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The Geomagnetic Spectrometer observed by POLAR/TIDE and simulated by the UT Arlington DyFK transport model WEN ZENG, JAMES HORWITZ, The University of Texas at Arlington, HEATHER ELLIOTT, Southwest Research Institute, THOMAS MOORE, Goddard Space Flight Center — Observations of characteristic streaming energies of outflowing ionospheric ions in the polar cap magnetosphere by approximately noon-midnight orbiting spacecraft frequently indicate a decline of the ion streaming energies from dayside to the night side. When multiple ion species are detected, generally an ion species separation is observed in which for similar energies, H^+ tends to be confined closer to the dayside ion source, followed by He^+ and O^+ toward the nightside. These effects can be viewed as resulting from a natural geomagnetic mass spectrometer. Here we compare ion streaming energy observations by the Thermal Ion Dynamics Experiment (TIDE) on POLAR with ionospheric plasma transport simulations using the UT Arlington Dynamic Fluid Kinetic (DyFK) model. Using realistic parameters for soft electron precipitation and wave-particle heating levels for the creation of the ionospheric cleft ion fountain (CIF) source region, as well as realistic convection values, the DyFK simulations show good agreement with measurements of the ion streaming energies along the POLAR orbit through the polar cap magnetosphere. The POLAR orbit in these cases typically covered an altitude range of 2 to 8 R_E as the spacecraft traversed the polar cap magnetosphere. These and related results will be presented and discussed. This work was completed under financial support by NASA grant NNG05GF67G and NSF grant ATM-0505918 to the University of Texas at Arlington.

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