



## Analysis of Trends in Surface Air Temperature and Indices of Temperature in Castilla y León

Ramón Viloria and Verónica Tricio

Department of Physics, Faculty of Science. University of Burgos . Plaza Misael Bañuelos, s.n. 09001 Burgos, Spain  
(rviloria@ubu.es)

In the context of global warming studies, air temperature (mean, minimum and maximum) and some indices of temperature in the Castilla y León region have been analysed in this work. The study of such indices offers an insight into the climatic system behaviour deeper than a simple analysis of changes in mean values. Castilla y León country, in the northern half of Spain, has a continental climate, with extremely cold winters and hot summers. A general temperature increase trend has been reported in the region (Fernández-Montes and Rodrigo, 2011; de Castro et al., 2005; del Río et al, 2012) in good agreement with global warming evidences contained in IPCC reports.

In this work, mean daily temperature data for more than 70 years from meteorological stations located in the main cities of the region have been used to study the temperature trends and seasonal behaviour. In addition, statistical and climatic software packages, as RClimate, have also been used and different Climate Extremes Indices have been calculated: Summer days, Iced days, Frost days or DTR. The resulting series were analysed through trends, while the slopes of these trends of the climate indices have been evaluated with least square linear fitting (Storch and Zwiers, 1999).

In order to find different cooling or warming patterns, a monthly and seasonal analysis has also been carried out, with great evidence in season displacements and summer warming. The main differences are found in autumn and winter, with a clear warming trend in autumn months and a significant cooling in the winter in some stations.

### References

Fernández-Montes, S. and Rodrigo, F. S., 2012, Trends in seasonal indices of daily temperature extremes in the Iberian Peninsula, 1929–2005. *Int. J. Climatol.*, 32: 2320–2332. doi: 10.1002/joc.3399  
Storch, H.V. and Zwiers, F.W.. Statistical Analysis in Climate Research. Cambridge University Press, 1999.  
De Castro, Manuel, Javier Martín-Vide, and Sergio Alonso. "El clima de España: pasado, presente y escenarios de clima para el siglo XXI." Evaluación preliminar de los impactos en España por efecto del cambio climático (2005): 1-64.  
Del Río, S., Cano-Ortiz, A., Herrero, L. and Penas, A., 2012. Recent trends in mean maximum and minimum air temperatures over Spain (1961-2006). *Theor. Appl. Climatol.*, 109: 605-626.