Effect of 22 July 2009 Total Solar Eclipse on D-region Ionosphere: As Studied from Tweek VIf Broadband Measurements

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Tweek radio atmospherics are ELF/VLF electromagnetic pulses launched by individual lightning discharges with certain frequency dispersion characteristics at lower end. These waves propagate long distance with very low attenuation rate (2-3 dB/1000 km) via multiple reflections through the boundaries of Earth-Ionosphere waveguide (EIWG). The dispersion analysis of these tweeks is a well established technique applied to understand the lower ionosphere i.e., ionospheric height, electron density, distance traveled, etc. Tweek data recorded at Indian low latitude ground station Allahabad (Geomag. lat. 16.05[°]N), Nainital (Geomag. lat. 20.48[°]N) and Varanasi (Geomag. lat. 15.91[°]N) during 22 July 2009 total solar eclipse is used in present study to understand the dynamics of Dregion ionosphere during eclipse. Allahabad, Varanasi and Nainital stations was in 100% and 90 % totality paths respectively. It is a well know fact that tweeks are not usually observed at any given location after sun rise. But because of reduction in ionization and night time conditions during eclipse (duration w.r.t. to stations in India 5:30 IST-7:30 IST), we observed good numbers of tweeks during this period in our broad band VLF measurements. So, tweek atmospherics recorded during eclipse have been used to study the variations of lower ionospheric parameters like electron density and reflection height during this period. Lower boundary of the ionosphere, the D-region is pushed up by \sim 6-8 km during different phases of eclipse and decrease in electron density is also observed. Detailed results will be discussed and presented during the workshop.