



## **Benchmarking the performance of daily temperature homogenisation algorithms**

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This work explores the creation of realistic synthetic data and its use as a benchmark for comparing the performance of different homogenisation algorithms on daily temperature data. Four different regions in the United States have been selected and three different inhomogeneity scenarios explored for each region. These benchmark datasets are beneficial as, unlike in the real world, the underlying truth is known a priori, thus allowing definite statements to be made about the performance of the algorithms run on them. Performance can be assessed in terms of the ability of algorithms to detect changepoints and also their ability to correctly remove inhomogeneities. The focus is on daily data, thus presenting new challenges in comparison to monthly data and pushing the boundaries of previous studies.

The aims of this work are to evaluate and compare the performance of various homogenisation algorithms, aiding their improvement and enabling a quantification of the uncertainty remaining in the data even after they have been homogenised. An important outcome is also to evaluate how realistic the created benchmarks are. It is essential that any weaknesses in the benchmarks are taken into account when judging algorithm performance against them. This information in turn will help to improve future versions of the benchmarks. I intend to present a summary of this work including the method of benchmark creation, details of the algorithms run and some preliminary results. This work forms a three year PhD and feeds into the larger project of the International Surface Temperature Initiative which is working on a global scale and with monthly instead of daily data.