

Title: Statistical and physical descriptions of raindrop size distributions in equatorial Malaysia from disdrometer observations

Author/Authors: Hong Yin Lam, Siatling Jong, Jafri Din

Abstract: This work investigates the physical characteristics of raindrop size distribution (DSD) in an equatorial heavy rain region based on three years of disdrometer observations carried out at Universiti Teknologi Malaysia's (UTM's) campus in Kuala Lumpur, Malaysia. The natural characteristics of DSD are deduced, and the statistical results are found to be in accordance with the findings obtained from others disdrometer measurements. Moreover, the parameters of the Gamma distribution and the normalized Gamma model are also derived by means of method of moment (MoM) and maximum likelihood estimation (MLE). Their performances are subsequently validated using the rain rate estimation accuracy: the normalized Gamma model with the MLE-generated shape parameter μ was found to provide better accuracy in terms of long-term rainfall rate statistics, which reflects the peculiarities of the local climatology in this heavy rain region. These results not only offer a better understanding of the microphysical nature of precipitation in this heavy rain region but also provide essential information that may be useful for the scientific community regarding remote sensing and radio propagation.