Geophysical Research Abstracts
Vol. 20, EGU2018-16432, 2018
EGU General Assembly 2018
© Author(s) 2018. CC Attribution 4.0 license.

Ground-truthing flood risk estimates from global models

Ignazio Giuntoli (1), Ilaria Prosdocimi (2), and David Hannah (1)
(1) University of Birmingham, UK (i.giuntoli@bham.ac.uk), (2) University of Bath, UK

As multi-model ensemble experiments become available, future changes in flood risk are estimated using simulated runoff from global models to inform mitigation and adaptation strategies. However, model runs suffer from considerable biases and uncertainties that cascade and amplify in flood risk estimates. Attempts in the literature to quantify these biases and uncertainties are still scarce and are rarely carried out in a ground-truthing fashion (e.g., using catchment scale observed data as benchmark). Indeed, runoff extremes, which are inherently difficult to sample and to simulate, merit careful attention given the crucial role of their assessment in preventing future casualties and damages to infrastructures and ecosystems.
This study aims to assess the ability of global models in capturing the statistical distribution of high flows in the continental United States (CONUS). For selected catchments, we extract annual runoff maxima (AMax) from simulated (nine global impact models - GIMs fed by five global climate models – GCMs) and observed data over a common 35-yr control period (1970-2006). We then fit an extreme value distribution to the simulated and observed AMax and use it as basis for comparison. Further, we compare simulated AMax fits for the future period (2065-2099) comparing it to the control period for an appraisal of changes in frequencies. Results show considerable discrepancies between the distribution of observed and modelled data, suggesting that most models fail to simulate observed levels of annual maxima. Conversely, there is not a strong evidence of changes in the properties of the fit between control and future period in the simulated AMax. Our results call for caution in the use of model projections for flood risk estimates and highlight that the models should be routinely evaluated against observations prior to using their future runs for estimating flood risk change.