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Enhanced seasonal predictability of the summer mean temperature in Central Europe favored by new dominant weather pattern

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Long-term daily temperature records include a wide range of information about the state and variability of the global, regional and local climate system. A diagnose of the climate change induced circulation changes can be estimated by seasonal predictability measures.

At the Central European climate station Potsdam the long-term relation between the late winter variability and the meteorological summer mean temperature was analyzed over the last 100 years using a regression model. An enhanced predictability was found after 1990 and the prediction of the last 3 summers (2014, 2015, 2016) was nearly perfect.

On the regional level we found for the present climate an enhanced predictability over the North-Eastern part of Central Europe (the southern part of the Baltic region) using E-OBS temperature data. This cannot be a coincidence but might be linked to occurring circulation changes over North-Atlantic European Sector. Long-term analyses of Hess/Brezowsky Großwetterlagen show a significant increase of two dominant weather types. Both currently explain about 30% of the total variability. They are characterized by opposite shapes and are often associated with heat extremes (BM: Zonal Ridge across Central Europe) and heavy rain (TRM: Trough over Central Europe) in the summer half-year, respectively. The distance pattern of the Z500 composite fields also reveals a maximum over this region.

The prediction for the upcoming summer 2017 will be evaluated and assessed in the long-term perspective. Potential applications across sectors, such as tourism, public health and labor productivity are discussed. Prediction for Potsdam (19 April 2017): Tjja = 19.2° C & Hot Days = 20.5d