

Intraseasonal variability of the tropical tropopause derived from COSMIC RO data

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The intraseasonal variability of the tropical tropopause temperature and height and its relationship with convective activities are examined by using the 5-yr COSMIC radio occultation (RO) measurements (Nov. 2006 – Oct. 2011) and NOAA/OLR data. The intraseasonal variability of the tropopause properties is extracted using a bandpass filter with a period of 20-90 days. Negative tropopause temperature anomalies associated with the enhanced convection move eastward slowly, occurring over the equator to the east of the convective center and extending poleward to the subtropics to the west, forming the horseshoe-shaped structure. This structure resembles the stationary wave response known as the Matsuno-Gill pattern [Gill, 1980], which is a combined structure of Kelvin and Rossby wave responses to an imposed heating over the equator. A horseshoe-shaped structure index (HSI) [Nishimoto and Shiotani, 2011] is used to represent this structure, and its intraseasonal variability is related to the convective activities especially over the major monsoon regions. As for the tropopause height, enhanced convection tends to locally lower the tropopause height over the Indian and west Pacific oceans significantly, which seemingly reflects the response of the vertically propagating equatorial Kelvin waves to the enhanced convection. The seasonal difference of intraseasonal variability is also investigated.