Multi-instrument Observations of Ion-Neutral Coupling in the Dayside Cusp

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Using data from the Scanning Doppler Imager, the Super Dual Auroral Radar Network, the EISCAT Svalbard Radar and an auroral all-sky imager, we examine an instance of F-region neutral winds which have been influenced by the presence of poleward moving auroral forms near the dayside cusp region. We observe a reduction in the time taken for the ion-drag force to re-orientate the neutrals into the direction of the convective plasma (on the order of minutes), compared to before the auroral activity began. Additionally, because the ionosphere near the cusp is influenced much more readily by changes in the solar wind via dayside reconnection, we observe the neutrals responding to an interplanetary magnetic field change within minutes of it occurring. This has implications on the rate that energy is deposited into the ionosphere via Joule heating, which we show to become dampened by the neutral winds.