

Impact of Climate Change on Variation of the Aridity and Evaporative Indexes in South Korea

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Abstract

The aridity index, which is determined as the ratio of potential evapotranspiration to precipitation, is one of key parameters in drought characterization. Whereas the evaporative index, which is defined as the ratio of actual evapotranspiration to precipitation, represents the fraction of available water consumed by the evapotranspiration process. This study investigates variation of the aridity and evaporative indexes due to climate change during the 21st century in South Korea. Estimations of the aridity and evaporative indexes are obtained using SWAT mode based on ensemble of 13 different GCMs over 5 large basins of South Korea for 2 RCP scenarios (RCP 4.5 and RCP 8.5). The results shows the opposite trends of the two indexes, where the aridity index is projected as always increase, while the evaporative index is expected to decrease in all of 3 future period (2011-1940, 1941-1970, 1971-2099). The estimated results also suggest that land cover influenced significantly evapotranspiration along with the change of climate. The study indicates that South Korea will be facing with a high risk of water scarcity in future due to climate change, which is seriously challenging for water planing and management in the country.

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Keywords : Climate Change, Aridity Index, Evaporative Index, Evapotranspiration Process, Water scarcity, SWAT model

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