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New version of 1 km global river flood hazard maps for the next generation of Aqueduct Global Flood Analyzer

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The Aqueduct Global Flood Analyzer, launched in 2015, is an open-access and free-of-charge web-based interactive platform which assesses and visualises current and future projections of river flood impacts across the globe. One of the key components in the Analyzer is a set of river flood inundation hazard maps derived from the global hydrological model simulation of PCR-GLOBWB. For the current version of the Analyzer, accessible on http://floods.wri.org/#/, the early generation of PCR-GLOBWB 1.0 was used and simulated at 30 arc-minute (∼50 km at the equator) resolution.

In this presentation, we will show the new version of these hazard maps. This new version is based on the latest version of PCR-GLOBWB 2.0 (https://github.com/UU-Hydro/PCR-GLOBWB_model, Sutanudjaja et al., 2016, doi:10.5281/zenodo.60764) simulated at 5 arc-minute (∼10 km at the equator) resolution. The model simulates daily hydrological and water resource fluxes and storages, including the simulation of overbank volume that ends up on the floodplain (if flooding occurs). The simulation was performed for the present day situation (from 1960) and future climate projections (until 2099) using the climate forcing created in the ISI-MIP project. From the simulated flood inundation volume time series, we then extract annual maxima for each cell, and fit these maxima to a Gumbel extreme value distribution. This allows us to derive flood volume maps of any hazard magnitude (ranging from 2-year to 1000-year flood events) and for any time period (e.g. 1960-1999, 2010-2049, 2030-2069, and 2060-2099). The derived flood volumes (at 5 arc-minute resolution) are then spread over the high resolution terrain model using an updated GLOFRIS downscaling module (Winsemius et al., 2013, doi:10.5194/hess-17-1871-2013). The updated version performs a volume spreading sequentially from more upstream basins to downstream basins, hence enabling a better inclusion of smaller streams, and takes into account spreading of water over diverging deltaic regions. This results in a set of high resolution hazard maps of flood inundation depth at 30 arc-second (∼1 km at the equator) resolution.

Together with many other updates and new features, the resulting flood hazard maps will be used in the next generation of the Aqueduct Global Flood Analyzer.