



Access and harmonization of Baseline and Reference in-situ Observations within C3S

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Among the objectives of the Copernicus Climate Change Service (C3S), there is the access to observational records from selected in-situ GCOS relevant networks and initiatives related to a subset of atmospheric Essential Climate Variables. At present several datasets are to be published including near surface temperature from U.S. Reference Climate Network (USCRN); atmospheric temperature, humidity and wind vertical profiles from the GCOS Reference Upper-Air Network (GRUAN) and the Integrated Global Radiosonde Archive (IGRA); vertical profiles, partial and total column contents of ozone concentration from the Network for the Detection of Atmospheric Composition Change (NDACC), SHADOZ (Southern Hemisphere Additional Ozonesondes), the European Brewer Network (EUBREWNET) and other initiatives.

The work carried out within the C3S also aims to:

- Detect and adjust systematic inhomogeneities in the observation time series, due to a variety of causes (changes in station location, instrumentation, calibration or drift issues, different instrument sensitivity across different networks, changes in the measurement procedures, etc.)
- Establish measurement traceability of ground-based observations which must be related to a reference (SI or community acknowledged) “standard” through an unbroken chain of calibrations, each contributing to the measurement uncertainty;
- Quantify measurement uncertainties in the historical data, where traceability was not properly established, using available metadata, analysis of sensors’ intercomparison or statistical analysis;
- Achieve the comparability of measurement results, for quantities of a given kind, provided by different measurements and techniques ensuring a coherent use of datasets which are physically consistent and which does not introduce any undesired effect.

The present work will summarize the status of C3S datasets for the in-situ baseline and reference atmospheric observations and review the approach adopted to:

- ensure to the extent possible the measurement comparability of the ozone datasets;
- quantify the total uncertainty budget of USCRN near-surface temperature measurements;
- identify and adjust biases, and quantify uncertainties in the IGRA data.