi@ufa.cas.cz)

It was established that the main source of the cusp plasma is reconnection that occurs at the subsolar region during southward IMF, on lobe field lines during northward IMF, and duskward or dawnward of the cusp proper when horizontal IMF components dominate. Each of these locations can be distinguished in high-altitude cusp observations according to specific dispersion patterns. These signatures can be either of spatial or of temporal origin. However, the analysis of cusp observation usually reveals a mixture of different plasma populations. Using observations of the Magion-4/Interball-1 satellite pair, we would like to show that a simple interpretation in terms of IMF direction can lead to misinterpretation because the 3D nature of draping of the magnetic field and the time of flight effect should be considered. For example, the field line reconnecting tailward of the cusp (even during purely northward IMF) actually does not touch the subsolar point (as usually drawn in 2D schemes) but it is already on the flank. After a southward IMF turn, closed magnetopause lines at the subsolar point are in contact with southward IMF and they can reconnect. Consequently, there can be two sources of the cusp plasma operating simultaneously, each of them with specific dispersion patterns.