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Correlation Between Topside Equatorial Plasma Depletions and Inter-Tropical Convergence Zone

MEI JUNG HO

Huey Ching Yeh

Quiet time ion density depletions observed by the ROCSAT-1 IPEI payload during the solar maximum years of 2000-2002 were used to compile the global occurrence patterns of plasma bubbles at topside ionosphere. The spatial distributions of plasma bubbles are then compared with those of Inter-Tropical Convergence Zone (ITCZ) for solstice seasons when the longitudinal variations of bubble occurrence are most pronounced. We found that the maximum occurrences of seasonal bubble structure are almost all collocated with the most intense rainfall regions of ITCZ. Such spatial correlation exists not only in the seasonal averaged data but also in the monthly averaged patterns, which is demonstrated by comparing the monthly bubble occurrence pattern of 2001 January with that of 2002 January. Significant difference between the two months was found to closely relate to the precipitation anomalies along the northeast coast of Brazil during the two different years. The high spatial correlation between the two structures strongly supports the suggestion that tropospheric seeding associated with ITCZ plays an important role in triggering large-scale plasma bubbles.