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Trends of convective and stratiform precipitation in central Europe

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Significant trends in some characteristics of atmospheric precipitation were observed in central Europe in recent decades. Little attention has been paid to the investigation whether these trends are related to changes of precipitation falling from convective and stratiform clouds. The probable reason is the lack of long-term series of precipitation data disaggregated according to their origin into convective and stratiform.
We propose an algorithm disaggregating 6-hour precipitation amounts into predominantly convective and stratiform based on analysis of past and present weather conditions (type of clouds and weather state) from SYNOP data. Efficiency of the algorithm is tested, and disaggregated precipitation amounts are analysed with respect to their trends at weather stations in the Czech Republic.
The trends in mean convective precipitation were rising over 1982–2010 in all three seasons in which convective precipitation is important (spring, summer and autumn) and they were stronger than the trends in mean stratiform precipitation in each season. This shows that the observed increases in total precipitation are mainly due to increases in convective precipitation. This effect may also be related to observed warming of surface air temperatures that may enhance instability and support conditions for stronger convection. Heavy convective precipitation increases in summer and autumn and decreases in spring at majority of the stations while heavy stratiform precipitation increases in spring and autumn and decreases in summer. Some trends of precipitation characteristics differ between the western and eastern parts of the Czech Republic and between lowland and highland areas.