# Spatial Extension of Runoff Data Using a Lumped Concept Model

Nam Won Kim[1] and Yong Jung[2]
Water Resources Research Division, Korea Institute of Construction Technology, South Korea.

**Abstract.** Runoff data availability is a substantial factor for precise flood control such as flood frequency or flood forecasting. However, in Korea runoff depths and/or peak discharges for small watersheds are rarely measured. To compensate for this discrepancy, a semi-distributed rainfall-runoff model based on the lumped concept such as a Storage Function Method (SFM, Kimura 1961) was applied for the Choongju Dam Watershed (~6600km$^2$) in Korea. This area was divided into 22 small watersheds ranged from 3.3km$^2$ to 606km$^2$ for measuring the capability of spatial extension of runoff data. The chosen total number of flood events for searching parameters of SFM was 21 from 1991 to 2009. The parameters for 22 small watersheds consist of physical property based (storage coefficient: K, storage exponent: P, lag time: $T_l$) and flood event based parameters (primary runoff ratio: $f_1$, saturated rainfall: $R_{sa}$). Saturated rainfall and base flow from event based parameters were explored with the golden search method with respect to inflow at Choongju Dam while other parameters for each small watershed were fixed with primarily obtained from simulations of previous events. When inflow of Choongju Dam was optimized, the effects of other small watersheds were observed to show the capability of spatial extension of runoff data based on the observed data.

**Acknowledgement.** This research was supported by a grant (11-TI-C06) from Construction Technology Innovation Program funded by Ministry of Land, Transport and Maritime Affairs of Korean government.

[1]Water Resources Research Division
Water Resources & Environment Research Department
Korea Institute of Construction Technology (KICT)
1190 Simindae-Ro, Ilsanseo-Gu, Goyang-Si, Gyeonggi-Do, 411-712, South Korea
Tel: +82-31-910-0256
e-mail: nwkim@kict.re.kr

[2]Water Resources Research Division
Water Resources & Environment Research Department
Korea Institute of Construction Technology (KICT)
1190 Simindae-Ro, Ilsanseo-Gu, Goyang-Si, Gyeonggi-Do, 411-712, South Korea
Tel: +82-31-910-0475
e-mail: yjung@kict.re.kr (Corresponding author)