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Effects of soil moisture storage on the water-energy balance relationship for catchments in China

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Budyko hypothesis describes that the annual water balance can be expressed as a function of available water and available energy. In most previous studies, water availability was considered as precipitation and energy availability was considered as potential evapotranspiration at mean annual scale. But more precisely, water supply should be precipitation together with soil moisture storage. Understanding the effects of soil moisture storage on the water-energy balance relationship is important in watershed hydrology. In this paper, the water-energy balance model was improved by considering the effect of soil moisture storage change. The improved model was then used to analyze the effects among 296 study catchments in China.