

Study of the Equatorial Atmospheric Kelvin Waves during El Nino events Study of the Equatorial Atmospheric Kelvin Waves during El Nino events

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The effect of El Nino Southern Oscillation (ENSO) on equatorial stratospheric Kelvin waves is investigated using temperature data retrieved from Global Positioning System Radio Occultation (GPS RO) observations of FORMOSAT-3/COSMIC during the period from August 2006 to December 2013. Enhanced Kelvin wave activity is observed during the El Nino event of 2009-2010. The easterly winds above the tropopause during this period favored the vertically upward propagation of these waves that induced a fast descending westerly regime by the end of 2010. The zero-wind line is observed to take only 5 months to descend from 10 to 50 hPa. Meanwhile, the Westerly Wind Events (WWEs) are noticed in the western Pacific Ocean that might have participated in the occurrence of El Nino which also pushed the low OLR region into the central Pacific region. This study shows using observational data the effect of El Nino on equatorial Kelvin waves and consequently on the stratospheric quasi-biennial oscillation (QBO) through wave-mean flow interactions. Earlier El Nino events of 1987 and 1998 are also investigated, qualitatively, to understand the effects of ENSO on QBO. It is found that although El Nino events can result in enhanced equatorial wave activity, an effect is observed on QBO only when the ambient zonal winds in the lower stratosphere favor their upward propagation and consequently interact with the mean flow.

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