

MATHEMATICAL MODEL SYSTEM FOR FORECAST OF WATER LEVEL IN AMPHOE HAT YAI AND ADJACENT AREA, SONGKHLA PROVINCE, THAILAND

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Abstract : Variable Infiltration Capacity 2 Layers (VIC-2L) Model is a precipitation-runoff model with 1-kilometer grid resolution. Every grid is divided into 2 layers using Variable Infiltration Capacity concept where upper soil is designed to represent the dynamic behavior of the soil column that respond to rainfall events, while the lower layer is used to characterize the slowly varying between-storm soil moisture behavior. The lower layer only responds to rainfall when the upper layer is wet. Input data include precipitation derived from a combination of rain gauges and TRMM satellite remote sensing data, maximum-minimum temperature, wind speed, texture of dominant soil and vegetation types in Arc/Info format. This format provides an easy manipulation if environmental conditions are to be changed. The result from VIC-2L model will give output as runoff of every grid which subsequently input to Routing Model. The Routing Model uses linear transfer function together with Digital Elevation Model (DEM) to route runoff into discharge at grid points where gauging stations are located, thus, allowing calibration and verification with measured data to be performed. Well-calibrated model can then be run to reproduce flood scenario. By using Rating Curve Equation which relate water level to discharge, the amount of discharge which cause flood and, in turn, the amount of precipitation can be determined. The mathematical model system has been used to simulate water level under different conditions such as varying precipitation, land cover change and road level. It is found that such a system can be applied to reproduce flood event that caused losses in the past and forecast water level in the future.