

World Calibration Centre WCC-Empa

Supporting Global Research and Policies



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Introduction

The World Calibration Centre for Surface Ozone, Carbon Monoxide, Methane, and Carbon Dioxide (WCC-Empa) was established in 1996. WCC-Empa

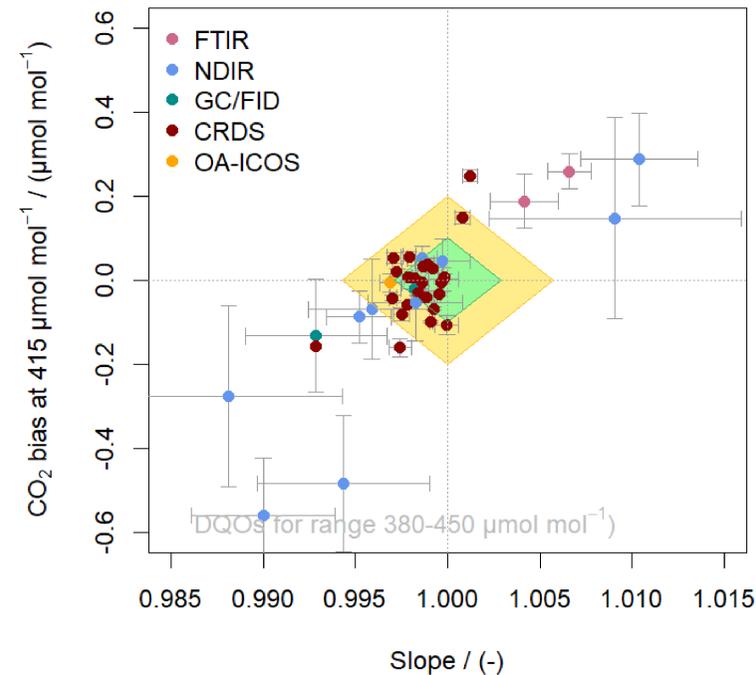
- supports global research and policies,
- completed more than 100 station audits, mainly at global GAW stations,
- covers four important greenhouse and reactive gases,
- collaborates with other calibration centres to improve traceability,
- assesses the performance of stations also with independent parallel measurements,
- includes data and metadata review in the audit procedure.



Audited stations by WCC-Empa since 1996 (red triangles)

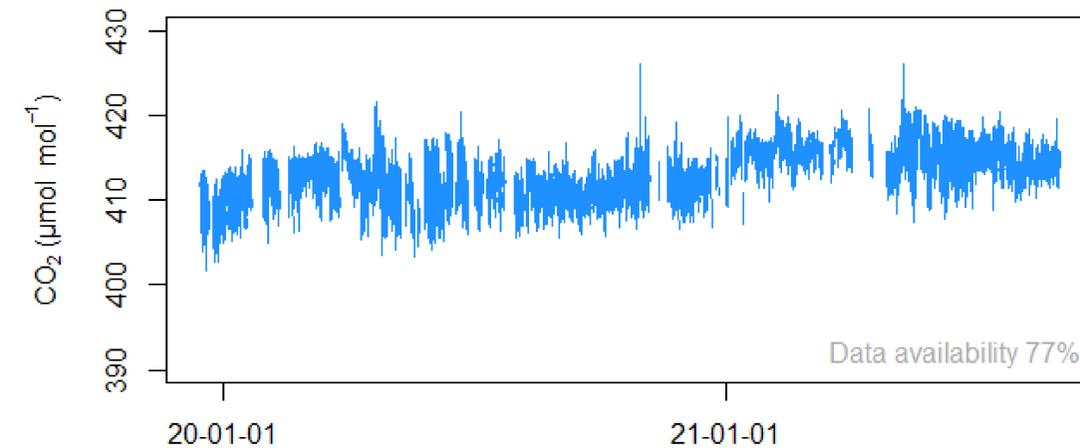
Selected CO₂ Audit Results

- Update from results published by Zellweger et al. (amt-9-4737-2016).
- Newer CO₂ measurement techniques perform better compared to NDIR.
- Comparisons shown here are only for analyzers without instrumental problems and measurements on the same calibrations scale.



CO₂ bias at 415 ppm vs. the slope of the performance audit for individual travelling standard comparisons involving different analyzers. The colored areas correspond to the WMO/GAW compatibility and extended compatibility goals.

Training, Capacity Building and Twinning



Mt. Kenya (MKN) hourly CO₂ data from the re-establishment of GHG measurements in December 2019 until September 2021.



Training and maintenance visit at Mt. Kenya by WCC-Empa and MeteoSwiss (September 2021).

- WCC-Empa regularly trains station staff during audit, and it is involved in training activities together with QA/SAC-CH.

- Example MKN shows that successful long-term operation can be achieved with the regular support by twinning partners.

Expert Teams and Memberships

WCC-Empa staff is engaged in various WMO/GAW panels such as the Scientific Advisory Group for Reactive Gases, the Expert Team on Atmospheric Composition Measurement Quality (ET-ACMQ), and the Expert Team on Measurement Uncertainty (ET-MU). Furthermore, a link to BIPM and National Metrology Institutes is given by the membership in the CCQM-GAWG Task Group on Ozone Cross-Section Change Management.

Outreach

- WCC-Empa audit reports are made publicly available as WMO/GAW reports.
- Peer-reviewed publications with recommendations on measurement progress.
- Contributions to GAW and WMO reports, e.g. the recommendations on Low-cost Sensors for the Measurement of Atmospheric Composition (WMO- No. 1215, 2021).