



Evolution of extreme temperatures over western Iberia; reporting on recent changes and future scenarios

Alexandre M. Ramos (1), Ricardo M. Trigo (2,4), and Fátima E. Santo (3)

(1) Universidade de Vigo, Environmental Physics Laboratory, Ourense, Spain (alexramos@uvigo.es), (2) CGUL,IDL,Faculdade de Ciências, Universidade de Lisboa, Portugal, (3) Instituto de Meteorologia, Lisboa, Portugal, (4) Departamento de Engenharias, Universidade Lusófona, Lisboa, Portugal

We report on changes in surface air temperature extremes over mainland Portugal during the period 1941–2006 using daily maximum and minimum temperatures (Tmax and Tmin) from 23 of the most reliable Portuguese station records. Here we have used indices corresponding to the number of days above the 90th and below the 10th percentile for both Tmax and Tmin. This allowed us, to compute trends for the entire period of data (1941–2006) as well as for two consecutive 31-year periods: 1945–1975 (relative cooling period) and 1976–2006 (relative warming period), based on results found by Karl et al, 2000. The most striking results are related with the last period (1976–2006) that reveal a significant increase in extreme heat events for both spring and summer seasons, and a decrease in extreme cold events in winter.

In the second part of this work we present an analysis of climate change over Portugal simulated by the Hadley Centre regional climate model (HadRM3) with data obtained from Project PRUDENCE. The ability of the model to reproduce the present climate (1961–1990) is tested and evaluated. For this purpose, values of Tmax and Tmin of all 23 climatological weather stations (1961–1990 climate normals) were aggregated into a new time series. Additionally we have computed the seasonal percentiles in 1% steps (ranging from 1% to 99%). For comparison purposes we have aggregated HadRM3 values into a new time series averaging grid points located closest to the 23 climatological weather stations considered, and computed the corresponding seasonal percentiles in 1% steps. This procedure allowed an objective comparison between the two probability distributions (climatological and simulated by the model), using standard q-q plots.

Finally we have evaluated changes of probability distributions for future climate projections under the IPCC emission scenarios (B2 and A2), for the period between 2071–2100 when compared to the present climate (1961–1990) simulated by the model. The same 23 grid points (closest to the 23 climatological weather stations) employed in the present climate comparison are used. Results, once again, are presented for Tmax and Tmin on seasonal basis.

Karl, T.R., R.W. Knight and B. Baker (2000), The record breaking global temperature of 1997 and 1998: evidence for an increase in rate of global warming? *Geophys. Res. Lett.*, Vol. 27, 5, 719–722.