



The classification of atmospheric circulation over Serbia

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Daily weather types over Serbia were obtained using the objective weather typing system of Jenkinson and Collison (1977), which is based on the Lamb weather types (Lamb 1972). The daily atmospheric circulation that affects Serbia was characterized using a set of indices associated with the direction and vorticity of the geostrophic flow over an area that covers the majority of Europe and the Mediterranean Sea. To obtain the circulation types, the daily values of the sea level pressure (SLP) and the geopotential height at 500 hPa for the period 1961-2010 were retrieved from the National Centers for Environmental Prediction/National Center for Atmospheric Research (NCEP/NCAR) reanalysis (Kalnay et al. 1996) on a $2.5^\circ \times 2.5^\circ$ longitude-latitude grid. The shortcoming of this method is the lack of data on other higher levels. In this study, this deficiency was solved by the vertical structure of the atmosphere that was employed to analyze the geopotential anomaly at 500 hPa.

Twenty six different weather types were grouped into three main groups: eight pure directional types - northerly (N), northeasterly (NE), easterly (E), southeasterly (SE), southerly (S), southwesterly (SW), westerly (W) and northwesterly (NW), two pure types based on the severity of the geostrophic vorticity - cyclonic (C) and anticyclonic (A), and sixteen hybrid types (eight cyclonic and eight anticyclonic for each direction). Composite maps of each circulation weather types (CWT) were constructed for the period 1961-2010 for all seasons. Each of the CWT has a distinct underlying synoptic pattern that produces the expected type and direction of flow over the study area. It was found that the cyclonic (anticyclonic) types are associated with a higher (lower) than average probability and intensity of rainfall. The relative frequencies of the circulation types were computed. It was found that the anticyclonic type was the most common type in all seasons: (14.33%) spring, (18.70%) summer, (23.87%) autumn and (18.93%) winter. Obtained results are in agreement with the results of researcher for different areas across Europe (e.g. Trigo et al. 2000; Linderson 2001).

References

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