



## **Large systematic trend difference between national and regional homogenized datasets and global collections**

Victor Venema and the Homogenization Team

University of Bonn, Meteorological institute, Bonn, Germany (victor.venema@uni-bonn.de)

The global land temperature trend may be biased due to remaining inhomogeneities. Well-homogenized national datasets on average clearly show more warming than global collections when averaged over the region of common coverage.

For this study we have collected a dataset with more than 40 national and regional average monthly temperature series (called “national” from now on). National datasets can be better homogenized than global ones. More data is available at national weather services to serve as a reference in the detection and correction of breaks. More stations and knowledge of the local climatology can help in selecting better references that are expected to have the same climate signal. More metadata is available nationally on network-wide breaks and to determine the right date of the statistically detected breaks. Furthermore, better homogenization methods are available for regional networks.

Here we compare these national datasets to the global collections BEST, CRUCY, CRUTEM4, GHCNv3 and GISS. For all datasets the country average series have been computed. A subset of 10 well-homogenized national datasets shows a clearly stronger temperature trend, which is several tenths of a degree Celsius per century larger and mostly statistically significant. These differences are seen for the entire period between 1800 and now. The differences are smallest for CRUTEM4 and CRUCY, which include homogenized data from many of our national datasets. The differences are largest for BEST and GISS. GHCN represents a middle case.

We are working on better understanding these differences by comparing all datasets, which range from raw data to data homogenized by various methods and which use a range of different methods to compute the national average. We look for relationships between the methods used for homogenization and averaging and the trend differences.

In an accompanying poster, we

- i) review the literature on trend uncertainties due to remaining inhomogeneities,
- ii) present work on the ability of homogenization methods to detect inhomogeneities and correct trend biases, especially in case of a low signal-to-noise ratio,
- iii) review recent work on various causes of cooling biases in the climate record due to inhomogeneities and
- iv) present the work of the Parallel Observations Science Team of the International Surface Temperature Initiative (ISTI-POST) to study the influence of these factors using parallel measurements.