

Ionospheric scintillation characteristics from 2010 to 2013 at different longitudes at about 15°S in Australia

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Ionospheric scintillation shows great regional characteristics. In this paper, we studied the GPS amplitude scintillations (S_4 larger than 0.2) from 2010 to 2013 at station Darwin (12.45°S, 130.95°E), Weipa (12.63°S, 141.88°E) and Willis Island (16.29°S, 149.97°E) in Australia, to show the variations of the scintillation characteristics among these three stations with similar latitude but different longitudes. The results show that: The occurrences of scintillation during sunset hours (O_{sunset} , LT 18:00-24:00) are similar to those beyond the sunset hours (O_{other} , LT 0:00-18:00) at all stations, but they have different seasonal variations: at Darwin the O_{sunset} is high in around June and December, but the O_{other} is high in around April and September, so they have great difference; at Weipa the O_{sunset} is high in around April and October, and the O_{other} is high in around April and September, always has one month difference with the O_{sunset} ; at Willis Island the O_{sunset} is high in around January and November in 2012 but high in April and December in 2013, and the O_{other} has similar variation trend with O_{sunset} . Scintillations are stronger from 2010 to 2012 than in 2013 at Darwin and Weipa, but reverse at Willis Island. Comparing the different stations, only the seasonal variation trends of O_{other} at Darwin and at Weipa are similar. We also compare our statistics with gravity wave measurement by GOCE satellite (Gravity Field and Stead-state Ocean Circulation Explore). The scintillation O_{sunset} don't show obvious association with gravity wave activities, while the O_{other} seem to have reverse trends to those of gravity wave activities at the three stations.

Keywords: Ionospheric Scintillation, Middle Latitude, Longitude Difference, Gravity Wave