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A new observational analysis of near surface air temperature change since the late 18th century developed for the GloSAT project

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The GloSAT project is developing a new observational analysis of global air temperature change over land and ocean since the late 18th century.

A new global analysis processing system has been developed that uses a computationally efficient spatial statistical method to estimate air temperature anomaly fields from historical observations. This will be the first presentation of this analysis approach. This method, based on Gaussian Markov Random Fields, jointly estimates temperature anomaly fields over land and ocean based on weather station and ship-based air temperature observations. The increased computational efficiency of the approach compared to conventional kriging-based estimates allows for increased spatial resolution in the analysis.

Observational uncertainties are represented within the analysis framework to propagate uncertainty into the output ensemble data set. This accounts for errors arising from uncorrelated effects and structured errors such as residual biases in observations from an individual weather station or ship after correction. Observational error models have been co-developed with project partners providing the input land and marine data products.

Initial results from the application of the analysis system to GloSAT air temperature observation data will be demonstrated.