Plain Language Summary: We propose a new procedure for the objective identification and classification of heavy rainfall areas (HRAs) to advance the understanding of mesoscale convective systems (MCSs) in Japan. The distributions of accumulated precipitation amounts are evaluated from the radar/raingauge-analyzed precipitation amounts and characteristic features of HRAs are examined. The HRAs extracted during the warm season (April–November) in 2009–2018 are classified into four types (e.g., linear-stationary, linear, stationary, and others) from their morphological features and temporal variations.
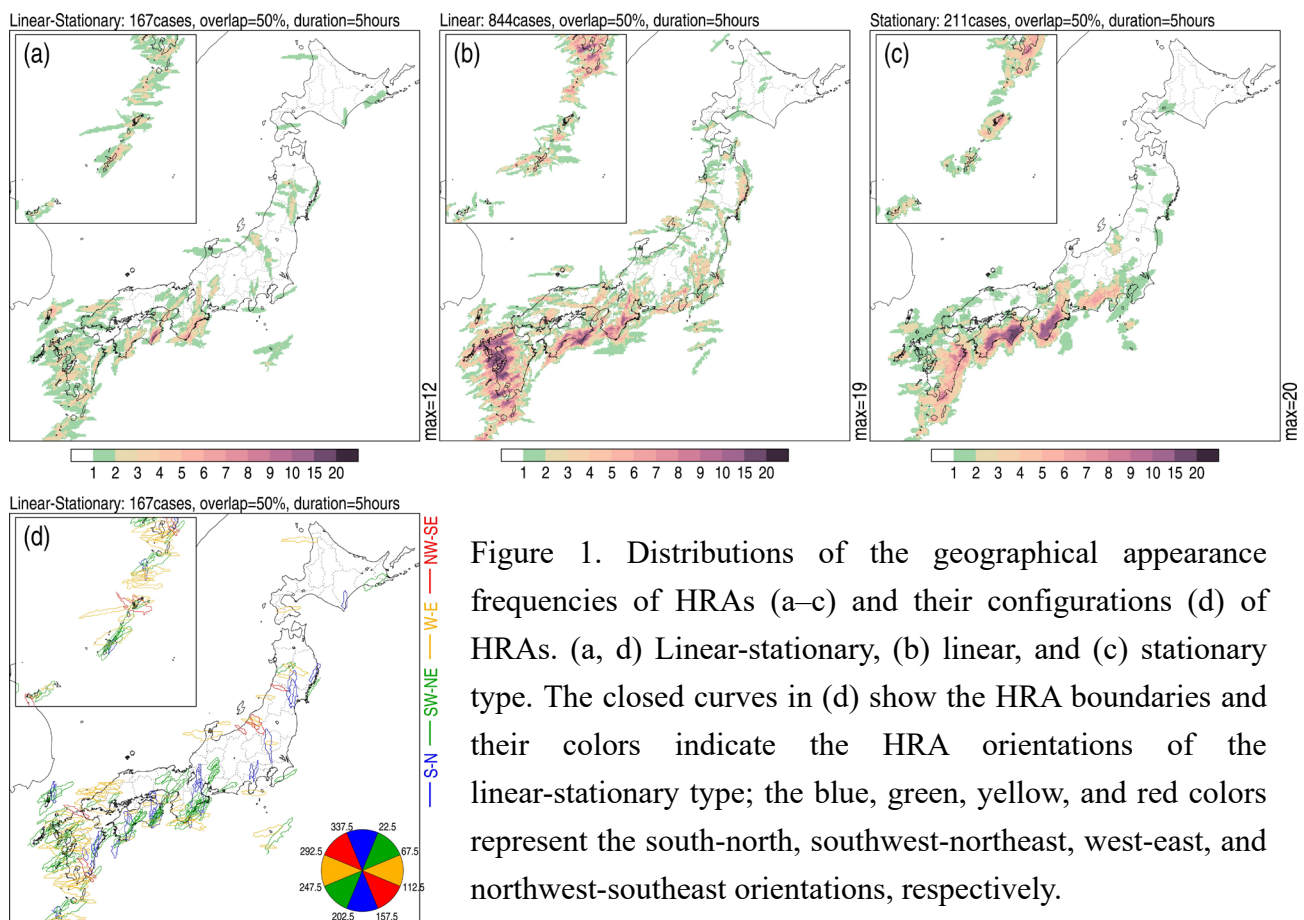

Figure 1. Distributions of the geographical appearance frequencies of HRAs (a–c) and their configurations (d) of HRAs. (a, d) Linear-stationary, (b) linear, and (c) stationary type. The closed curves in (d) show the HRA boundaries and their colors indicate the HRA orientations of the linear-stationary type; the blue, green, yellow, and red colors represent the south-north, southwest-northeast, west-east, and northwest-southeast orientations, respectively.

- HRAs are frequently distributed on the Pacific sides of eastern and western Japan; 80% of HRAs appeared from June to September and 60% of the HRAs were observed in association with stationary fronts and tropical cyclones.
- Most HRAs are reasonably identified and classified based on their morphological features despite the simplified procedures, e.g., approximately 80% of those HRAs of the linear-stationary type corresponded to typical elongated and stagnated MCSs, as has been suggested in previous studies.