

Study of Basin Recession Characteristics and Groundwater Storage Properties

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Stream flow and groundwater storage are freshwater resources that human live on. In this study, we discuss southern area basin recession characteristics and Kao-Ping River basin groundwater storage, and hope to supply reference to Taiwan water resource management.

The first part of this study is about recession characteristics. We apply Brutsaert (2008) low flow analysis model to establish two recession data pieces sifting models, including low flow steady period model and normal condition model. Within individual event analysis, group event analysis and southern area basin recession assessment, stream flow and base flow recession characteristics are parameterized.

The second part of this study is about groundwater storage. Among main basin in southern Taiwan, there are sufficient stream flow and precipitation gaging station data about Kao-Ping River basin and extensive drainage data, and data about different hydrological characteristics between upstream and downstream area. Therefore, this study focuses on Kao-Ping River basin and accesses groundwater storage properties. Taking residue of groundwater volume in dry season into consideration, we use base flow hydrograph to access periodical property of groundwater storage, in order to establish hydrological period conceptual model. With groundwater storage and precipitation accumulative linearity quantified by hydrological period conceptual model, their periodical changing and alternation trend properties in each drainage areas of Kao-Ping River basin have been estimated.

Results of this study showed that the recession time of stream flow is related to initial flow rate of the recession events. The recession time index is lower when the flow is stream flow, not base flow, and the recession time index is higher in low flow steady flow period than in normal recession condition. By applying hydrological period conceptual model, groundwater storage could explicitly be analyzed and compared with precipitation, by only using stream flow data.

Keywords: stream flow, base flow, recession characteristics, groundwater storage