

Relationship between equatorial plasma bubble occurrence and atmospheric waves in the lower atmosphere

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To know a relationship between plasma bubble occurrence in the equatorial ionosphere and atmospheric wave activity in the lower thermosphere and troposphere, we analyze two-year data of GPS ionospheric scintillation (a proxy of plasma bubble occurrence), neutral wind at around 90 km altitude, and Earth brightness temperature (T_{bb}: a proxy of tropospheric activity). Scintillation and neutral wind data were obtained from three GPS receivers and a meteor radar, respectively, located at Kototabang, West Sumatra in Indonesia (0.2 S, 100.3 E; dip lat. 10.4 S). We find the following: 1) scintillations occur mostly from post-sunset to midnight in equinoctial months, similar to a characteristic of plasma bubble occurrences in the equatorial region, 2) scintillation occurrence and temporal variations of T_{bb} and neutral wind have planetary-wave periods, i.e., periods from a few days to several tens of days, and 3) the scintillations tend to be enhanced when high and low T_{bb} regions are located over the Indian Ocean in the west of Kototabang, suggesting that atmospheric gravity waves propagating upward from the troposphere through the mesosphere may, more or less, contribute to the seeding of plasma bubbles.