

A distributed time variant gain model applied to the Fujiang River of the Yangtze basin

WANG MIAOLIN^{1,2,3}

*1 Upper Yangtze River Survey Bureau of Hydrology & Water Resources, Bureau of Hydrology, Changjiang Water Resources Commission, Chongqing 400014, China
wangml@igsrr.ac.cn, sywangml@cjh.com.cn*

2 Key Lab of Water Cycle & Related Land Surface Processes, Institute of Geographic Sciences & Natural Resources Research, Chinese Academy of Science, Beijing 100101, China

3 Graduate School of the Chinese Academy of Science, Beijing 100039, China

Abstract In order to analyse the impact of climate change and human activities on runoff, the Fujiang River in the upper reaches of the Yangtze River was chosen as a case study and a Distributed Time Variant Gain Model (DTVGM) was developed and applied to the Fujiang River. The results indicated that the model efficiency coefficient reaches 0.8 and the simulated discharge process is similar to that observed. The proposed model was then used for assessing the relative effects of climate change and human activities on runoff change between 1981 and 1998. The runoff depth during the flood period in 1998 was 44.52% smaller than that in 1981. About a fifth of the runoff change was the result of human activities and four-fifths of the runoff decrease was caused by climate change. So it was concluded that climate change is the main force on the runoff changes.

Key words climate change; distributed hydrological model; Fujiang River; human activities; Time Variant Gain Model; Yangtze River
