



EUSTACE break-detection algorithm for a global air temperature dataset

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EUSTACE (EU Surface Temperature for All Corners of Earth) is an European project that involves 8 institutes in 4 countries. Its goal is to produce daily estimates of surface air temperature since 1850 across the globe for the first time, by combining surface and satellite data using novel statistical techniques.

Here we describe a fully automatic state-of-the-art break-detection algorithm that was developed for the global LSAT dataset used within EUSTACE. We evaluate the performance of the method using artificial benchmarks and present various statistics related to frequency and size of the inhomogeneities detected in the real data.

We show in particular that long-term temperature trends calculated from raw data are more often underestimated than overestimated and that this behaviour is mostly related to inhomogeneities affecting maximum temperatures in the U.S. network. In addition, we show that minimum temperatures are affected by a negative bias in the recent years. This problem is found in every continent and could be related to changes of the radiation screens and/or to a new definition of the meteorological day.