

In-situ observation of the rain drop size distribution over the ocean by the instruments onboard R/V Mirai

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The drop size distribution (DSD) of precipitation, including the information about the number of droplets in each size bin, is the important parameter to estimate the fresh water flux from radar, to estimate the surface mechanical mixing by impacts of falling rain, and to estimate the cloud microphysics aloft. However the past in-situ measurements of DSD have been made over landmass, not over ocean, while the previous studies pointed that the precipitation characteristics differ between continental and oceanic ones. To tackle this issue, we installed optical disdrometers onboard the research vessel Mirai, who cruises various climate regime ranging from tropics and polar region. In the present study, the data in the tropical area (i.e. only for raindrops) are analyzed as the R-Dm relationship, which is one simple expression of the DSD. The obtained R-Dm relationships slightly differ from that obtained from "global average" by Kozu et al. (2009) with excess of large drops, while the land-based observations by similar instruments resembles to Kozu et al. (2009). The excess of large drops are more significant (1) over ocean than land, (2) in case of Pre-PMC near coast of Sumatra Island in the Maritime Continent than other tropical cruises, (3) under the stratiform precipitation than under the non-stratiform precipitation, and (4) in data by LPM than by Parsivel. The instrumental dependency was further examined by comparing the other raingauges.

Keywords: drop size distribution, oceanic rainfall, research vessel Mirai