The Study of the Record-Breaking Rainfall in Japan in July 2018 based on Ensemble Simulation using the Non-hydrostatic Icosahedral Atmospheric Model

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The record-breaking rainfall in Japan in July 2018 damaged a large area of western Japan. Main reasons of this event are considered as follows: (1) Concentration of water vapor in two very moist airstreams maintained over western Japan, (2) Persistence of upward flow associated with activation of a stationary Baiu front, (3) Formation of mesoscale line-shaped precipitation systems (Tsuguti et al. 2018). This study especially focuses on the environmental field before the formation of the linear precipitation zones and the active convection in East China Sea, which has contributed moistening the middle-to-upper troposphere above the area and thereby the continual influx of the moist atmosphere to western Japan was reinforced (Shimpo et al. 2019). To investigate the relationship between these, numerical ensemble simulation using the cloud system resolving model (NICAM; Non-hydrostatic Icosahedral Atmospheric Model) is conducted, and the result is amply similar to reanalysis data. Firstly, from the analysis of the result, convective activity in East China Sea and the environmental field of line-shaped precipitation systems are related to each other. Secondly, the active convection is related to the depth of upper trough and ridge located above China at 200hPa. Considering these results, the meandering of Polar jet is linked to the line-shaped precipitation systems occurrence in western Japan via continuous active convection in East China Sea.

Key words: NICAM, Line-shaped Precipitation Systems, Heavy Rainfall, Convection

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