



## **A simple statistical method for analyzing flood susceptibility with incorporating rainfall and impervious surface**

Shou-Hao Chiang and Chi-Farn Chen

Center for Space and Remote Sensing Research, National Central University, Zhongli Dist., Taoyuan City, Taiwan  
(gilbert@csr.ncu.edu.tw)

Flood, as known as the most frequent natural hazard in Taiwan, has induced severe damages of residents and properties in urban areas. The flood risk is even more severe in Tainan since 1990s, with the significant urban development over recent decades. Previous studies have indicated that the characteristics and the vulnerability of flood are affected by the increase of impervious surface area (ISA) and the changing climate condition. Tainan City, in southern Taiwan is selected as the study area. This study uses logistic regression to functionalize the relationship between rainfall variables, ISA and historical flood events. Specifically, rainfall records from 2001 to 2014 were collected and mapped, and Landsat images of year 2001, 2004, 2007, 2010 and 2014 were used to generate the ISA with SVM (support vector machine) classifier. The result shows that rainfall variables and ISA are significantly correlated to the flood occurrence in Tainan City. With applying the logistic function, the likelihood of flood occurrence can be estimated and mapped over the study area. This study suggests the method is simple and feasible for rapid flood susceptibility mapping, when real-time rainfall observations can be available, and it has potential for future flood assessment, with incorporating climate change projections and urban growth prediction.