



## **Future climate heat waves over Europe from an ensemble of RCMs from EuroCORDEX simulations**

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Among the extreme events that are projected to be changed related to climate change issues, heat waves are some of the most worrying climatic events due to the vulnerability of our society to their effects and the probable increase of its frequency and duration throughout the 21st century.

There are different heat waves definitions, but a complete description should include both, its intensity and frequency features, and so at least a couple of indices need to be considered. With this objective, the ETCCDI has developed several climate indices to measure extreme temperature. The Warm Spell Duration Index (WSDI) or TX90p, calculated with percentile-based thresholds, seem to be the ones most commonly used to study heat waves frequency. Apart from those definitions, several other interesting indices have been proposed, such as HWMI (Heat Wave Magnitude Index).

In this study, duration and intensity of heat waves are studied at a regional scale over Europe using simulations of an ensemble of regional climate models included within the EURO-CORDEX database (<http://www.euro-cordex.net/>). Vautard et al. (2013)<sup>1</sup> is the first-step work for the proposed analysis, as there the capability of the regional climate models to accurately describe such extreme event processes is showed.

The evolution in the characteristics of heat waves is analyzed using a set of climate indices of extreme events and comparing the results obtained in the historical simulations with those of the simulations for future climate. Different scenarios are used to better assessment of the possible evolutions of the heat waves under climate change conditions for the end of the 21st century. A comparison of several RCMs are analyzed in detail to improve our understanding of the uncertainties related to heat wave description: two RCMs forced with the same GCM, two different emissions scenarios for the same RCM, and the effect of resolution 0.44 vs 0.11. This exercise is intended to be a first step in the full study of the whole euro EURO-CORDEX database of regional climate change simulations.

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Vautard, R. et al. The simulation of European heat waves from an ensemble of regional climate models within the EURO-CORDEX project. *Climate Dynamics* 41, 2555–2575 (2013).