

What Drives the Electrodynamics of the Low-Latitude Evening Ionosphere?

*Arthur D Richmond¹, William Evonosky², Tzu-Wei Fang³, Astrid Maute¹

1. NCAR, 2. U. South Florida, 3. U. Colorado

Neutral and plasma dynamics are strongly coupled in the F region. In the low-latitude evening ionosphere an eastward neutral wind is accelerated by a strong eastward horizontal pressure gradient force that is incompletely balanced by ion drag and viscosity. Plasma convection is driven mainly by the zonal neutral wind in the lower Equatorial Ionization Anomaly (EIA) region, balanced by ion-neutral collisions in the E and lower F regions. Increased night-time E-region conductivity retards both ion convection and neutral winds in the F region. Unless the E-region night-time conductivity is large, the accelerating eastward ion convection draws plasma up from lower apex heights, producing the equatorial F-region pre-reversal enhancement of vertical ion drift.