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Gravity wave variability in the equatorial MLT region over Pameungpeuk, Indonesia (7.4°S, 107.4°E)

Venkateswara Rao Narukull^{1*}, Toshitaka Tsuda¹

¹RISH, Kyoto University, Uji, Japan

We study short period gravity waves (20-120 min.) in the equatorial Mesosphere and Lower Thermosphere (MLT) observed by an MF radar at Pameungpeuk (7.4°S, 107.4°E). In particular, we study diurnal variation of short period gravity wave variance and its relation to convection in the troposphere. Overall, the gravity wave variance at 88 km enhances between 20 LT and 07 LT, with a peak around 3 LT. The enhancement is mainly observed during September-October and February-April. The convective activity persists from 14 - 24 LT with a peak activity around 18 LT and enhances between November-April. Time delay between the peak of convective activity and peak of GW enhancement is 1-15 hours. This agrees well with theoretical calculations and previous reports based on reverse ray tracing analysis. This study shows that, indeed, convection is the major source for gravity waves observed in the equatorial MLT region.

Keywords: MLT Dynamics, Gravity waves, MF Radar, Convection