Estimating precipitation for poorly-gauged areas in western China

JUNLIANG JIN\textsuperscript{1,2}, GUIHUA LU\textsuperscript{1,3} & ZHIYONG WU\textsuperscript{1,3}
\textsuperscript{1} State Key Laboratory of Hydrology, Water Resources and Hydraulic Engineering, Hohai University, Nanjing 210098, China 
jinjunliang@gmail.com
\textsuperscript{2} College of Hydrology and Water Resources, Hohai University, Nanjing 210098, China
\textsuperscript{3} Research Institute of Water Problems, Hohai University, Nanjing 210098, China

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