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Conditioning stochastic weather generator on atmospheric circulation – preliminary assessment

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Synthetic data series provided by stochastic weather generators are often used in climate change impact studies which require local climatological information. The aim of this study is to analyse links between larger-scale circulation patterns and surface meteorological variables over Central Europe during the course of the year. Atmospheric circulation will be described using circulation indices (flow strength, direction and vorticity) calculated from daily sea level pressure data taken from the NCEP/NCAR reanalysis (available from 1948 to present) and classified into 27 circulation types. This classification consist of 2 types with large absolute vorticity (strongly cyclonic and anticyclonic type), 8 directional types, 16 hybrid types (combinations of directional and cyclonic/anticyclonic types) and the last type represents an unclassified pressure field. In the next step, annual courses of minimum temperature, maximum temperature, mean temperature and precipitation (taken from the E-OBS gridded dataset) will be calculated individually for each circulation type. Comparison of these annual courses will allow us to study links between the surface meteorological variables and atmospheric circulation in sub-monthly temporal resolution. First results suggest substantial temperature deviations from the mean annual course for certain circulation types and the magnitude of these anomalies varies over the year. The results are expected to be useful for conditioning an existing stochastic spatial weather generator on atmospheric circulation, which may result in more realistic weather data produced by the generator. In addition, variable warming (or cooling) effects of certain circulation types during the course of the year may be used as an objective method for delimiting climatological seasons in the changing climate.