

Changes of atmospheric circulation in Central Europe and their influence on climate trends in the Czech Republic

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This work is concerned with the influence of changes of atmospheric circulation on observed trends of 11 climatic elements from 21 stations in the Czech Republic in the period 1961-1998. Atmospheric circulation in Central Europe is described by the German (Hess&Brezowsky) and Czech-Slovak (Brádka's) subjective catalogues of synoptic types. In the study period there is a strong upward trend in the occurrence of cyclonic types in Brádka's catalogue in autumn, winter and summer. In the Hess&Brezowsky catalogue in winter the number of zonal (west) types increases, as does the occurrence of anticyclonic types in spring and summer. To assess their effect on observed climate trends we have used the method of "hypothetical" seasonal trends that are calculated from a daily series, constructed by assigning the long-term monthly average of the given climatic element under a specific circulation type to each day classified with this type. The ratio of these "hypothetical" trends and observed seasonal trends (DJF, MAM, etc.) shows that changes in atmospheric circulation are the primary cause of massive winter warming, and autumn cooling connected with increasing precipitation and humidity. However, the Brádka's catalogue does not explain positive trends in sunshine duration and the decrease of humidity and cloudiness in winter. In spring and summer, the circulation influence on observed climate trends (warming, increasing sunshine duration, decreasing humidity and cloudiness) is negligible except for precipitation, relative humidity and cloudiness changes that are related to trends in the Hess&Brezowsky catalogue, mostly in spring. Observed trends in total wind speed and zonal and meridional wind are spatially incoherent and mostly insignificant so their connection to atmospheric circulation changes cannot be assessed.