



Cluster observations of two separated cusp populations: double cusp or motion of the cusp?

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Modelling plasma entry in the polar cusp has been successful in reproducing ion dispersions observed in the cusp at low and mid-altitudes. The use of a realistic convection pattern allowed Wing et al. (2001) to predict double cusp signatures that were subsequently observed by the DMSP spacecraft. In this paper, we present a cusp crossing where two cusp populations are observed, separated by a gap around 1° ILAT wide. Cluster 1 (C1) and Cluster 2 (C2) observed these two cusp populations with a time delay of three minutes and about 15 and 42 minutes later, Cluster 4 (C4) and Cluster 3 (C3) observed, respectively, a single cusp population. A peculiarity of this event is the fact that the second cusp population seen on C1 and C2 was observed at the same time as the first cusp population on C4. This would tend to suggest that the two cusp populations were spatial features similar to the double cusp. Due to the nested crossing of C1 and C2 through the gap between the two cusp encounters, C2 being first to leave the cusp and last to re-enter it, these observations cannot be explained by two stable cusps with a gap of precipitation in between. On the other hand these observations are in agreement with a motion of the cusp first dawnward and then back duskward due to the effect of the IMF-By component.