

Statistical survey of the mid-altitude cusp location: Cluster observation

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A preliminary statistical study of the Cluster cusp crossings during the summer and fall of the 2001-2003 is performed. When Cluster encounters with the mid-altitude cusp, we can see the decreases in magnetic field and increases in the magnetosheath-like plasma. About 100 cusp crossings are chosen for the statistics. The cusp crossing is identified with the magnetic field, low energy electron and ions data. The results show that the invariant latitude range of the cusp is from 70.9 to 81.7 degree in the northern hemisphere and from 72.1 to 80.5 degree in the southern hemisphere. And the Magnetic Local Time (MLT) range is from about 0812 to 1424 in the northern hemisphere and from 0818 to 1448 in the southern hemisphere. The position of the cusp is significantly dependent on the dipole tilt angle. We also calculate the MLT distribution of the cusp locations and the result shows that the peak probability of observing the polar cusp occurs at a little after the MLT noon in the northern hemisphere and at about half an hour before the MLT noon in southern hemisphere. There is no obvious difference in the configuration between the northern cusp and the southern cusp.