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A new strategy to link large scale atmospheric features with local extremes

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A classification of atmospheric features is a useful method to generate subsets of days on which to perform further analyses. They exhibit, depending on the classification procedure used, an improvement in coherence and, in broad terms, a higher degree of within-class similarity than the usage of the entire set of data. This stratification can be done by extracting large scale information from the atmosphere using *empirical* (e.g., Hess-Brezowsky Grosswetterlagen) or *numerical-algorithmic* (e.g., EOFs, clustering, et cetera) approaches. What all of these approaches share is the tendency to describe *average conditions*. What all of these approaches fail to achieve is an adequate description of the behaviour of *local and regional extremes*.

However, regional extremes and their future development are a topic of high relevance, e.g., for climate impact studies and devising adaptation strategies. A innovative approach will be presented which re-defines the concept of "pattern". It is based upon the the concept that a local extreme can be described by a combination of large-scale atmospheric properties. In this regard, a pattern is a configuration of the describing properties Pn (e.g. P1 low, P2 low, P3 high, P4 low). It will be shown that (i) extremes share the associaton to certain large-scale properties, (ii) a distinct cluster analysis is able to identify patterns which have high dissimilarity amongst them as well as high similarity of the days which each of them encompasses.

With these new patterns, studies concerning the future development of the associated extremes can be carried out. Not only do they describe the extremes of meteorological parameters such as temperature, precipitation or wind – it will be shown that probabilities of surpassing thresholds or properties such as the areal extent of extremes or the occurrence and future development of user-relevant extreme indicators can be well described by this strategy.