



Estimation of typhoon rainfall in GaoPing River: A Multivariate Maximum Entropy Method

Wu Pei-Jui (1) and Yu Hwa-Lung (2)

(1) Department of Bioenvironmental Systems Engineering, National Taiwan University, Taipei, Taiwan (r03622030@ntu.edu.tw), (2) Department of Bioenvironmental Systems Engineering, National Taiwan University, Taipei, Taiwan (hlyu@ntu.edu.tw)

The heavy rainfall from typhoons is the main factor of the natural disaster in Taiwan, which causes the significant loss of human lives and properties. Statistically average 3.5 typhoons invade Taiwan every year, and the serious typhoon, Morakot in 2009, impacted Taiwan in recorded history. Because the duration, path and intensity of typhoon, also affect the temporal and spatial rainfall type in specific region, finding the characteristics of the typhoon rainfall type is advantageous when we try to estimate the quantity of rainfall.

This study developed a rainfall prediction model and can be divided three parts. First, using the EEOF (extended empirical orthogonal function) to classify the typhoon events, and decompose the standard rainfall type of all stations of each typhoon event into the EOF and PC (principal component). So we can classify the typhoon events which vary similarly in temporally and spatially as the similar typhoon types. Next, according to the classification above, we construct the PDF (probability density function) in different space and time by means of using the multivariate maximum entropy from the first to fourth moment statistically. Therefore, we can get the probability of each stations of each time. Finally we use the BME (Bayesian Maximum Entropy method) to construct the typhoon rainfall prediction model, and to estimate the rainfall for the case of GaoPing river which located in south of Taiwan. This study could be useful for typhoon rainfall predictions in future and suitable to government for the typhoon disaster prevention.