

Overview on ten years of WCC-N₂O

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The World Calibration Centre for N₂O (WCC-N₂O) has been established in 2001 as a central GAW facility according to the requirements of the GAW Strategic Plan 2001–2007 (WMO/GAW Report No. 142). Its overall goal is the improvement of the N₂O data quality and compatibility within the network. The WCC-N₂O is linked to the GAW standard scale maintained by the Central Calibration Laboratory (CCL) for N₂O. The WCC-N₂O (<http://imk.fzk.de/wcc-n2o/>) is hosted by the Karlsruhe Institute of Technology (formerly Forschungszentrum Karlsruhe), IMK-IFU, and its activities are conducted under supervision and through funding by the Quality Assurance/Science Activity Centre (QA/SAC) Germany, operated by the German Environment Agency (UBA). As specified by GAW, the major tasks of the WCC-N₂O comprise the development of quality control procedures, conducting audits at stations and intercomparison experiments as well as providing training and technical advice to GAW station personnel. After ten years of operation of the WCC-N₂O, this presentation gives an overview on its activities and achievements.

During the entire period, the work conducted in the analytical laboratory was related to comparisons of N₂O standards of different levels in the traceability chain and dedicated to different purposes. Presently, eight laboratory standards (range 253 – 358 ppb), recalibrated by the CCL in 2009, establish the link to the GAW N₂O scale. They are used for the calibration and surveillance of a suite of 22 gas mixtures. Five of them serve as scale back-up, while 17 are suitable as travelling standards for audits and intercomparisons, usually comprising sets of five cylinders. Moreover, the WCC-N₂O took part in three international intercomparison experiments.

From the ten system and performance audits conducted since 2002, considerable progress over the years can be noted with respect to network compatibility of N₂O measurements by GAW stations. Thanks to the recommendations of GAW meetings as well as updated measurement guidelines including data quality objectives, and based on the acquisition of CCL-calibrated standards, by several stations the link to the GAW N₂O scale was improved or newly established. On the analytical side, the audits have revealed significant differences in performance for the gas chromatographic systems, even if equipped with similar instrumentation. In conclusion, the fulfilment of the GAW N₂O data quality objectives still remains a challenge. Details on these issues will be discussed. For completeness, a brief summary of other activities of the WCC-N₂O will also be presented.