

A multi - level approach to flood frequency regionalization

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Abstract. The identification of a homogeneous region is one of the fundamental steps in flood frequency analysis using regionalization. A multi-level approach is presented here that combines physical and statistical criteria to cluster homogeneous regions in a geographic area based on observed flood data. Seasonality analysis helps in identifying catchments a common flood generation mechanism. Scale invariance of flood peaks, as parametrized by basin area, is used to test the conjecture that simple scaling provides the physical basis of such mechanism. Statistical tests (homogeneity and goodness of fit tests) are finally used to assess the statistical robustness of the clustered regions. The approach yields to appropriate application of the index flood method (Darlymple, 1960) in regions with complex climate and topography controls. An application to the North Western Italy is finally presented.