

Geomorphic Flood Area (GFA): a QGIS tool for a cost-effective delineation of the floodplains

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The importance of delineating flood hazard and risk areas at a global scale has been highlighted for many years. However, its complete achievement regularly encounters practical difficulties, above all the lack of data and implementation costs.

In conditions of scarce data availability (e.g. ungauged basins, large-scale analyses), a fast and cost-effective floodplain delineation can be carried out using geomorphic methods (e.g., Manfreda et al., 2011; 2014). In particular, an automatic DEM-based procedure has been implemented in an open-source QGIS plugin named Geomorphic Flood Area – tool (GFA – tool). This tool performs a linear binary classification based on the recently proposed Geomorphic Flood Index (GFI), which exhibited high classification accuracy and reliability in several test sites located in Europe, United States and Africa (Manfreda et al., 2015; Samela et al., 2016, 2017; Samela, 2016). The GFA – tool is designed to make available to all users the proposed procedure, that includes a number of operations requiring good geomorphic and GIS competences. It allows computing the GFI through terrain analysis, turning it into a binary classifier, and training it on the base of a standard inundation map derived for a portion of the river basin (a minimum of 2% of the river basin's area is suggested) using detailed methods of analysis (e.g. flood hazard maps produced by emergency management agencies or river basin authorities). Finally, GFA – tool allows to extend the classification outside the calibration area to delineate the flood-prone areas across the entire river basin. The full analysis has been implemented in this plugin with a user-friendly interface that should make it easy to all user to apply the approach and produce the desired results.

Keywords: flood susceptibility; data scarce environments; geomorphic flood index; linear binary classification; Digital elevation models (DEMs).

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