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Observing severe precipitation near complex topography during the Yilan Experiment of Severe Rainfall in 2020 (YESR2020)

Abstract

With northeasterly prevailing wind under the active East Asian winter monsoon, stratocumulus clouds with heavy rainfall exceeding 100 mm · day-1 often occur over the plain and near the mountains in Yilan, Taiwan. The Yilan Experiment of Severe Rainfall is a field campaign during 20-24 November 2020 to study the multi-scale interactions between terrain, circulation, and precipitation in winter. High temporal and spatial resolution sounding observations reveal the three-dimensional structure of the wind field and the atmospheric environment in this study.

During YESR2020, the variability of the local-scale wind patterns and the characteristics of the heavy rainfall were captured by the observations. Preliminary analysis showed that a local-scale convergence line could appear over the Yilan Plain under the northeasterly environment, the precipitation hotspot was located in the mountainous area of southern Yilan, where the local winds signified turbulence features, and the severe rainfall could be the shallow convection under stratus with warm rain processes revealed by the radar observation.

The results of YESR2020 inspire the design of future field observations and offer some ideas to explore detailed mechanisms of severe rainfall in Yilan, like studies about terrain sensitivity test, microphysics processes, and thermodynamic field simulation with different meteorological tools.

Keyword

Yilan Experiment of Severe Rainfall

Reference

Su, S.-H., Chang, Y.-H., Liu, C.-H., Chen, W.-T., Chang, W.-Y., Chen, J.-P., et al. (2022) Observing severe precipitation near complex topography during the Yilan Experiment of Severe Rainfall in 2020 (YESR2020). *Q J R Meteorol Soc*, ***148(745)***, 1663–1682. Available from: https://doi.org/10.1002/qj.4271