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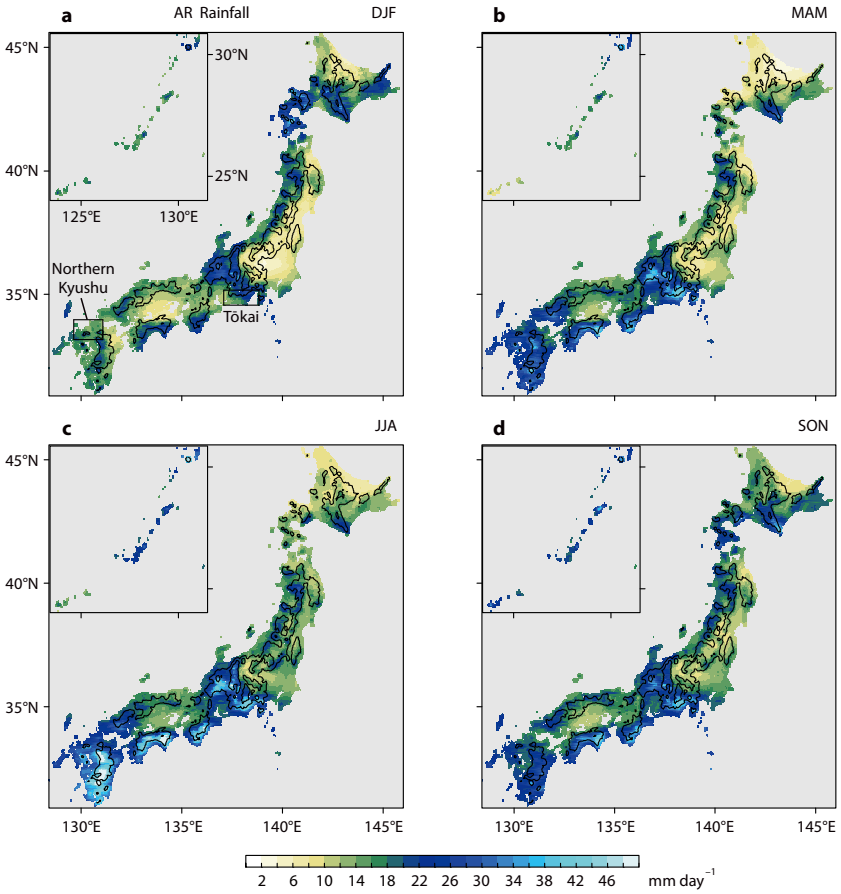

Figure 1. Climatology of precipitation (mm day^{-1}; 0.05° × 0.05° resolution) accompanied with atmospheric river (AR) over Japan detected by JRA-55 vertically integrated water vapor transport. (a) December-to-February (DJF), (b) March-to-May (MAM), (c) June-to-August (JJA), and (d) September-to-November (SON) mean. Upper left corners represent the Ryukyu Islands. Thin contours represent topography (400 and 1,200 m).

- This study evaluates contribution of atmospheric rivers (ARs) to the hydrological cycle over East Asia (Fig. 1) using high-resolution daily rainfall observations and vertically integrated water vapor transport in atmospheric reanalysis.
- ARs account for 14–44% of total rainfall and 20–90% of extreme heavy-rainfall events over East Asia during warm seasons despite their low occurrence.
- AR-related extreme rainfalls are especially dominant over western-to-southeastern slopes of terrains over the Korean Peninsula and Japan, owing to strong orographic effect and a stable direction of the low-level moisture flow.
- A strong relationship between warm-season AR heavy rainfall and preceding-winter El Niño is identified since the 1970s, suggesting a high seasonal predictability of AR-related natural disaster risk over Korea and Japan.