Synoptic-scale predictors of summer heavy large-scale precipitation

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For the purposes of warning of disastrous rain floods, it is necessary to reduce as much as possible the quantitative precipitation forecast uncertainty which can significantly increase in the case of extreme precipitation. Previous studies showed that in the synoptic scale, some dynamic and thermodynamic quantities typically reached abnormal values in specific regions before and during the events with heavy large-scale precipitation. Therefore, the evaluation of the extremity of these quantities in the particular areas can represent the method of the objective and quantitative classification of causal synoptic weather patterns. In addition, the quantities can be applied as predictors in a post-processing model for the assessment of the extremity of impending precipitation.

The contribution concerns with the first step of the construction of such model. Initially, it describes the method of the selection of the area-related synoptic-scale predictors of heavy large-scale precipitation. The method uses the re-analyses ERA-40 and the objectively assembled set of the most extreme historical precipitation events. The predictors are determined for eight clusters of the Czech river basins of the second order. The clusters are proposed with respect to the statistical similarities in daily areal precipitation amounts. Finally, the most significant predictors within the respective areas are exemplified and discussed.