

Takasaki, Y., M. Yoshizaki, A. Suzuki-Parker, and Y. Watarai, 2019: Sensitivity of quasi-stationary band-shaped precipitation system to topography: A case study for 28 August 2008 Okazaki heavy rainfall event. *J. Meteor. Soc. Japan*, **97**, <https://doi.org/10.2151/jmsj.2019-026>.

Plain Language Summary: This study presents sensitivity numerical experiments to examine the impact of surrounding mountainous topography on the quasi-stationarity of the precipitation system using the Weather Research and Forecasting (WRF) model with 500 m horizontal resolution. In an experiment without the mountains to the east of Okazaki city, the quasi-stationary precipitation system was not reproduced. On the other hand, experiments including eastside mountains produced a low-level convergence in south of Okazaki city, resulting in the quasi-stationary precipitation system and prolonged precipitation as observed near Okazaki city.

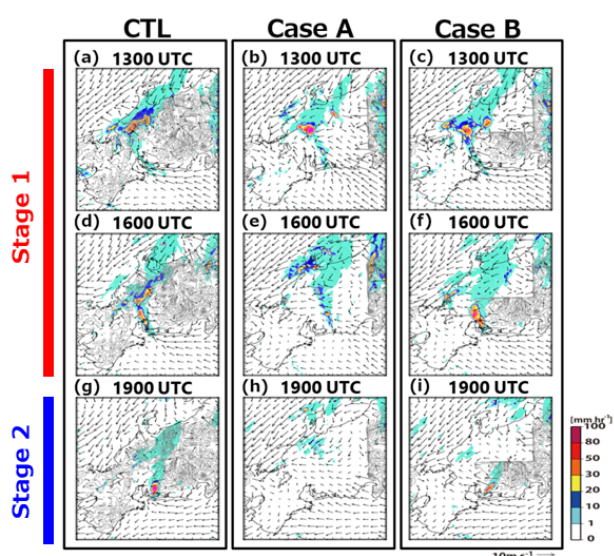


Figure 1. Simulated horizontal distributions of hourly precipitation (mm hr^{-1}) and surface winds by sensitivity experiments at 28 August 2008 at 1300, 1600, and 1900 UTC for (a), (d), (g) CTL (with real topography), (b), (e), (h) Case A (all mountains within ~ 200 km from Okazaki city are removed), and (c), (f), (i) Case B (similar to Case A, all mountains within ~ 200 km from Okazaki city are removed except for the southeastern quadrant). Thin solid line contours indicate topography (drawn at 200 m interval).

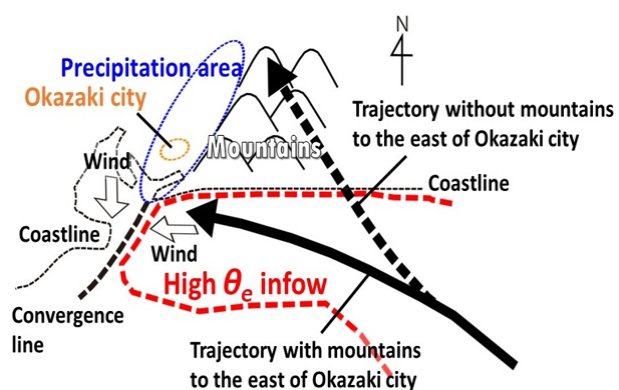


Figure 2. A schematic illustration of the quasi-stationary precipitation system described in the present study.

- In Case A, unlike CTL, the precipitation system dissipated by 1900 UTC. In contrast, the Case B experiment reproduced the quasi-stationary precipitation from 1600 UTC to 1900 UTC around Okazaki city (Fig.1).
- Southeasterly winds from the ocean shifted to easterly due to enhanced pressure gradient associated with presence of the mountains to the east of Okazaki city.
- The sustained easterlies continuously supplied warm and moist air to Okazaki city and formed a low-level convergence to restrict the eastward movement of the precipitation system (Fig.2).