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A systematic search for direct ionosphere to ring current plasma transfer

T.P. OBrien (1), C. Lemon (1), J. Roeder (1), and J. Fennell (1)
(1) The Aerospace Corporation (paul.obrien@aero.org/310-336-1636)

We present the results of a systematic search for transfer of ionospheric plasma directly into the ring current, specifically on drift shells interior to geosynchronous orbit. We rely primarily on Polar/CAMMICE/MICS particle observations and the Dst index. We start with a broad definition of candidate ionospheric transfer events, which would be identified by increased field-aligned fluxes relative to locally mirroring fluxes, and which would occur preferentially during the main phase or early recovery phase of magnetic storms. We examine hydrogen and oxygen ions in the ring current energy range (roughly 1-100 keV). From this set of candidate events, we can estimate upper limits on the energy and plasma supply to the ring current directly from the ionosphere and on the frequency with which such transfer occur.