Supawut Kokun 2014: Peak Flow Simulation using an Antecedent Precipitation Index Method in Upper Chi Basin. Master of Engineering (Water Resources Engineering), Major Field: Water Resources Engineering, Department of Water Resources Engineering. Thesis Advisor: Ms. Wandee Thaisiam, Ph.D. 129 pages.

Chaiyaphum Province is located in the foothill area of Upper-Chi basin and usually suffers from flooding annually. A heavy rainfall in upstream area causes a flash flood and overbank flow in Amphoe Muang of Chaiyaphum Province. Past flood events cause a high damage in flood area especially in Amphoe Muang because of the late flood warning system. Currently, the accumulated rainfall is applied to set a flood warning criteria in Chaiyaphum Province. However, the maximum peak flow of Chi river cannot be estimated. The objective of this study is to find a relationship between an Antecedent Precipitation Index (API) and the maximum peak flow in the Upper-Chi basin during flash flood. Thus, the peak flow in Chi river can be estimated from the proposed equations.

The study used rainfall data from 9 automatic rainfall gauge stations and flow discharge data from 4 gauging stations of study area. The gauging station E.23 is selected for flood warning station of Chi river. The study results show that flow at E.23 will overbank when the API exceed 75 millimeters. In this work, the relationship equations of API and flow discharge of 4 gauging stations are proposed. 4 equations for forecasting the maximum peak flow of four gauging stations are achieved with the deviation of ≈3-13%. It is apparent that the equations can be used to estimate peak flows for Chi river and in turn can be used as a practical flood warning criteria for Amphoe Muang of Chaiyaphum, particularly in the affected areas. Moreover, the proposed equation can be used for flood hydrograph prediction. The predicted flood hydrograph is in a good agreement for small catchment area.

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