Hydrology in a Changing World: Environmental and Human Dimensions
Proceedings of FRIEND-Water 2014, Montpellier, France, October 2014 (IAHS Publ. 363, 54-59, 2014).

Flood duration frequency analysis in a changing climate: the methodology applied to Fengle River (Yangtze basin, China)

C. SALLES[1], Y. CHU[2], J. L. PERRIN[3], M. G. TOURNOUD[1], L. BOUDET[1], F. N. CRES[1], C. RODIER[4], S. ZHENG[2], L. HUANG[2] & Y. MA[2]

1 Université Montpellier 2, HydroSciences Montpellier, UMR 5569 CNRS IRD Université Montpellier 1 Université Montpellier 2, F-34095 Montpellier Cedex 5, France
christian.salles@um2.fr

2 School of Resources and Environment, Anhui Agricultural University, Hefei 230036, China

3 IRD, HydroSciences Montpellier, UMR 5569 CNRS IRD Université Montpellier 1 Université Montpellier 2, F-34095 Montpellier Cedex 5, France.

4 CNRS, HydroSciences Montpellier, UMR 5569 CNRS IRD Université Montpellier 1 Université Montpellier 2, F-34095 Montpellier Cedex 5, France

Abstract The Chao Lake, located in the Yangtze basin, is the fifth largest freshwater lake in China. The lake catchment (9130 km^2) includes the city of Hefei (3.5 million inhabitants) and a large extent of paddy fields and rural areas. The Fengle River is a tributary of the Chao Lake. It is currently subject to flood risks and inundation issues. Many changes are expected in land use and agricultural practices in the future, due to the tourist appeal of the Chao Lake shore and the fast expansion of the city of Hefei. Climate changes are also expected in this region, with a high impact on the rainfall regime. The consequences of all these changes on flood occurrence and magnitude are a major issue for the economic development of the area and tools are needed to carry out such an analysis. Here, a methodology is proposed for investigating the potential impact of rainfall regime change on flood duration and frequencies in the future. The methodology consists of three steps: first from a literature review scenarios of changes in precipitation are identified and used to build future series of daily rainfall; secondly, future daily discharges are simulated using a distributed hydrological model (MERCEDES) previously calibrated on current rainfall–discharge data; finally the current *vs* future discharge dynamics are characterized in terms of flood frequencies from discharge–duration–frequency curves. The methodology is implemented on the Fengle River, for which 20 years of daily discharges (Taoxi station), daily rainfall (eight stations), temperature and evapotranspiration (Hefei weather station) are available.

Key words flood duration frequency; rainfall; downscaling, land use and climate changes