

EGU2020-18693

<https://doi.org/10.5194/egusphere-egu2020-18693>

EGU General Assembly 2020

© Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.



An Assessment of Long-Term Temperature Variability in the Sierra de Guadarrama (Spain)

Cristina Vegas Cañas¹, J. Fidel González Rouco¹, Jorge Navarro Montesinos², Etor E. Lucio Eceiza¹, Elena García Bustamante², Inés Álvarez Arévalo¹, Ernesto Rodríguez Camino³, Andrés Chazarra Bernabé³, and Félix García Pereira¹

¹Dpt. Earth Physics and Astrophysics, IGEO (UCM-CSIC), Universidad Complutense de Madrid (UCM), Spain (cvegas@ucm.es)

²Centro de Investigaciones Energéticas, Medioambientales y Tecnología (Ciemat)

³Agencia Estatal de Meteorología (AEMet)

This work provides a first assessment of temperature variability from interannual to multidecadal timescales in the Sierra de Guadarrama, located in central Spain, from observations and regional climate model (RCM) simulations. Observational data are provided by the Guadarrama Monitoring Network (GuMNet; www.ucm.es/gumnet) at higher altitudes and by the Spanish Meteorological Agency (AEMet) at lower sites. An experiment at high horizontal resolution of 1 km using the Weather Research and Forecasting (WRF) RCM, feeding from ERA Interim inputs, is used. Through model-data comparison, it is shown that the simulations are annually and seasonally highly representative of the observations, although there is a tendency in the model to underestimate observational temperatures, mostly at low altitudes. Results show that WRF provides an added value in relation to the reanalysis, with improved correlation and error metrics relative to observations.

The analysis of long term trends shows no significant temperature trends in the area during the last 20 years. However, when spanning the analysis to the whole observational period, back to the beginning of the 20th century at some sites, significant annual and seasonal temperature increases of ca. 1degC/century develop, most of it happening during de 1970s.

The temporal variability of temperature anomalies in the Sierra de Guadarrama is highly correlated with the temperatures in the interior of the Iberian Peninsula. This relationship can be extended broadly over south-western Europe.