

Spatial variability of summer monsoon raindrop size distribution over Western Pacific Ocean.

*BALAJI KUMAR SEELA¹, JAYALAKSHMI JANAPATI², PAY-LIAM LIN², KRISHNA REDDY KRISHNAREDDYGARI³, Ryuichi Shiroyuka⁴

1. Department of Atmospheric Science, National Central University & Taiwan International Graduate Program (TIGP), Academia Sinica, Taiwan, 2. Department of Atmospheric Science, College of Earth Science, National Central University, Taiwan., 3. Department of Physics, Yogi Vemana University, Kadapa, Andhra Pradesh, India, 4. Department of Coupled Ocean-Atmosphere-Land Processes Research, Japan Agency for Marine-Earth Science and Technology, Yokosuka, Japan

Raindrop size distribution (RSD) characteristics in summer monsoon (June to August) rainfall of two observational sites [Taiwan (24° 58' N, 121° 10' E), Palau (7° 20' N, 134° 28' E)] in Western Pacific region are studied by using four years of impact type disdrometer data. In addition to disdrometer data, TRMM, MODIS, ERA-Interim data sets are used to illustrate the dynamical and microphysical characteristics associated with summer monsoon rainfall of Taiwan and Palau. Significant differences between raindrop spectra of Taiwan and Palau rainfall are noticed. Palau rainfall is associated with higher concentration of small drops when compared to Taiwan rainfall. RSD of Taiwan and Palau rainfall are fitted to gamma distribution. RSD stratified on the basis of rain rate showed higher mass weighted mean diameter (D_m) and lower normalized intercept parameter ($\log_{10}N_w$) in Taiwan than Palau rainfall. Even after classifying the precipitation in stratiform and convective regimes, Taiwan rainfall showed higher D_m values than Palau rainfall. Furthermore, the mean value of D_m is higher in convective precipitation as compared to stratiform precipitation for both the locations. Radar reflectivity (Z) and rain rate (R) relations ($Z = A \cdot R^b$) derived for Taiwan and Palau showed a clear variations in the coefficient with less variation in exponent values. Terrain influenced clouds extended to higher altitudes over Taiwan resulted with higher (lower) D_m ($\log_{10}N_w$) values in Taiwan rainfall as compared to Palau.

Keywords: Raindrop Size Distribution (RSD), mass weighted mean diameter, Normalized intercept parameter.