

國立中央大學大氣物理研究所書報討論

Date: 09/22

Location: S1-713

Speaker: Hou-Lun Lao

Advisor: Prof. Sheng-Hsiang Wang,

Influence of Monsoonal Wind Speed on Intensity and Diurnal Variations of the Mei-Yu Season Coastal Rainfall over South China

Abstract

Previous studies have primarily focused on the influence of monsoon wind speeds on the land-sea breeze, but a detailed exploration of physical mechanisms underlying the influence of monsoon wind speeds on coastal rainfall remains unexplained and underexplored. This study performs the Weather Research and Forecasting (WRF) model to investigate the influence of monsoonal wind speed on the intensity and diurnal variation of coastal rainfall during the Mei-Yu season over southern China. In the model, the average of high-wind and low-wind days from 2007 to 2009 were used as boundary conditions. Comparisons with ground radar observations show that while there are differences in rainfall intensity, both the spatial distribution and the diurnal variation of rainfall are well verified in the simulation.

On high-wind days, intense quasi-stationary coastal rainfall occurs along the coastline due to differential land-sea friction; in the early morning, convergence between the land breeze and monsoonal wind enhances and leads to the maximum of coastal rainfall. On the other hand, in the low-wind days, coastal rainfall is primarily caused by the land-sea-breeze fronts, which exhibit noticeable inland propagation during the daytime. Sensitivity experiments indicate that the spatial distribution of coastal rainfall is mainly controlled by the ambient wind speed, while the rainfall intensity is sensitive to the ambient moisture content in upstream oceanic airflow within the boundary layer. Furthermore, the differences in land-sea friction play a significant role in coastal rainfall on high-wind days but have little impact on low-wind days.

Keyword

Land sea breeze

Reference

Chen, X., F. Zhang, and K. Zhao, 2017: Influence of Monsoonal Wind Speed and Moisture Content on Intensity and Diurnal Variations of the Mei-Yu Season Coastal Rainfall over South China. *J. Atmos. Sci.*, 74, 2835–2856.