

Historic European Non-CO₂ Atmospheric Greenhouse Gas Records: Harmonization and Uncertainty Assessment

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One important aim of the European project InGOS ("Integrated non-CO₂ Greenhouse gas Observation System") is harmonizing historic greenhouse gas (GHG) observations. The project brings together the PIs of 20 European atmospheric monitoring stations to jointly revisit, reevaluate and quality control their historic datasets (i.e. starting from 2000) for CH₄, N₂O and H₂. The need for consolidating European in situ data has become necessary since in the last decades European GHG monitoring has been conducted by a multitude of national organizations and institutions, each with its own measurement procedures, quality control system and link to the international calibration scales.

Furthermore, for the first time, uniform and comprehensive uncertainty estimates are calculated for all sites to provide additional, valuable information to data users. The InGOS uncertainty assessment presented here makes use of all historically available quality measures at the monitoring sites such as surveillance cylinders and/or co-located flask sample measurements. The InGOS uncertainty assessment consists of different uncertainty categories, namely repeatability, reproducibility, lab internal scale consistency, flask comparison uncertainty and scale transfer uncertainty. In Figure 1 an example for the uncertainty estimates of the Heidelberg N₂O measurements is given. Although designed for gas chromatographic data, the InGOS uncertainty estimates may be universally applied for different GHG measurement techniques. In addition to the uncertainty methodology we present a section of the revisited European data sets including their uncertainties.

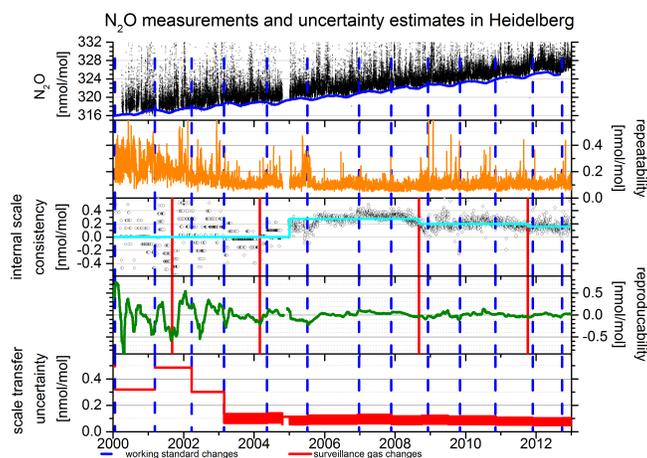


Figure 1. N₂O measurements in Heidelberg and the respective uncertainty estimates.