

Changes in heat waves characteristics over Extremadura (SW Spain): duration, intensity and frequency

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Heat waves (HW) are increasing and its consequences are important not only for the effects over the population but also for the agriculture and biodiversity. That's why trends in heat wave events over Extremadura, a Region located in the southwest of Spain and characterized by irrigated land with crops like corn or tomatoes growing in summers, has been studied. Heat waves are defined as days occurring above the 95th percentile of the summer (June-August) maximum temperature time series. Another event named as Warm Event (WE) has been studied and defined as exceedance over the 75th percentile. For this purpose, a set of 13 regularly distributed daily maximum temperature time series was selected from a larger database for the Region of Extremadura for the common period 1965-2014. A stochastic seasonal functional heteroscedastic auto-regressive model developed to simulate daily (minimum, maximum, or mean) temperature time series coherent with observed time series (Parey et al., 2014, Dacunha-Castelle et al., 2015) has been used. This stochastic temperature generator is used to reproduce 1000 time series equivalent to the observed ones in order to investigate the significance of the changes in HW characteristics: duration, intensity and frequency; using different sub-periods length for the observed period. The results show that the changes in HW frequencies of the last 10-year sub-period comparing to the first are significant for 7 of the 13 observatories but the changes in HW durations and intensities are not significant. But when considering the lower threshold (75th percentile) to study changes in WE characteristics, frequency shows significant changes in 8 observatories, duration for 4 observatories and intensity for 2. Then, the parameters of the WE are increasing higher than the corresponding to the HW events.

References:

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Dacunha-Castelle, D., T. T. H. Hoang and S. Parey (2015), Modeling of air temperatures: preprocessing and trends, reduced stationary process, extremes, simulation, *Journal de la Société Française de Statistique*, 156, 138-168.