



Implication of recent climate change for the hydrology of the source region of the Yellow River

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The basin upstream of the Tangnaihai station (UYE), with an area of 121972 km², is known as the source region of the Yellow River (YR) which is the second largest river in China. The UYE accounts for about 16% of the YR basin area, but it produces about 38% of the total annual runoff, and thus is considered to be the “water tower” of the entire basin. The UYE has experienced a warming trend of 0.41°C/10y during 1961-2009. Accompanied by the warming climate, total discharge in the UYE has shown a decreasing trend over the past 49 years. In this work, we analyze the spatial-temporal changes of climate factors and water balance terms in the UYE during 1961-2009, including precipitation, temperature, runoff, evapotranspiration, snow cover extent, and terrestrial water storage change, from gauge observations, model simulations, and satellite retrievals. This work aims to better understand the water budget change characters in the UYE in relation to the climate factors in the past 5 decades. An improved understanding certainly has implications for the sustainable management of water resources not only for the UYE but also for the entire Yellow River basin.