Study on cusp/cleft O+ transport path inside the magnetosphere
JING LIAO, LYNN KISTLER, CHRISTOPHER MOUIKIS, Space Science Center, University of New Hampshire — The plasma in the magnetosphere comes from both the solar wind and the ionosphere. Energy from the solar wind can heat and accelerate the ionospheric ions, causing them to flow out from the cusp and be transported across the polar cap, into the magnetotail. The polar orbit of the CLUSTER satellite is ideal for observing the transport path. Using the instrument CODIF/CIS, which measures ion composition from 40 eV to 40 keV, these ions can be identified as tailward streaming O+, with a narrow energy range. We have developed an automated procedure to identify this population. The database gives the occurrence frequency of the streaming O+ as a function of position for geomagnetically quiet and storm times and how it depends on IMF magnitude and orientation, solar wind pressure, and geomagnetic activity. We find that while the beams can be observed for all geomagnetic conditions, their occurrence frequency is much higher during geomagnetic storms. In addition, we find that there is a strong asymmetry in the transport that depends on the y-component of the interplanetary magnetic field.