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Assessment of water resources availability considering complex water use in small and medium river basins against abnormal climate and extreme drought

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Recently, there has been a growing interest in extreme drought in the hydrological impact assessment due to climate change, but most studies are either drought index based on weather information or development of drought prediction systems to monitor the status. Therefore, it is not enough to evaluate water resource availability that reflect watershed characteristics. In order to evaluate and predict the precise water resource availability during drought, it is necessary to evaluate the characteristics of the hydrological environment considering the artificial water use in the watershed. CAT (Catchment hydrologic cycle Assessment Tool, Kim et. al, 2017) was used to evaluate the characteristics of the hydrological environment. CAT provides tools for analyzing artificial water use such as water supply, water reuse and groundwater intake. In this study, the water resource availability of Boryeong-Dam watershed (163.6 [U+33A2]), which is known to be an extreme drought region, was evaluated considering the complicated agricultural water use in the upstream region. Rainfall and observed inflow data were used from 1999 to 2016, and daily climate data such as mean temperature, relative humidity, wind speed, and duration of sunshine were used. Comparing the simulated runoff with the observed runoff in the upstream area of Boryeong-Dam watershed, the model efficiency was improved by more than 10 % compared with the existing simulated runoff without consideration of the agricultural water use. This is the result before parameter calibration. If the detailed water use such as groundwater intake is taken into consideration, the model efficiency will be improved more.

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