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Analysing the teleconnection systems affecting the climate of the Carpathian Basin

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Nowadays, the increase of the global average near-surface air temperature is unequivocal. Atmospheric low-frequency variabilities have substantial impacts on climate variables such as air temperature and precipitation. Therefore, assessing their effects is essential to improve global and regional climate model simulations for the 21st century. The North Atlantic Oscillation (NAO) is one of the best-known atmospheric teleconnection patterns affecting the Carpathian Basin in Central Europe. Besides NAO, we aim to analyse other interannual-to-decadal teleconnection patterns, which might have significant impacts on the Carpathian Basin, namely, the East Atlantic/West Russia pattern, the Scandinavian pattern, the Mediterranean Oscillation, and the North-Sea Caspian Pattern. For this purpose primarily the European Centre for Medium-Range Weather Forecasts' (ECMWF) ERA-20C atmospheric reanalysis dataset and multivariate statistical methods are used. The indices of each teleconnection pattern and their correlations with temperature and precipitation will be calculated for the period of 1961-1990. On the basis of these data first the long range (i. e. seasonal and/or annual scale) forecast ability is evaluated. Then, we aim to calculate the same indices of the relevant teleconnection patterns for the historical and future simulations of Coupled Model Intercomparison Project Phase 5 (CMIP5) models and compare them against each other using statistical methods. Our ultimate goal is to examine all available CMIP5 models and evaluate their abilities to reproduce the selected teleconnection systems. Thus, climate predictions for the 21st century for the Carpathian Basin may be improved using the best-performing models among all CMIP5 model simulations.