Imaging the Thermospheric Wind in the Auroral Oval

Thermospheric neutral wind observed by the Poker Flat Scanning Doppler Imager (SDI). The figure shows the ionospheric electric field from the Weimar convection model with auroral images from the Poker Flat all-sky camera overlaid. The Black arrows show the thermospheric wind image from the SDI every 75 minutes; observations are typically made every 15 minutes. The wind is derived from the Doppler shifted OI(630.0 nm) emission which originates at about 240 km altitude. The transition from antisunward to sunward neutral flow is seen between 0531 and 0801 UT. This is the signature of ion drag transferring westward momentum to the neutral wind from the duskside ion convection. From 0916 UT onward the influence of the cross-polar convection is also obvious, shearing the neutral flow back toward the eastward direction. (Conde, M., et al., Assimilated observations of thermospheric winds, the aurora, and ionospheric currents over Alaska, J. Geophys. Res. Vol. 106, No. A6, p. 10,493, 2001).