Geophysical Research Abstracts, Vol. 7, 04968, 2005
SRef-ID: 1607-7962/gra/EGU05-A-04968

Comparison of Regional Methods for Design Flood Estimation in the Hron Basin in Slovakia

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The extreme floods in Central Europe have resulted in scientific and societal concerns about the reliability of flood frequency estimates in the region. As a consequence, also the currently used regional flood frequency estimation methods are being revisited. In the past regional envelope curves of the relationship between flood quantiles and catchment area were often regarded as solution to some design tasks in river engineering and dam design. Due to the unavoidable overestimation of design floods these are not generally applicable for all river engineering problems, such as river training and restoration. In the study several regional design flood estimation methods and regional flood frequency approach were applied for annual and seasonal floods using flood data from 251 basins in Slovakia. Instead of the traditional regional regression formulae between flood quantiles and the basin area other physiographic basin characteristics were considered in the flood formulae and the Hosking Wallis methodology was also applied in estimating floods at regional scale. Subjective delineation of regions was complemented by the use of objective regionalisation approaches based on more complex climate-soil-vegetation control characteristics and regional frequency analysis. A comparison of flood quantiles computed by regional approaches was performed with statistical reference values and values derived by the traditional simple approaches. The applicability of the compared methods for design purposes was discussed.