Application of Model for Prediction Across Scales in Drought Index and Reservoir Inflow Estimation

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The topography of Taiwan is precipitous that the river flows is usually short and rapid. Moreover, Taiwan is an area prone to suffer droughts due to uneven temporal distribution of precipitation and small storage capacity of reservoirs, although the total rainfall amount is plentiful, the water resource is difficult to reserve. With the significant impacts of climate change - causing drought and floods to be more frequent in recent years. The seasonal rainfall forecasts with dynamic model outputs become an important issue for water resource management in Taiwan. The new high-resolution global model, "Model for Prediction Across Scales" (MPAS) is used for this study to develop seasonal precipitation prediction. The meteorological and hydrological model are further integrated in this study for drought index and reservoir inflow estimation. The results showed using different combinations of physics schemes in MPAS can build up an ensemble system for seasonal rainfall forecast and reservoir inflow forecast. But there are still uncertainties in MPAS for long-term forecast. However, the ensemble system is able to produce probability forecast of reservoir water level in the future. These information can help the authorities to make decisions in water resources planning and droughts warning.

Keywords: seasonal forecast, water resource management, MPAS, reservoir inflow prediction