

Frequency distribution of raindrop size observed by an optical disdrometer during heavy rainfall in Tokyo

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Frequency distribution of raindrop size during rainfall varies depending on the rainfall type and its intensity (e.g., Marshall and Palmer, 1948). The frequency distribution of raindrop size shows a lot of information to understand not only the difference in rainfall characteristics by region and season but the development of convective clouds that cause heavy rainfall. The purpose of this study is to clarify the relationship between the life stage of convective clouds and frequency distribution of raindrop size observed in the Tokyo Metropolitan area.

Currently, optical disdrometers (Thies Clima Laser Precipitation Monitor 5.4110, etc.) are installed at six sites in the Tokyo Metropolis and Sendai City. In this study, using the observation data in Tokyo from April to September in 2014, minutely rainfall intensity and the number of raindrops for each 22 class of raindrop size (sphere equivalent diameter) were examined. Contribution ratio of raindrop water for each class to the rainfall amount was calculated to investigate the temporal changes in heavy rainfall case on July 20, 2014. As a result, it was observed that an increase in contribution ratio of large size raindrops corresponds to an increase in rainfall intensity. The difference in frequency distribution due to the relative position within a convective system and the temporal changes in the other heavy rainfall cases will also be investigated.

Keywords: Raindrop size, Frequency distribution, Rainfall intensity, Optical disdrometer