Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

ACG05-P02 Room:Convention Hall Time:May 24 16:15-17:30

Microstructure of Precipitation in Different MJO Phases over Sumatra

Marzuki Marzuki[1*], Hiroyuki Hashiguchi[1], Masayuki Yamamoto[1], Toshiaki Kozu[2], Toyoshi Shimomai[2]

[1]Research Institute for Sustainable Humanosphere, Kyoto University, [2]Interdisciplinary Faculty of Science and Engineering, Shimane University, [3]Department of Physics, Andalas University, Indonesia

1 Introduction

Natural variabilities of precipitation microstructure (e.g., DSD) substantially limit the accuracy of some DSD applications such as radar-derived rainfall. The aim of the present study is to investigate the intraseasonal variation of precipitation microstructure at Kototabang, west Sumatra, from long term precipitation data record.

2 Data and Methodology

The DSD observation was from a 2D-Video Disdrometer (2DVD), about eight years (end of 2002?2010). The vertical profile of DSD was from 24 GHz Micro Rain Radar (MRR). 1.3 GHz wind profiler data were used to determine the precipitating cloud type. Horizontal distribution of precipitation around 2DVD was observed by using 9 GHz X-band weather radar. Precipitation data were classified into three categories of MJO phase, i.e., (i) active, (ii) inactive/suppressed and (iii) weak MJO. Active and suppressed MJO are strong MJO phase in which the amplitude of MJO is greater than unity. For Kototabang, active convection was assumed when the MJO is during phases 2, 3, 4, and 5, and inactive/suppressed convection was assumed during phases 6-8 and 1. All cases with the amplitude of MJO being less than unity are assumed as weak MJO phase.

3 Results

During light rain, a slight difference in the DSD could be seen in which the DSD during inactive phase had more large drops than during active phase. The evidence of intraseasonal variation of DSD become more obvious during heavy rain in which the DSDs were much broader during inactive than active MJO phases, consistent with the previous study [1, 2]. Figure shows diurnal variation of percentage of rainfall contribution for several rain types during active and inactive MJO phases. During active MJO phase, shallow convective rain was dominant while deep convective rain was dominant during inactive phase. Detailed analysis regarding the intraseasonal variation of precipitation microstructure over Sumatra will be presented in the meeting.

References

[1] Kozu, T., T. Shimomai, Z. Akramin, Marzuki, Y. Shibagaki, and H. Hashiguchi (2005), Intraseasonal variation of raindrop size distribution at Koto Tabang, West Sumatra, Indonesia, Geophys. Res. Lett., 32, L07803, doi:10.1029/2004GL022340.

[2] Marzuki, T. Kozu, T. Shimomai, W. L. Randeu, H. Hashiguchi, and M. Vonnisa (2010), Raindrop size distributions of convective rain over equatorial Indonesia during the first CPEA campaign, Atmos. Research, 96, 645-655.

Keywords: Precipitation, MJO