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Heat waves analysis over France in present and future climate

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A new method for analysing the heat waves, based on the high quantiles of daily temperature distributions, has been defined to identify them at different spatial and temporal scales. The heat waves events can be considered as multi-dimensional objects combining several information about duration, maximal temperature or global intensity. This method has been applied over France with the SAFRAN reanalysis data since 1959 for establishing regional heat waves climatology and is used in real time to qualify in progress events in close relation with the weather forecasts.
Climate change time scale has also been studied in details. Heat waves have been calculated for historical and future climate based on the EURO-CORDEX regional multi-model ensemble, under different Representative Concentration Pathway scenarios (RCP4.5 and RCP8.5). The EURO-CORDEX ensemble simulates heat waves which characteristics are consistent with the events detected from the SAFRAN reanalysis between 1971 and 2005. Models are able to simulate waves as intense as the 2003 exceptional event. Under future climate conditions, whatever the considered scenario, the heat waves become more frequent and have higher mean duration and intensity. Moreover, heat waves could occur during a larger part of summer. The 2003 event corresponds to a typical event at the end of the century, and its characteristics are much lower than the strongest waves that could occur over the last 30 years of the 21st century. However, the intensity of the evolution during the end of the century will strongly depend on climate policies.
The seasonal time scale has also been recently considered from seasonal forecast models by evaluating the predictability of the heat wave days anomaly over Europe.
These elements, end users relevant, are mostly available through national climate services like DRIAS or the Climat HD portal.