



Evaluation and comparison of circulation classifications for the North Atlantic-European region

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A wide variety of approaches for classifying large-scale atmospheric circulation types has been developed over the last decades and numerous studies applying different classifications in varying fields of climate research have been carried through. However attempts towards a systematic and quantitative evaluation and comparison of circulation classifications have been rarely undertaken although such comprehensive performance assessments may provide useful advice regarding the suitability of classifications for different applications and as well with respect to the development of new optimized classification methods.

Within the framework of the EU COST Action 733 “Harmonisation and Applications of Weather Type Classifications for European regions” several approaches for the systematic evaluation and comparison of circulation classifications are applied to a comprehensive set of circulation classifications for the North-Atlantic European domain and several subdomains.

Analyses presented in this contribution focus on the quantification of discriminatory power and within-type variability as important properties of circulation classifications. More than 70 circulation classifications are analysed with respect to their ability to produce consistent and well separated circulation types via the estimation of several quantitative criteria characterizing basic properties of the classifications (e.g. explained variation, within-type standard deviation). All evaluation criteria are not only estimated for gridded SLP data – the variable that is used for classification – but as well for gridded data of corresponding surface climate variables (temperature, precipitation). Based on evaluation results the ability of different classification approaches to efficiently discriminate atmospheric circulation and as well important target variables is depicted and respective comparison studies are presented.