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Atmospheric circulation types and temperature variability in Serbia

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The atmospheric circulation is a significant factor of climate variability. The classifications of atmospheric circulation are very useful tools in climate change research. For the analysis of temperature variability in Serbia was used SynopVis Grosswetterlagen (SVG) system. This classification method is based on NCEP-Reanalyses and using MSLP, Z500 and T850 for 29 objective calculated Hess-Brezowsky circulation types.
The first part of this study analyzes the correlations between the frequencies of SVGs and the mean annual and seasonal temperatures for 17 stations in Serbia for the period 1949-2009. It was obtained a statistical significant correlation between these variables. For most stations the western and southern circulation types are positively correlated with annual and seasonal temperatures, and northern and eastern circulation types are negatively correlated. These stations have the positive linear trends of annual and seasonal temperatures. Exception is autumn when all station have a negative linear trend of temperatures and negative correlation with western atmospheric circulation. Also the stations on the southern and southeastern parts of Serbia show the negative correlation with western circulation in the winter and they have a negative linear trend of temperatures in this season of year. This means that the atmospheric circulation is a significant factor of regional climate differences. Also, there are determined the favorites SGVs for extreme warm and cold temperatures events. The trends of their frequency were analyzed too.
The aim of the second part of this study is investigation the relations between atmospheric circulation and external climate forces. In this purpose there are used some of the solar activity indices. Finally, the correlations between SVGs and temperatures in Serbia in the periods of different solar activity were discussed.