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Application of COST733 Objective Classifications in Croatia

Ivana Marinovic¹ and Christoph Beck²

¹Croatian Meteorological and Hydrological Service, Department of Climatology, Croatia (ivana.marinovic@cirus.dhz.hr)

²Institute of Geography, Physical Geography and Climate Research, University of Augsburg, Germany (christoph.beck@geo.uni-augsburg.de)

Climate modifiers over Croatia such as the Adriatic sea, highly developed orography of Gorski kotar and the Dinarides, and the Slavonian plain cause the great climatic differences between Croatian regions. Related to this, regional weather conditions can differ a lot within the same type of large-scale atmospheric circulation.

Until now, the weather types that are commonly in use in Croatia have been determined according to the subjective Poje's classification which consists of 29 weather types determined after the distribution of surface pressure and defined for relatively small and diverse areas. Hence, the Croatian area is divided into five regions by expert's experience: Eastern and Central Croatia, North, Middle and South Adriatic.

The motivation of the here presented study is to improve previous knowledge and practice that is mainly based on the application of Poje's classification by implementing the results of the COST733 action "Harmonization and Applications of Weather Types Classifications for European Regions". For the first time, the efficacy of different objective classifications provided by COST733 will be examined utilizing Croatian meteorological station data. This study intends to determine the most suitable combination of main classification parameters such as domain size, number of types, input variables and classification methods. Based on these results, in a subsequent step, an optimized classification that is intended to be the most appropriate to capture precipitation conditions in Croatian regions should be developed.

For evaluating the discriminative power (synoptic skill) of the classifications and the relevance of specific settings several statistical metrics will be used, some of them consider precipitation intensity, while others consider precipitation occurrence/ absence. The assessment of evaluation results takes into account the effect of varying numbers of types and specifies spatial (among regions) and as well temporal (among seasons) variations.

Some preliminary results have shown better classification performance along the Adriatic coast and in the mountainous region than in the more continental parts, as well as for optimization and threshold based methods among other methods. Furthermore, better classification performances are found in the cold part of the year (winter, autumn) and spring compared to summer, as well as for single day classifications than for four days ones. However, there is no clear improvement in the inclusion of additional variables. Statistic metrics calculated from occurrence/ absence of precipitation exhibit larger values (better performance) than those calculated from precipitation intensity. Moreover, results have pointed out the importance of temporal compliance of the datasets.