



Links between the extreme daily precipitation and the prevailing directions of the air masses over Serbia

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The focus of this study is the analysis of the extreme daily precipitation in Belgrade (central Serbia) and their links with the prevailing direction of the air masses at the 500, 1500 and 5000 m during the period 1949-2009. The extreme precipitation conditions were defined by the 10 wettest days of each year. Four-day backward trajectory simulations were conducted during the precipitation period to investigate the regional transport of the air masses using the HYSPLIT model. The air mass trajectories were classified into fourteen trajectory categories by the origin and direction of their approach to Belgrade.

The following origins of the air masses were considered from eight original directions: northern Europe (N), northeastern Europe (NE), eastern Europe (E), southeastern Europe (SE), southern Europe (S), southwestern Europe (SW), western Europe (W); northwestern Europe (NW). Also, six hybrid directions are established by the direction of flow in the layer up to 1500 m and from 1500 m to 5000 m. Flow of air masses in the layer up to 1500 m from northeastern Europe, and from 1500 m to 5000 m from south or south-west is assigned by NES; from northwestern Europe and southwestern Europe by NWSW; from northern Europe and southeastern Europe by NSE, from southern and northern Europe by S-N; from southeastern and northwestern Europe by SENW, and from southeastern and southwestern Europe by SESW.

The highest precipitation of 94 mm is recorded on June 14, 1994 and belongs to the NES (hybrid) category, while 88.4 mm, 84.8 mm and 80.1 mm belong to the W, SW and SE categories, respectively. Three of the most frequent categories of air flow (SW, NW and SE) contributed to more than a half of the observed precipitation during the 10 wettest days. Almost 68.2% of precipitation totals during the 10 wettest days in Belgrade fallen in the warmer part of the year. These are directly connected with the intensive convection of colder and humid, usually maritime air masses from Atlantic and Mediterranean over Serbia.