Application of hierarchical clustering method to classify of space-time rainfall patterns

Hwa-Lung Yu and Tu-Je Chang

National Taiwan University, Bioenvironmental System Engineering, Taipei, Province Of China Taiwan (hlyu@ntu.edu.tw)

Understanding the local precipitation patterns is essential to the water resources management and flooding mitigation. The precipitation patterns can vary in space and time depending upon the factors from different spatial scales such as local topological changes and macroscopic atmospheric circulation. The spatiotemporal variation of precipitation in Taiwan is significant due to its complex terrain and its location at west pacific and subtropical area, where is the boundary between the pacific ocean and Asia continent with the complex interactions among the climatic processes. This study characterizes local-scale precipitation patterns by classifying the historical space-time precipitation records. We applied the hierarchical ascending clustering method to analyze the precipitation records from 1960 to 2008 at the six rainfall stations located in Lan-yang catchment at the northeast of the island. Our results identify the four primary space-time precipitation types which may result from distinct driving forces from the changes of atmospheric variables and topology at different space-time scales. This study also presents an important application of the statistical downscaling to combine large-scale upper-air circulation with local space-time precipitation patterns.