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The error worlds of the global benchmarks for the International Surface Temperature Initiative (ISTI)

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Our surface temperature data are good enough to give us confidence that the world has warmed since 1880. However, the data are not perfect and the main source of uncertainty for secular trends is changes in the way temperature was observed and how well these inhomogeneities can be removed.

Previous assessments of homogenisation methods were based on regional and national networks. The Benchmarking and Assessment Working Group (BAWG) of the International Surface Temperature Initiative (ISTI; www.surfacetemperatures.org) will perform a global assessment replicating the network of the global ISTI raw data collection. The aim is to quantify the skill of homogenisation algorithms on a global scale against realistic benchmarks.

The benchmarking involves the creation of homogeneous synthetic worlds of station temperature data, the deliberate contamination of these with known inhomogeneities and the assessment of the ability of homogenisation algorithms to detect and remove these inhomogeneities. The ultimate aim is threefold: quantifying uncertainties in surface temperature data; enabling more meaningful product intercomparison; and improving homogenisation methods.

This presentation will detail how the inhomogeneities are generated. We will generate ten “blind” error worlds (the errors are unknown to user) with different assumptions about the inhomogeneities and several “open” error worlds (errors are known). The aim is that all blind worlds are realistic, but we also aim to ensure that enough diversity is included so that reality likely falls within the spread. The open error worlds will be partially more idealised and can be useful for understanding the performance of the homogenisation methods.

The error worlds differ in the size distributions and frequencies of (large-scale trend bias producing) inhomogeneities. We will make several assumptions about the size, frequency and the autocorrelations of the inhomogeneities (as a mixture of a random walk and noisy deviations from the baseline), their seasonal cycles and how the errors are correlated between stations and networks to produce global average trend errors.