



## **Incorporating metrological calibration procedures to improve temperature data series quality and ensure their traceability**

Alba Gilabert (1), Manola Brunet (1,3), Giuseppina Lopardo (2), Andrea Merlone (2), Philip Jones (3,4), Fabio Bertiglia (2), and Enric Aguilar (1)

(1) Center for Climate Change, Tortosa, Spain (alba.gilabert@urv.cat), (2) Istituto Nazionale di Ricerca Metrologica (INRiM), Torino, Italy, (3) Climatic Research Unit, School of Environmental Sciences, Univ. of East Anglia, Norwich, UK, (4) Department of Meteorology, Center of Excellence for Climate Change Research, King Abdulaziz University, Jeddah, Saudi Arabia

Climate data series quality depends on many factors, one of them being time-series homogeneity, although it also depends on the traceability of the observations. In the last decades, many efforts to improve homogenisation methods efficiency have been developed, but most of these studies do not take into account the traceability of the measurements nor estimates of the uncertainty budget of climate records. In general, meteorological agencies only carry out a few comparisons to determine whether the sensor is correctly working or not, but they do not perform any complete traceable procedures to ensure the data are being measured in accordance to national standards.

In 2010 the World Meteorological Organisation (WMO) and the Bureau International des Poids et Mesures (BIPM) started a joint cooperation to encourage the adoption of metrological procedures. Under the umbrella of the Research Grant (ENV07/REG05) in support of the parent EMRP MeteoMet (Metrology for Meteorology) project, different temperature sensors traceable to primary standards have been installed in different field trials. One of these has been set at the Ebro's Observatory (Roquetes, northeast Spain), to explore the potential bias introduced in temperature series associated with the changeover to automatic weather stations (AWS) in relation with the Spanish project CGL2012-32193 and also to determine the impact of introducing metrological calibration procedures according to national standards on climate data series quality.

In this contribution, we will show and discuss the results from parallel measurements taken with conventional thermometers (liquid-in-glass thermometers) and AWS sensors, by taking into account or not the calibration procedures. We also estimate the uncertainty budget, and we will show the effects of periodically adopting metrological calibration procedures to improve climate time-series quality.