



Urbanization Effects on Floods: A Global Assessment

Johanna Mård and Giuliano Di Baldassarre

Centre of National Hazards and Disaster Science (CNDS) & Department of Earth Sciences, Uppsala University, Sweden
(johanna.maard@geo.uu.se)

Many urban areas are developing and growing at a record pace in many places around the world. Urbanization causes dramatic changes in land and water use and have large effects on the local processes driving the hydrological system, including flooding. Land use change involves, for example, shifts from forest or vegetated areas to built-up areas with impervious surfaces that often results in more storm runoff and land erosion, which potentially increase peak discharges and flood magnitudes. Moreover, much of the urban development occur in flood-prone areas that are exposed to increased flood hazards. Considering the worldwide rapid development of urban areas, there is a need to synthesize regional urbanization effects on floods. For this reason, we present a global assessment where we use the increasing availability of big earth data to explore the effects of catchment urbanization on the frequency and severity of floods. More specifically, we use built-up areas extracted from earth observation data to estimate changes in catchment total impervious area, together with discharge and precipitation data to explore concurrent hydrological trends, e.g., changes in peak discharge and flood magnitudes. This global assessment provides useful information on urbanization effects on flood characteristics and contributes to improve our understanding of stream flow response to land-use change.