

## Efficiency tests for automatic homogenization methods of monthly temperature and precipitation series

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### Abstract

Five years after the efficiency tests of the European COST ES0601 project (known as "HOME") new tests are planned with the use of a new benchmark dataset. New tests are needed for three reasons: i) Several homogenization methods have newer versions since HOME, while some other methods were not tested by HOME; ii) The HOME benchmark represented only one climatic region (i.e. the central-western European climate) and a not very large selection of inhomogeneity problems; and iii) The number of networks in the HOME benchmark was small, and thus certain kinds of results with them have large statistical uncertainty. For all these reasons the representativeness of HOME results is limited.

The new tests will be performed by researchers of the Centre for Climate Change of the University Rovira i Virgili and those of the Spanish Meteorological Agency (AEMET) with the support of a Spanish national project. We will develop and use a much larger benchmark dataset than the HOME benchmark, but we will test automatic methods only, thus the amount of the required work remains feasible. Primarily, the openly accessible automatic methods will be tested, which do not need the direct collaboration of the method developers. However, we intend to keep contact with the developers in order to test the best versions of the methods with the best possible parameterizations. Until the autumn of 2016 we will be accepting newly developed methods and versions for testing.

In the development of the new benchmark, we will build on the knowledge gathered before the creation of HOME benchmark, but we aim to create an even more realistic benchmark including various segments representing particular climatic regions and inhomogeneity problems. For instance, the new benchmark will consider that a) The frequency of breaks of detectable size is generally much higher for temperature series than for precipitation series; b) The annual cycle of biases depends both on the examined variable and the geographical region; c) The frequent presence of short-term, platform-shaped inhomogeneities in observed temperature series.

The efficiencies will be evaluated with the residual root mean square error of monthly and annual values in homogenized series, as well as with the residual trend bias errors for individual time series and network mean trends.