



A holistic approach for large-scale derived flood frequency analysis

Viet Dung Nguyen (1), Heiko Apel (1), Yeshewatesfa Hundecha (2), Björn Guse (3), Vorogushyn Sergiy (1), and Bruno Merz (1)

(1) Germany Research Center for Geosciences, 5.4 Geoarchive/Hydrology, Potsdam, Germany (dung@gfz-potsdam.de), (2) SMHI Swedish Meteorological and Hydrological Institute, Hydrology Research, Sweden, (3) Kiel University, Institute for Natural Resource Conservation, Hydrology and Water Resources Management, Kiel, Germany, (4) Institute of Earth and Environmental Science, University of Potsdam, 14476 Potsdam, Germany

Spatial consistency, which has been usually disregarded because of the reported methodological difficulties, is increasingly demanded in regional flood hazard (and risk) assessments. This study aims at developing a holistic approach for deriving flood frequency at large scale consistently. A large scale two-component model has been established for simulating very long-term multisite synthetic meteorological fields and flood flow at many gauged and ungauged locations hence reflecting the spatially inherent heterogeneity. The model has been applied for the region of nearly a half million km² including Germany and parts of nearby countries. The model performance has been multi-objectively examined with a focus on extreme. By this continuous simulation approach, flood quantiles for the studied region have been derived successfully and provide useful input for a comprehensive flood risk study.