

# Atmospheric observations of tropical tropopause region with the Equatorial Atmosphere Radar

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## 1. Introduction

West Pacific region is a high cumulus convection area, and is considered to be a source of global atmospheric circulation. Nevertheless, the mechanism of atmospheric circulation is not clarified because of sparseness of observation data. Equatorial Atmosphere Radar (EAR) was installed in West Sumatra in the Republic of Indonesia in March 2001. Specifications of the EAR are as follows:

- (a) Location: 100.32E, 0.20S
- (b) Frequency: 47.0 MHz
- (c) Output power: 100 kW (Peak envelope)
- (d) Antenna system: Quasi-circular active phased array  
(110 m diameter, 560 three-element Yagis)
- (e) Beam width: 3.4 deg. (Half power, one-way)
- (f) Beam direction: Anywhere (within 30 deg. zenith angles)
- (g) Observation range: 1.5 km-20 km  
(Atmospheric turbulence),  
higher than 90 km  
(Ionospheric irregularity)

After a three month test observation, continuous observations including tropopause region has been performed since the end of June 2001.

## 2. Observation Results

Through continuous observations near tropopause region, good correspondence between the lapse-rate tropopause (LRT) observed with radiosondes and the lower edge of high echo power region observed with the EAR were shown.

This fact in the mid-latitude region was shown by Gage et al. [1982], but this is the first result in the tropical region, and the long-term continuous estimation of LRT from the echo power is expected.

Temporal variations of LRT height show a good correspondence with those of zonal wind, and Kelvin waves affect the changes of LRT height.

## 3. Conclusion

The EAR is able to observe three-dimensional winds and turbulence echoes continuously with good time and height resolutions, which are not achieved by radiosonde observations.

In the presentation, we will show continuous observation results near tropopause region.

The EAR is able to observe vertical wind, which is also one of strong points of it.

We will also show the observation results of vertical wind in the presentation.

## 4. References

Gage, K. S. and J. L. Green, An objective method for the determination of tropopause height from VHF radar observations, *J. Appl. Meteor.*, 21, 1150-1154, 1982.