

## DEVELOPMENT OF FLASH FLOOD FORECASTING MODEL FOR HAN RIVER BASIN

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Flash flood guidance (FFG) system is a monitoring and forecasting system against severe weather and disaster that is essential for mitigation of flood disaster. This FFG, refers to the volume of rain of a given duration necessary to cause flooding on small streams, can be used as a precaution for potential flash flood. It is generally composed of threshold runoff computation and model-driven soil moisture estimation for hydrologic component and precipitation forecast for meteorological component.

In this study, the developed results for FFG system on Han River basin are shown and evaluated. For the hydrologic component of FFG system, threshold runoff values are estimated for high-resolution sub-catchments on the basis of their delineated geometry, the regional regressions of channel cross-sectional characteristics, and the matching of surface runoff peak to bankfull flow. The results show that the threshold runoff estimates for these small headwater source basins are low (5 mm/h - 12 mm/6hrs), and that if the soil were to be completely saturated in these areas the likelihood of flooding will be high. However, the soil storage loss and losses due to evapotranspiration and deep soil percolation must be determined prior to establishing the flash flood guidance for these basins. This latter estimates may be substantially higher than the computer threshold runoff estimates and they even render these small headwater basins not very vulnerable to floods.

Also, the extended TOPMODEL is achieved for the on-going soil moisture estimates over the Han River basin. Several basic statistics between observed and model computed flows for all selected events are computed for evaluate the model performance. For example, the correlation coefficients between the observed and simulated flows are above 0.90 for the selected events. All these statistics confirm that the model-driven soil moisture can be representative over the study area and can be used as a component of FFG system.

For the meteorological component of the FFG system, the bias adjustment procedure for radar rainfall estimation is performed. Kim et al. (2004) presented some results of the real-time bias adjustment. Based on the results from threshold runoff computations, soil moisture estimation, and radar rainfall estimation, FFGs defined as the volume of actual rainfall that generates the present threshold runoff are computed in an operational

environment. Fig. 1 is an illustrated example for the basin-specific 1-hourly flash flood guidance estimation for Han River basin.

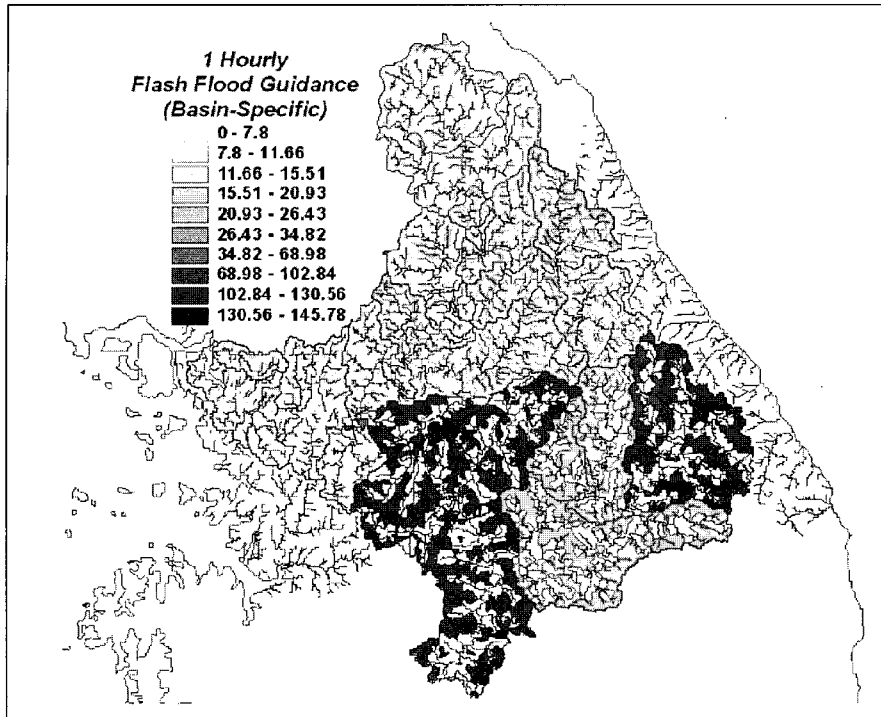


Fig. 1 Preliminary estimation of 1-hourly flash flood guidance for Han River watershed

#### REFERENCES

- Kim, J.-H., Jung, I.-W., and Bae, D.-H. (2004). "Hydrologic Utilization on the Real-Time Correction of Radar-Rainfall Estimation", *Flood Forecasting and Management with GIS and Remote Sensing (FM2S) 2004*, China, pp. 45-56.