



River Network Spatial Correction for Global Flood Modeling

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In this work we present the Spatial Correction of topography-derived RivErs to match actual rivers (SCORE) algorithm. The algorithm matches topography-derived river networks using D-8 or D-Inf with real rivers extracted from satellite imagery, or obtained from OpenStreetMaps. The real river spatial footprint was obtained from two sources: 1) extracted globally from satellite imagery using a simple water/land classification algorithm with LandSAT images as input, and 2) obtained from OpenStreetMap line features with “river” or “stream” labels. The relational river network was computed globally using HydroSHEDS flow directions, and SRTM topography, with an average contributing area threshold of 10 km².

For one branch of rivers: usually two upstream segments and one downstream, the SCORE algorithm iterates over the river segments starting from the most upstream segments. The algorithm finds the closest “water” pixel to the end point of the segment and, using the A* algorithm, it tries to find a path to the closest water pixel to the other end, with high preference given to water pixels along the way. Once all segments in the branch have solutions, the junction point can be resolved by minimizing the path overlap. SCORE saves the resolved junction points, such that for the next downstream branch, the “from” junction is known. The algorithm was implemented globally. Here, we present results from the Weser River Basin in Germany, correcting up to 95% of river segments.