



Equatorial Spread F Initiation and EVEX Results

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EVEX rocket/radar experiments were conducted from Roi Namur in the Kwajalein Atoll in May 2013 to test the conjecture that rapid onset of spread F bubbles following the F-region sunset is a consequence of large differential zonal flows between plasma and neutrals near the geomagnetic equator. Two sounding rockets collecting DC and AC electric field and plasma density measurements were launched into the equatorial ionosphere during an active E-region sunset event being monitored by ALTAIR and IRIS (UHF and VHF) radar systems. TMA and lithium vapor releases by the rockets climbing to 180 and 330 km apogees enabled the measurements of E- and lower F-region neutral winds during this pre-reversal enhancement period followed by spread-F activity. E-region turbulence during sunset and F-region turbulence and plasma drifts that developed subsequently were monitored by ALTAIR and IRIS (a 50 MHz two-element fixed-beam radar interferometer) systems using a combination of coherent and incoherent scatter modes. Winds, drifts, and turbulence data collected during the EVEX campaign support the conjecture that zonal differential dynamics of the plasma and neutrals in the equatorial F region at sunset time has a determining role in the initiation of post-sunset spread F bubbles.