

## MULTI-DIAGNOSTIC OBSERVATIONS OF EQUATORIAL IONOSPHERIC TURBULENCE

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The highly turbulent equatorial/low-latitude ionosphere during the evening hours can pose serious threat to radio communication and navigation systems in the immediate area. Hence, it is important for us to constantly improve our understanding on the nature of the turbulent ionospheric plasma structures and develop new ways to monitor their occurrence pattern. Specifically, multi-diagnostic observations of turbulent ionospheric plasma structures using a combination of ground-based remote sensing instruments and space-borne in situ measurements would be remarkably useful in providing valuable information on such ionospheric structures. Here, we report on the recent progress made in our ongoing efforts to characterize the large-scale extent of equatorial plasma bubbles (EPBs) over South America using a combination of ground-based GPS receiver network, ionosondes, and data from Plasma Langmuir Probe (PLP) on board the C/NOFS satellite mission. Using the total electron content (TEC) data measured by the ground-based GPS receiver stations, we computed the TEC gradients as well as the rate-of-TEC index (ROTI) as part of our investigation on potential ionospheric threats on SBAS/GBAS systems in the equatorial/low-latitude regions. In addition, we also derived the detrended TEC values (dTEC) using a numerical method developed quite recently [Pradipta et al., 2015] and mapped the calculated dTEC values into a fixed geographical latitude/longitude grid in order to provide a complete situational awareness on the spatial extent of the EPB structures as well as their motion. Case-by-case comparisons between the geospatial dTEC data maps, ground-based ionosonde observations of spread-F echoes, and plasma density depletions as detected by the PLP instrument on board the C/NOFS satellite mission had been carried out and some of the results shall be discussed.

Pradipta, R., C.E. Valladares, and P.H. Doherty (2015), An effective TEC data detrending method for the study of equatorial plasma bubbles and traveling ionospheric disturbances, *J. Geophys. Res. Space Physics*, 120, 11,048-11,055, doi:10.1002/2015JA021723.