

Estimating precipitation for poorly-gauged areas in western China

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Abstract Hydrological simulations in data-sparse areas have large uncertainties. This paper proposes spatial geo-statistical interpolation algorithms based on the hydrological analogy method to estimate the spatial distribution of precipitation for data-sparse areas using Tropical Rainfall Measuring Mission (TRMM) precipitation radar (PR) data and a small number of available recorded rainfall data. Taking the Kaidu River basin in Xinjiang, China, as a case study, using to the relationship between TRMM PR data and sparsely-recorded rainfall, the spatial distribution of precipitation was estimated with the proposed method. A macro-scale land hydrological model, the Variable Infiltration Capacity (VIC) model, was then established over the study basin with the derived data. Hydrological simulation over five data-sparse basins (including Dashankou, Xining, Jiayuguan, Yingluoxia and Qingshizui) indicates that the estimated precipitation from TRMM PR data significantly improved the accuracy of hydrological simulation; the proposed method can therefore be used to estimate the spatial distribution of precipitation for sparsely-gauged areas in western China.

Keywords data-sparse area; TRMM; hydrological simulation; VIC model