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## A multi-level approach to flood frequency regionalisation

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**Abstract.** A multi-level approach to flood frequency regionalisation is given. Based on observed flood data, it combines physical and statistical criteria to cluster homogeneous groups in a geographical area. Seasonality analysis helps identify catchments with a common flood generation mechanism. Scale invariance of annual maximum flood, as parameterised by basin area, is used to check the regional homogeneity of flood peaks. Homogeneity tests are used to assess the statistical robustness of the regions. The approach is based on the appropriate use of the index flood method (Dalrymple, 1960) in regions with complex climate and topography controls. An application to north-western Italy is presented.

**Keywords:** homogeneity, multi-level approach, regionalisation, seasonality, scale invariance, similarity, tests

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