EMS Annual Meeting Abstracts
Vol. 12, EMS2015-519, 2015
15th EMS / 12th ECAM

Description of the bias introduced by the transition from Conventional Manual Measurements to Automatic Weather Station through the analysis of European and American parallel datasets.

Enric Aguilar (1), Petr Stepanek (2,3), Victor Venema (4), Renate Auchmann (5), Fabricio Daniel dos Santos Silva (6), Erik Engström (7), Alba Gilabert (1), Zoia Kretova (8), Jose Antonio Lopez-Díaz (9), Yolanda Luna Rico (9), Clara Oria Rojas (10), Marc Prohom (11), Domingo Rasilla (12), Mozar Salvador (6), Gregor Vetacnik (13), and Yzhak Yosef (14)

(1) Universitat Rovira i Virgili, Center for Climate Change, C3,Tarragona/Tortosa, Spain., (2) Global Change Research Centre, Czech Academy of Sciences, Brno, Czech Republic., (3) Czech Hydrometeorological Institute, Brno Regional Office, Brno, Czech Republic., (4) University of Bonn, Meteorological institute, Bonn, Germany., (5) University of Bern, Institute of Geography, Bern, Switzerland. , (6) Instituto Nacional de Meteorologia, INMET, Brazil. , (7) Swedish Meteorological and Hydrological Institute, Norrköping, Sweeden. , (8) Main Hydrometeorological Administration, Bishkek, Kyrgizstan, (9) Agencia Estatal de Meteorología, AEMET, Madrid, Spain, (10) Servicio Nacional de Meteorología e Hidrología del Perú (SENAMHI), Lima, Perú, (11) Servei Meteorològic de Catalunya, Barcelona, Spain, (12) Universidad de Cantabria, (13) Slovenian Environment Agency, Ljubljana, Slovenia, (14) Israel Meteorological Service, Tel-Aviv, Israel

In this work, we approach the description of the bias introduced by the automatization of climate data networks in the framework of The Parallel Observations Scientific Team (POST). POST is a newly created group of the International Surface Temperature Initiative (ISTI), with the support of the World Meteorological Organization (WMO). The goals of POST (http://www.surfacetemperatures.org/databank/parallel_measurements) are the study of climate data inhomogeneities at the daily and subdaily level through the compilation and analysis of parallel measurements. Long instrumental climate records are usually affected by non-climatic changes, due to, e.g., relocations and changes in instrumentation, instrument height or data collection and manipulation procedures. These so-called inhomogeneities distort the climate signal and can hamper the assessment of trends and variability. Thus to study climatic changes we need to accurately distinguish non-climatic and climatic signals The most direct way to study the influence of non-climatic changes on the distribution and to understand the reasons for these biases is the analysis of parallel measurements A parallel measurement is composed of two or more time series, which measure a climatic variable with two different systems (for example, Montsouri and Stevenson Screens) or in two different locations (for example, city centre and airport). They mimic the situation “before” and “after” a homogeneity break. Most parallel measurements are obtained from collocated or nearly collocated series and can help us to understand the size and shape of different typical sources of inhomogeneity, which affect the climate series.

In this work we study the transition from conventional manual measurements (CON) to Automatic Weather Stations (AWS), using a several parallel datasets distributed over Europe and America. The variables studied in the analysis presented here are daily maximum temperature, daily minimum temperature and daily accumulated precipitation. First of all, the metadata – when available - is gathered to gain knowledge on the exact setting of the parallel series. Secondly, the difference (temperature) series AWS-CON and the ratio (precipitation) series AWS/CON are submitted to quality control, to remove obvious errors and inspected to detect internal inhomogeneities and split if necessary. In a third step, each segment is studied to understand the bias introduced by the transition, its seasonality as well as changes in the empirical distributions. When additional data is available, and attempt is made to study the effects of other variables on the observed bias.