



Physically based delineation of regions for regional rainfall frequency analysis in Slovakia

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Regional frequency analysis (RFA) of precipitation totals was recently adopted in the geographical-climatological conditions of the Slovak Republic. Several precipitation regimes do exist in the region of Western Carpathians, which are formed by western circulation, Mediterranean and continental influence and these are further differentiated by altitudinal zonality due to the rich orography. The poster focuses on the first stage of the regional L -moment algorithm - on the delineation of homogeneous regions of k -day precipitation. Several objective and process-based logical pooling techniques used to form homogeneous pooling groups of sites for regional frequency analysis of k -day precipitation totals were suggested and compared.

56 climatological stations, approximately evenly distributed on the whole territory of the Slovak Republic have been selected for the analysis. The basic database consists of 15 data sets, obtained by a combination of 5 durations of precipitation (1 to 5 days) and the 3 seasons considered (calendar year, warm and cold half year), respectively. Two homogeneity tests (the H -test from Hosking and Wallis and the X_{10} -test from Lu and Stedinger) were used.

Using objective methods of delineation of homogeneous pooling groups, based on several clustering techniques and various combinations of climatologically reasonable site characteristics (3 geographical site characteristics; mean annual precipitation; the ratio of the mean precipitation totals for the warm and cold half-year; the mean annual number of wet days; indices of Mediterranean and continental effects) resulted

in sets of homogeneous regions. In principle, based on the results of the tests, the whole area of Slovakia can be treated as a compact homogeneous region, regardless the duration of precipitation events or seasons considered. Logical knowledge-based delineations of the region into several distinctive precipitation regions, which took into consideration physical/geomorphological units and which were carried out by several specialists in the field of precipitation and climate, resulted in sets of homogeneous regions as well.

The problem of the influence of the choice of discriminating variables/aspects and their physical interpretation are discussed. Even though the delineation of homogeneous pooling groups by means of objective methods is generally accepted and recommended, here it is concluded, that such pooling of sites should not be carried out automatically in precipitation analysis. Instead a combination of physical/geomorphological considerations and objective methods should be preferred.

Key words: Slovak Republic, maximum 1- to 5-day precipitation totals, calendar year, warm/cold half-year, regional frequency analysis, homogeneous regions, cluster analysis, pooling methods.