The Applicability of Palmer Drought Severity Index under Climate Change over the Upper Green River Basin, WY

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요지

Drought is one of big issues on water resources over the Upper Green River Basin (UGRB), Wyoming. Particularly, changes of hydrological variables tend to increase the frequent and severity of drought due to the climate change. Thus, the temporal and spatial assessment of drought condition over the UGRB is significant.

In order to investigate the drought condition over the UGRB, this study calculates the fine-resolution Palmer Drought Severity Index (PDSI) using the gridded climate projections, which are the 112 World Climate Research Programme (WCRP) Coupled Model Intercomparison Project phase3 (CMIP3) Bias-Correction and Spatial-Downscaling (BCSD) projections produced by the U.S. Bureau of Reclamation and Lawrence Livermore National Laboratory (LLNL).

The problem is that the PDSI during winter and spring season is not accurate over the complex terrain due to the snow effects. In order to overcome the drawback, this study modified the Palmer Drought Severity Index using the gridded temperature, precipitation projections and the soil moisture data from Variable Infiltration Capacity (VIC) model simulations.

In conclusion, climate change would lead to more frequent and severer drought over the UGRB. This study presented the long-term temporal and spatial Palmer Drought Severity Indices over the UGRB. Furthermore, the uncertainty of future drought over the UGRB were presented.

Keywords: Palmer Drought Severity Index, Climate Change, Uncertainty