

Drought analysis based on precipitation generation from GCMs for the Qingjiang River Basin

KUNXIA YU, LIHUA XIONG, LEIHUA DONG & MIN WAN

State Key Laboratory of Water Resources and Hydropower Engineering Science, Wuhan University, Wuhan 430072, China

xionglh@whu.edu.cn

Abstract This paper aims to assess model reliability of 21 global climate models (GCMs) to reproduce observed historical monthly rainfall and drought, especially extreme events over Qingjiang River Basin. Monthly areal precipitation series were downscaled from 21 GCMs using the Statistical DownScaling Model (SDSM). All the downscaling rainfalls were evaluated against the 1960–1999 observed rainfall data over Qingjiang River Basin. The main conclusions include: (a) most downscaled rainfalls can reasonably reproduce the observed monthly areal rainfall series in both calibration period and validation period, although downscaled rainfall time series are more stationary; (b) downscaled rainfalls perform poorly when they come to drought, and observed drought characteristics cannot be well reproduced, but category simulation accuracy is generally satisfactory to some degree; (c) there is no clear difference in the ability to produce historical rainfall characteristics between GCMs, but the difference in the capability to simulate droughts and extreme events is significant.

Key words precipitation; drought; extreme; downscaling; global climate models; Qingjiang River Basin