

**DISTRIBUSI ARAH VERTIKAL HUJAN KONVEKTIF KUAT  
DI INDONESIA**

**SKRIPSI**



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### ABSTRAK

Telah dilakukan analisis distribusi arah vertikal awan konvektif kuat di Indonesia dengan menggunakan data *radar reflectivity factor* (dBZ), dari satelit *Tropical Rainfall Measuring Mission (TRMM) Precipitation Radar (PR) 2A25* selama 10 tahun pengamatan (1998-2007). Distribusi arah vertikal didefinisikan dalam dua tipe sel konvektif yaitu cumulonimbus tower (CbT) dan intense convective clouds (ICC) mengikuti pengelompokan dari beberapa penelitian sebelumnya. Data dBZ diasumsikan sebagai CbT jika mengandung  $Z > 20$  dBZ pada ketinggian 12 km dengan kedalaman 9 km. Awan ICC dibedakan menjadi dua ketinggian,  $Z > 30$  dan  $Z < 30$  dBZ pada ketinggian 8 (ICC8) dan 3 km (ICC3), masing-masingnya. Penelitian ini menemukan bahwa awan konvektif kuat lebih sering diamati pada daratan seperti Sumatera, Kalimantan, Jawa, daripada kawasan lautan. Hal ini konsisten dengan tingginya nilai CAPE di daratan terutama Indonesia bagian barat. Di bawah *melting layer*, peningkatan nilai  $Z$  terhadap penurunan ketinggian (downward increasing/DI) dominan teramati di lautan dan pantai dimana awan CbT mempunyai gradien DI terbesar. Sebaliknya, pada ketinggian di atas *melting layer*, awan CbT memiliki gradien DI terkecil yang menggambarkan pertumbuhan butiran presipitasi paling kecil dibandingkan dengan ICC8 dan ICC3. Hal ini berbeda dengan penelitian sebelumnya yang mendapatkan CbT memiliki tingkat pertumbuhan paling besar. Frekuensi kemunculan dan intensitas konvektif kuat dipengaruhi oleh musim dimana konvektif kuat banyak teramati pada bulan-bulan basah (MAM dan SON). Walaupun demikian, pengaruh musim terhadap pertumbuhan dan evolusi butiran presipitasi dari konvektif kuat tidak teramati dengan jelas dimana gradien  $Z$  di atas dan di bawah *melting layer* hampir sama untuk setiap musimnya.

Kata kunci: radar reflektivitas, awan konvektif kuat, Indonesia, TRMM-PR 2A25

## VERTICAL DISTRIBUTION OF INTENSE CONVECTIVE PRECIPITATION OVER INDONESIA

### ABSTRACT

The vertical structure in intense convective clouds over Indonesia has been analyzed using radar reflectivity factor (dBZ) data from satellite Tropical Rainfall Measuring Mission (TRMM) Precipitation Radar (PR) product during 10-year time span (1998–2007). The vertical structure of dBZ at the PR pixel scale has been classified into two type of convective cells, i.e., cumulonimbus tower (CbT) and intense convective clouds (ICC) following the classification proposed by some previous studies. The CbT contains  $Z > 20$  dBZ at 12 km altitude with at least 9 km deep and the ICC contains  $Z > 30$  and  $Z > 41$  dBZ at 8 and 3 km, respectively. It is found that convective cells is more frequently observed over land such as Sumatera, Kalimantan and Java, than over ocean areas. This is consistent with the value of CAPE, especially in land of western Indonesia. Below the melting layer, an increase in  $Z$  value towards the surface (downward increasing / DI) is predominantly observed in oceans and coastal where the CbT cloud has the largest DI gradient. On the other hand, at the altitude above the melting layer, CbT clouds have the smallest DI gradient that indicates the smallest growth of hydrometeor compared to ICC8 and ICC3. This is in contrast to previous studies which find the the CbT has the highest growth rate of hydrometeor. The occurrence frequency and convective intensity is influenced by the season where more intense convective is observed during wet months (MAM and SON). However, the influence of seasons on growth and evolution of hydrometeor of intense convective is not clearly observed where the gradient of  $Z$  above and below the melting layer is almost the same for each season.

Keywords: radar reflectivity, intense convective clouds, Indonesia, TRMM-PR 2A25