Modelling the occurrence of heat waves in maximum and minimum temperatures over Spain and projections for the period 2031-60

J. Abaurrea, J. Asín, A.C. Cebrián

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Abaurrea, J. · Asín, J. · Cebrián, A.C.

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Abstract The occurrence of extreme heat events in maximum and minimum daily temperatures is modelled using a non homogeneous common Poisson shock process. It is applied to five Spanish locations, representative of the most common climates over the Iberian Peninsula. The model is based on an excess over threshold approach and distinguishes three types of extreme events: only in maximum temperature, only in minimum temperature and in both of them (simultaneous events). It takes into account the dependence between the occurrence of extreme events in both temperatures and its parameters are expressed as functions of time and temperature related covariates. The fitted models allow us to characterise the occurrence of extreme heat events and to compare their evolution in the different climates during the observed period.

This model is also a useful tool for obtaining local projections of the occurrence rate of extreme heat events under climate change conditions, using the future downscaled temperature trajectories generated by Earth System Models. The pro-

J. Abaurrea
University of Zaragoza

J. Asín
University of Zaragoza

A.C. Cebrián
University of Zaragoza
E-mail: acebrian@unizar.es