

Water cycle mechanisms on the Loess Plateau, China: the Chabagou catchment case study

XIA JUN^{1,2}, YE AIZHONG², WANG LING³ & ZHANG XUECHENG¹

1 Key Lab. of Water Cycle & Related Land Surface Processes, Institute of Geographic Sciences and Natural Resources Research, CAS, Beijing 100101, China

xiaj@igsnrr.ac.cn

2 State Key Lab. of Water Resources & Hydropower Engineering Sciences, Wuhan University, Wuhan 430072, China

3 Bureau of Hydrology, YRCC, Zhengzhou 450004, China

Abstract It is important to recognize the hydrological process mechanisms on the Loess Plateau. The paper analyses the spatial and temporal distribution of rainfall and the rainfall–runoff relationship of the Chabagou catchment, a sub-catchment of the Yellow River basin in China, so as to understand the behaviour of rainfall–runoff in the area, and improve the Distributed Time-Variant Gain Model (DTVGM) fitted to the flow process of the catchment. The results of simulations show that there are two kinds of mechanisms, i.e. the saturation-excess runoff mechanism and the infiltration-excess runoff mechanism, on the Loess Plateau. The infiltration-excess runoff occurs when rain falls heavily in short time periods. This is the origin of floods on the Loess Plateau. The saturation-excess runoff occurs when rain falls for a long time with medium intensity. Runoff seldom occurs when the rainfall intensity is low because the soil is very thick on the Loess Plateau.

Key words Loess Plateau; experiment; DTVGM; water cycle mechanism
