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Cirrus cloud variabilitiy in association with two periods of equatorial waves (~4 days period and ~16 days period) is observed using 15 balloon-borne Cryogenic Frostpoint Hygrometers (CFH), Vaisala RS92 radiosondes at 3-hourly intervals, and a shipboard high spectral resolution lidar system over the R/V Mirai (8.0°S, 80.5°E) in November 2011 during the Cooperative Indian Ocean experiment on intraseasonal variability in the Year 2011 (CINDY2011)/the Dynamics of the Madden-Julian Oscillation (DYNAMO) field campaign. The ~4 days (~16 days) period waves showed the meridional mode number; n = 0 eastward inertial gravity waves and equatorial Kelvin waves (the equatorial Kelvin waves) dynamical characteristics.

From the early to middle of November, cirrus clouds appearance primarily corresponded with high supersaturation and high relative humidity with respect to ice due to the temperature disturbances by the equatorial waves of a ~4 days period within an altitude range 12 km and the cold-point tropopause. However if a warm phase of a ~16 days period equatorial Kelvin wave passes just above the cold-point tropopause, the cirrus clouds are absent around the cold-point tropopause though the waves of a ~4 days period provide the preferable wet conditions for the cirrus appreance. Our multi-instrument cirrus measurements have revealed that we should consider not only a long-period wave phase but also a short-period one when the dedydration amount variability due to cirrus clouds is estimated around the cold-point tropopause.