

Power-law exponents of runoff-drainage area relationships vary with flow occurrence frequency: Observations from Korean rivers

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Abstract

Runoff at any given location along a stream can be expressed as a function of its upstream area. The runoff-drainage area relationship can be well expressed as power-law (*Brush*, 1961) with its exponent, ranging as high as unity (e.g., *Stall and Fok*, 1968) and as low as 0.5 in natural rivers. Here, we study the runoff-drainage area relationships for Han River and Nakdong River, Korea. We find that the relationships follow power-law and their exponents are highly related with occurrence frequency of flow. To support this, we analyze flow frequency with historical data measured over decades. Findings in this study can broaden our understanding on mechanisms behind the catchment response to runoff.

Keywords : Frequency analysis, Power-law, Han River, Nakdong River

Acknowledgements

This research was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT and Future Planning (grant number 2015R1A2A2A05001592).

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