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Parallel measurements at the Ebro Observatory to assess the differences between the automatic weather station and manual air temperature measurements

Alba Gilabert Gallart (1), Manola Brunet (1,2), and Germán Solé (3)

(1) Center for Climate Change, Tortosa, Spain (alba.gilabert@urv.cat), (2) Climatic Research Unit, School of Environmental Sciences, University of East Anglia, Norwich, United Kingdom, (3) Observatori de l'Ebre (OE), Univ. Ramon Llull – CSIC, Roquetes, Spain

Transition between meteorological observing systems (e.g. from manual to automatic) has the potential to induce biases in combined time-series (e.g. temperatures), compromising both their usability and traceability. Being aware of the potential impact over the homogeneity of long-term records that the transition from manual to automatic weather stations can have on the combined series using both sources of data, the WMO – CIMI recommend to conduct parallel observations to ensure a smooth transition to the new observing systems (WMO, 2010). Although different studies have addressed this issue, there is not a consensus about the magnitude and sign of the bias introduced by the automation of weather stations. This is, probably, caused because in many cases the automation is accompanied by site relocations, shelter modifications, etc. In addition, this transition adds a new uncertainty source, which is rarely taken into account.

In this study, we describe the settings of our field trials set up at the Ebro Observatory (Roquetes, Spain) from 2013-onwards, in order to evaluate potential biases between automatic weather stations (AWS) and manual air temperature observations (MAN), along with the impact of using AWS calibrated (AWSc) following traceable metrological procedures. On 2016 the field trial has been expanded, a new AWSc was installed inside a Young screen in order to assess the bias associated with the use of different shelters (Young screen vs. Stevenson screen), this new AWSc was calibrated regarding the same metrological standard procedure in the same climatic chamber than the AWSc installed in 2013 and both signals are transmitted by the same system and processed with the same datalogger to isolate the Young – Stevenson differences. Also initial results and findings from these two field trials will be presented and discussed.