TERRAIN EFFECTS ON CONVECTIVE SYSTEMS IN SOUTHWESTERLY FLOW AROUND TAIWAN

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Southwesterly flow is a common weather pattern in summer around Taiwan. Although the flow is associated with the Asia summer monsoon, the subtropical high plays a key role in determining its on set near Taiwan (Liou and Lin, 1998). Due to ample moisture supply, severe convective systems are usually triggered within the southwesterly flow that cause floods in Taiwan. This study is focused on the impact of Taiwan terrain on the southwesterly flow pattern and the convective systems associated with it. The influence of Taiwan terrain on the southwesterly flow is simpler than that on middle latitude fronts because the temperature structure plays a very minor role in this situation.

A mesoscale model is used to conduct numerical experiments in examining the effects of Taiwan terrain on the evolution of the convective systems in the southwesterly flow. The model includes the option of different cumulus parameterization such as relaxed Arakawa-Schubert, modified Kuo, and Kain-Fritsch schemes. A case of July 10th 1995 is selected for 36h model simulations with 30 km and 10 km grid resolutions. Precipitation amount and distribution from the numerical experiments with different ground conditions are compared and interpreted through the consideration of the Froude and Scorer numbers. It is found that the blocking effect of the Taiwan terrain on the southwesterly flow is responsible for the formation of low-level jets as well as the heavy rainfall occurred at the lee side of the mountain. The land-sea contrast effect, on the other hand, is responsible for the heavy rainfall occurred at coastal regions.

Key words: southwesterly flow, convective systems, and terrain effects