

Spring-autumn asymmetry of plasma bubble occurrence and transequatorial meridional wind observed with SEALION ionosonde network

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In Asian longitudes, plasma bubble occurrences are known to be high at equinoctial seasons. Furthermore, it is also known that they are higher in spring (March-April) than in autumn (September-October). The high plasma bubble occurrences in equinoctial seasons have been explained by several mechanisms such as alignment of the magnetic meridian and the sunset terminator. However, the difference between spring and autumn have poorly understood.

With three ionosonde stations of the SEALION ionosonde network (Kototabang (0.2S, 100.3E), Indonesia, Chumphon (10.7N, 99.4E), Thailand, Chiang Mai (18.8N, 98.9E), Thailand) along the magnetic meridian, we have analyzed the ionospheric height variation associated with the prereversal enhancement (PRE). We have found that the north-south asymmetry of ionospheric height is more enhanced in autumn than in spring. This indicates that the transequatorial meridional wind is more stronger in autumn than in spring. Stronger north-south asymmetry of the ionosphere would increase the fieldline-integrated Pederson conductivity, and suppress the plasma bubble development. From our analysis, the spring-autumn asymmetry of the transequatorial meridional wind could be one of the important factors that result the spring-autumn asymmetry of plasma bubble occurrences.