Brutsaert method for baseflow recession characterization and groundwater storage trends

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Groundwater is a critical component of the terrestrial water budget and acts as a relatively stable water source in Taiwan. In the present study, river basins characterization and groundwater storage trends in northern Taiwan are analyzed using the Brutsaert method. As groundwater storage sustains baseflows in a water system during dry periods, it can be assessed directly from the streamflow record. The characteristic drainage time-scale value, K, varied between 34 and 84 days, with a mean value of 54 days and a standard deviation of 16 days. From correlation analysis, K is strongly correlated with the main channel slope. Based on annual values of groundwater storage over the period of record, five subbasins showed downward trends, ranging from -0.053 to -0.950 mm/year, and three subbasins exhibited upward trends, ranging from 0.111 to 0.141 mm/year. During the period of 2000-2014, the groundwater storage trends in northern Taiwan had an obvious spatial distribution. River basins with significant negative trends (mean value of -2.729 mm/year) are located in the northeast part of the study area. In contrast, the subbasins in the northwest part all showed positive trends (mean value of 0.944 mm/year) in groundwater storage.