



Atmospheric circulation types and extreme areal precipitation in southern central Europe – impacts of present and future climate change

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The joint Austrian-Bavarian climate research project WETRAX (Weather patterns, cyclone tracks, and related precipitation extremes) included – as a contribution from the University of Augsburg – the analysis of large-scale atmospheric circulation types and their impact on extreme areal precipitation in Southern Germany and Austria. Based on daily gridded rainfall data generated by ZAMG (Austria) for the period 1951-2006, regions of similar rainfall variability have been determined by seasonal s-mode PCAs. Extreme areal precipitation beyond the 95% percentile has been analyzed with respect to frequency and rainfall amount. Large-scale circulation types are derived from NCEP reanalyses data by SANDRA classification (simulated annealing and diversified randomization) including optimizations with respect to climatic variables and atmospheric levels considered for classification. One focus is on frequency changes of circulation types being relevant for heavy precipitation, both in the observation period and in future projections based on RCP scenarios and different global climate model simulations. Furthermore, regression models are derived to assess future changes of extreme areal precipitation within the different rainfall regions from frequency changes of the large-scale circulation types.