

**SOWER (Soundings of Ozone and Water in the Equatorial Region): Cloud-top height variability associated with equatorial Kelvin Wave in the tropical tropopause layer during the Mirai Indian Ocean cruise for the Study of MJO-convection Onset (MISMO) campaign**

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Cloud-top height (CTH) variability in the tropical tropopause layer (TTL) in association with equatorial Kelvin waves is investigated using a new CTH dataset based on MTSAT-1R geostationary satellite measurements with a statistical look-up table constructed based on CloudSat measurements. We focus on a case in the tropical Indian Ocean during October-December 2006, when shipboard radiosonde, TTL water vapor, and 95-GHz cloud radar measurements were taken during the Mirai Indian Ocean cruise for the Study of the MJO-convection Onset (MISMO) field campaign. At 10-15 km, the satellite-based CTH data agree well with the radar echo top heights from shipboard radar reflectivity data. During the MISMO campaign, cloud frequency was suppressed in the warm phase of equatorial Kelvin waves propagating in the TTL. The suppressed-cloud region moves eastward to the western Pacific together with Kelvin waves. We found that changes in CTH occurrence frequency over the vessel in association with Kelvin waves are much greater than those associated with the diurnal cycle. It is expected that the phase of equatorial Kelvin waves is important for the intraseasonal variabilities of both the radiative budget of the tropical atmosphere and water vapor transport in the TTL.