Baseflow Separation for Estimation of Baseflow Rate in Two Small Catchments, Yuseong, Daejeon.

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ABSTRACT

This study aims to separate hydrograph into baseflow and rain water to calculate baseflow rate during a rainfall in two small catchments, Yuseong, Daejeon. The two catchments adjoin and one catchment area is about three times area of the other. A discharge of stream is composed entirely of groundwater contributions during a period with no excess rainfall. During the period, the chloride concentration of the stream water can be regarded as being in equilibrium with that of the groundwater. Two component hydrograph separations were performed during storm period. The required data were obtained by long term monitoring of the stream stage, along with discharge rate of stream. The chloride concentration of the rainfall and stream water were measured and recorded. Baseflow separation, a mixing model using conservative chemical tracer(Cl) is applied to chemical hydrograph separation technique. These results show that baseflow rates are 11.8%, and 31.6% of rainfall in two catchments.

key ward: Hydrograph separation, Excess rainfall, Tracer, Baseflow, Mixing model.

Table 1 Rainfall characteristics in two catchments.

Catchment	Area (km^2)	Event Dates (day)	Rainfall (mm)	Cl concentration (ppm)
S1	10.48	April 26-27, 2004	49	0.38
S2	4.09			

Table 2 Results of hydrograph separation to the event for two catchments in depth(mm) normalized by catchments area. Proportions to total rainfall of each component were also presented as percent in parenthesis.

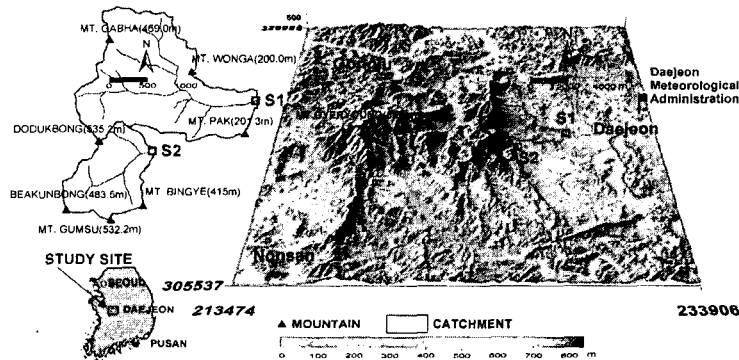| Catchment	Total rainfall (P)	Total runoff (Q_{Ttotal})	Total New water (Q_{Ntotal})	Un-corrected Baseflow (Q_{Ototal})	Total Pre-old water $(Q_{POtotal})$	Corrected Baseflow $(Q_{Ocorrected})$
S1	49 (100)	12.7 (25.9)	6.9 (14.1)	5.8 (11.8)	0 (0)	5.8 (11.8)
S2	49 (100)	22.3 (45.5)	6.8 (13.9)	15.6 (31.8)	0.1 (0.2)	15.5 (31.6)

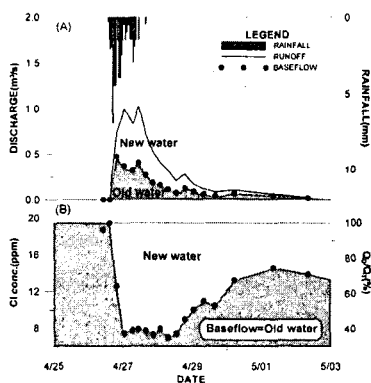Figure 1 Map of the study area showing relief and sampling sites.

Figure 1 Baseflow separation at S1 during April 26 through May 2, 2004. (A) Rainfall and stream discharge, (B) the Cl concentration
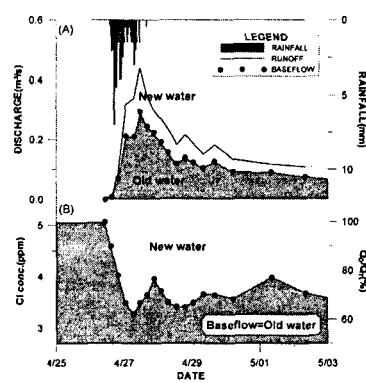
Figure 3 Baseflow separation at S2 during April 26 through May 2, 2004. (A) Rainfall and stream discharge, (B) the Cl concentration