The Role of Field-Aligned Current Closure on the E and F-Region Coupled Thermosphere-Ionosphere

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In this study, the behaviour of both E and F-region neutral winds are examined in the vicinity of intense R1 and R2 field-aligned currents (FACs), measured by AMPERE. This is achieved through the dual sampling of both the green (557.5nm) and red (630nm) auroral emissions, sequentially, from a ground based Scanning Doppler Imager (SDI) located in Alaska.

With the addition of plasma velocity data from the Super Dual Auroral Radar Network (SuperDARN) and ionospheric parameters from the Poker Flat Incoherent Scatter Radar (PFISR), we assess how the large closure of Pedersen currents (implied by the strong FACs) modifies the spatial and temporal structure of the neutral wind at different altitudes. We find that the thermosphere becomes significantly height dependent, which could indicate a broader altitude range where the Pedersen conductivity is more important during intense FAC closure.