



## **A Web-GIS Design Tool for reuse and validation of multiple regional extreme rainfall estimation studies**

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The ongoing methodological advances in spatial statistics and increase in precipitation records have favoured the development and update of various Regional Frequency Analysis (RFA) of rainfall extremes, particularly in complex-terrain regions. As a consequence, the assessment of hydrological hazards related to extreme precipitation tends to become time-varying, according to the updates of the estimations. To comply with design of infrastructures, then, estimates from different techniques of RFA that co-exist for the same areas are often required.

The methodological differences among the various approaches, the different sources of data and the lack of a common quantitative geographic domain often make this multiple estimation quite troublesome. Moreover, in addressing this task, reproducibility of the studies sometimes represents a problem, particularly as regards computation of rainfall extreme over an area, e.g. at the basin scale.

A GIS-based tool has been designed to help researchers and technicians to reproduce existing RFA estimation studies and to obtain comparison of estimation for design compatibility purposes. This new design tool produces concurrent estimates of rainfall extremes both at a point and over an area, using also reverse-engineering of non-digital parameter maps and providing a common geographical background regardless of the original reference systems and resolution of raster maps available. The tool interface allows easy selection of the area of interest and generates tables and graphs which clearly depict similarity and differences of the rainfall extremes estimated on different durations by different methods.

In areas where controversial estimates come from various analyses, as e.g. border lines of the considered region, with this tool it becomes easy to proceed to the assessment of a multi-model estimate, that allows the technician to compute very useful model-averaged estimates.