



Are human activities induced runoff change overestimated?

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In the context of climate change, not only does the amount of annual precipitation and potential evapotranspiration alter, but also do the seasonal characteristics of climate, such as intra-annual distribution of water and energy. Yet, the runoff change induced by the change in seasonality of climatic forces is seldom evaluated, which is usually thought as the results of human activity, leading to contaminative runoff change attribution results.

The past 50-year climatology seasonality was investigated by analyzing the daily meteorological records of 743 national weather stations across the China. Obvious spatial pattern of climatology seasonality emerged in China. The trend analysis indicated that there is decrease in precipitation seasonality, leaving other seasonal characteristics, such as peak time of climate forcing unchanged.

With the aid of stochastic soil moisture model, water-energy balance models which take the effects of climate seasonality into consideration are developed. Efforts are made to achieve a better understanding of mean annual runoff change due to the climate change.

As a representative of hydrologic responses, the contributions of variations in climate, especially in precipitation seasonality, and land use to runoff change of 282 catchments in China were evaluated. The results showed that the decline of precipitation seasonality has a significant influence on runoff change in the Yellow River, Haihe River and Liaohe River. Meanwhile, it also indicated that the contribution of land use change to runoff change is overestimated by the common runoff change attribution methods.