

Modelling runoff response to land-use change using an integrated approach in Xiangjiang River basin, China

HONGLIANG XU^{1,2}, CHONG-YU XU^{1,3}, BIN ZHOU⁴ & V. P. SINGH⁵

1. Department of Geosciences, University of Oslo, PO Box 1047 Blindern, 0316 Oslo, Norway
xuhongliang.nju@gmail.com

2 Department of Land Resources and Tourism, Nanjing University, Nanjing, China

3 Department of Hydrology and Water Resources, Wuhan University

4 Department of Chemistry, University of Oslo, Oslo, Norway

5 Department of Civil and Environmental Engineering, Texas A&M University, College Station, Texas, USA

Abstract Economic development and urbanization have affected both water quantity and quality in many regions of the world. Understanding and quantifying the hydrological response to urbanization and land-use change have become a major focus in studies of the impact of human activities on hydrology. This study employs an integrated approach that combines the land-use change allocation model (CLUE-s) and a physically-based distributed hydrological model (SWAT) for examining the impact of various land-use change scenarios in a region undergoing rapid change in land-use – the Xiangjiang River basin in China. Results indicate that various land-use policies have different levels of impact on the simulation of streamflows. Land-use change can lead to significant changes in the distributions of water resources and hydrological processes. Results of this study will be helpful for land-use planning and watershed management. The integrated modeling approach is shown to be a promising tool for land-use impact studies.

Key words land-use change; distributed hydrologic model; SWAT; CLUE-s; Xiangjiang River basin