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Extreme climate indices calculations on harmonized dataset covering the Carpathian region

M. Lakatos and the CARPATCLIM Homogenization and Interpolation Team
Hungarian Meteorological Service, Climate Division, Budapest, Hungary (lakatos.m@met.hu)

CARPATCLIM Homogenization and Interpolation Team:
Austria: Ingeborg Auer, Johann Hiebl
Croatia: Janja Milković
Czech Republic: Pavel Zahradníček, Petr Štěpánek, Radim Tolasz
Hungary: Tamás Szentimrey, Zita Bihari, Mónika Lakatos, Tamás Kovács, Ákos Németh, Sándor Szalai
Poland: Piotr Kilar, Robert Pyrc, Danuta Limanowka
Romania: Sorin Cheval, Monica Matei, Alexandru Dumitrescu, Marius Birsan
Serbia: Dragan Mihic, Predrag Petrovic, Tatjana Savic
Slovakia: Peter Kajaba, Gabriela Ivanakova, Oliver Bochnicek, Pavol Nejedlik, Pavel Šastný
Ukraine: Oleg Skrynyk, Yurii Nabyvanets, Natalia Gnatiuk

Climate change is expected to result in significant changes in the Carpathian region to affect ecosystems and human activities. The impacts of climate change on society come forward mainly through extreme weather and climate events, such as heat waves, droughts, heavy rainfall and storms. The investigation of the climate extremes, observed trends, changes in frequency and intensity could contribute to the establishment of the adaptation strategies in the region. Climate indices are used in several projects on climate change as prevailing indicators of changes in extremes.
Studying the spatio-temporal changes of extreme indices can be implemented through the analysis of observations reliable in time and in space. The spatial interpolation of indices values for station locations is a difficult task as the distribution functions of the several derived values are unknown. However, the basic variables, such as temperature and precipitation can be gridded by the knowledge of their statistical properties, thus higher quality gridded datasets can be constructed for further analysis, as it is realized in the CARPATCLIM project. The homogenized (MASH (Szentimrey)) and gridded (MISH (Szentimrey and Bihari)) datasets created in the frame of the CARPATCLIM, hold by JRC and a consortium of members from 9 different countries are used in this study. The gridded database is produced in daily temporal resolution for period 1961-2010 and in 0.1° spatial resolution for many basic meteorological variables. The harmonized database achieved through the tender service in the CARPATCLIM project provides relevant outcomes for studying extremes.
Several extreme indices are calculated in this study for the Carpathian region as preliminary result of the investigations of the dataset. The days with threshold values such as summer days, frost days, heat wave duration and percentage of wet days above specific values are presented. The obtained trends, the results of the linear trend analysis, the significance of the changes are demonstrated on the grid defined in the CARPATCLIM tender specification.