*Forecasting the weather
- ensemble techniques
in probabilistic weather prediction*

The effect of the size of the domain on the relationship between circulation types and near surface environmental variables

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With respect to the application of circulation type classifications in synoptic climatological analyses it is essential to optimize the discriminative power of classifications for local near surface environmental variables. On the basis of results from evaluation and comparison studies that have been carried through within the framework of the EU COST Action 733 "Harmonisation and Applications of Weather Type Classifications for European regions" it can be stated that the performance (in terms of discriminative power for environmental target variables) of circulation type classifications varies in dependence of the methodological approach (e.g. cluster analysis, principal component analysis, correlation analysis) but as well as a function of several „boundary conditions" that are independent of the respectively applied classification method (e.g. number of designated circulation types, variables that are utilized for classification).

In this contribution the effect of varying size of the spatial domain of the classification on the relationship between resulting circulation types and near surface environmental parameters is investigated.

To this end several objective circulation type classifications (threshold based approaches, PCA-based methods, leader and optimization algorithms) have been applied iteratively to spatial domains of differing size, each of them centered over one out of 11 specific „target domains" of fixed size within the North-Atlantic European region. Based on several types of target variables (daily gridded and station based 2 metre temperature and precipitation data, daily station based PM10 data) the relationship between circulation types and environmental parameters has been quantified using several evaluation metrics (e.g. explained variance, correlation between observed and reconstructed parameter time series).

As one major finding arising from the comparison of evaluation results grouped according to the size of the spatial domain it can be stated that variations in the size of the spatial domain have a more distinct effect on the relationship between circulation types and environmental variables than the choice of a specific methodological classification approach.