

# Atmospheric dynamics in equatorial region based on equatorial atmosphere radar (EAR) observations

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The equatorial Indonesia region is a center of intense atmospheric motions closely associated with global atmospheric change. The world's most active convective clouds are generated in this region. The 47-MHz Equatorial Atmosphere Radar (EAR) installed right at the geographic equator in West Sumatra, Indonesia (0.20S, 100.32E) in 2001. It has a near-circular active phased array antenna system. The field is approximately 110 m in diameter, and consists of 560 three-element Yagi antennas. The output power of the EAR is 100 kW (peak envelope). It can observe atmospheric echoes in 1.5-20 km altitude, and ionospheric irregularity echoes from the E-region and F-region. Atmospheric observation data from the EAR are publicly available at the following web address: <http://www.rish.kyoto-u.ac.jp/ear/data/>

The purpose of this study is to investigate various atmospheric waves in the equatorial region and the tropical tropopause layer (TTL) by means of long-term observations with the EAR. We have continued observations of the troposphere and the lower stratosphere since the radar's inauguration in June 2001. Long-term operation of the EAR elucidates behavior of equatorial atmospheric waves and their interaction with the background atmosphere. We found a modulation of tropopause height by breaking Kelvin waves that seemed to cause exchange of air mass between the troposphere and the stratosphere.