
Projected changes in heat waves and cold waves indices in Romania over the period 2020-2100

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Abstract

Research in climatology focused in the latest decades on climate change and especially on changes in extreme weather events. Among them, heat waves and cold waves are among the most studied. Since climate change is already affecting large areas worldwide, it is important to study in details the future evolution of these changes at regional and local scale. The aim of this study is to analyse changes on heat waves and cold waves indices over the period 2020-2100, divided into three sub-periods (2021-2040, 2041-2070, and 2071-2100) in five weather stations in Romania by using a set of 10 indices recommended by Expert Team for Climate Change Detection Monitoring and Indices. Heat waves were detected based on excess heat factor, while cold waves were detected based on excess cold factor. The indices for observed and modelled data were calculated by employing ClimPACT2 software. Modelled data for daily minimum and maximum temperature was extracted from EURO-CORDEX Project database. RCP4.5 and RCP8.5 scenarios of five regional climate models (ALADIN, REMO, RACMO22E, RCA4, and WRF331F) were considered. We compared the average values of the historical reference period (1961-1990) with those obtained for the three sub-periods for each scenario (RCP 4.5 and RCP 8.5). The results of this study showed major changes for all the analysed indices, especially for the period 2071-2100, which showed the highest changes under both analysed scenarios. The cold waves become less, shorter, but more intense (for RCP 4.5) or remain at the same intensity (for RCP 8.5), while the heat waves will be more, longer, and more intense for both scenarios.

Keywords: projected climate change, heat waves, cold waves, indices, regional climate models, Romania

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