



## A combination of cluster analysis and Kappa statistic for the evaluation of climate model results

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Different statistical methods are combined for the comparison of the spatial structures of two data-sets. This is useful for the validation of climate simulation data with respect to observational data of the same spatial and temporal coverage. We assume that simulated data and observed data are both given as time-series at locations such as grid cells or station locations. The spatial structure of such a data-set is understood as the spatial distribution of clusters (obtained from a cluster analysis of the time-series), which contain climatologically similar locations. If the spatial distribution of clusters was identical for the observed and the simulated data, the simulation would describe the spatial structure of the observations perfectly. Differences between these distributions are quantified using the  $\kappa$ -statistic.  $\kappa$ -variants can discriminate between differences which are due to differing cluster frequencies or and those due to differing spatial distributions. We demonstrate the method using simulation data from the statistical regional climate model STAR for Germany.