

Quality Assurance and Quality Control for N₂O

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Co-ordinated Quality Assurance and Quality Control (QA/QC) are required when wanting to combine N₂O measurements from different sites and different monitoring programmes in order to increase the global data coverage. The NOAA calibration scale was designated as the standard scale for N₂O within GAW. NOAA acts as Central Calibration Laboratory (CCL), where the primary and secondary standards are maintained. QA/QC responsibilities have been taken over by the World Calibration Centre for N₂O (WCC-N₂O), whose tasks are described in WMO/GAW Reports 142 and 156. The WCC-N₂O laboratory standards are linked to the GAW scale on the level of the CCL tertiary standards. Such standards should also be kept by GAW stations and participating laboratories (range 290 - 350 ppb). Scale offsets between laboratories will be assessed by intercomparisons of calibrated cylinders of air circulated within round-robin experiments, intercomparisons as part of a field audit performed by the WCC-N₂O as well as systematic intercomparisons of measurements of the same discrete samples between labs or stations.

The work on Measurement Guidelines (MGs) was central to the activities of the WCC-N₂O during recent years. The MGs for N₂O will form part of a future WMO/GAW report containing Data Quality Objectives (DQOs) and guidelines for both CH₄ and N₂O, including guidelines for audits. Since the use of internationally accepted vocabulary (ISO terminology) is requested by GAW, the current draft also deals with definitions of terms relevant to trace gas measurements. It is foreseen that the concept of 'uncertainty of measurements' will be explained in the form of a tutorial as part of the MGs.

DQOs for N₂O - largely based on the 2003 Toronto recommendations - have been approved by the Scientific Advisory Group for Greenhouse Gases (SAG GG). As goals for the near future (possibly till 2010), the repeatability of the data should be ≤ 0.2 ppb, and the reproducibility ≤ 0.3 ppb. With respect to the network or interlaboratory comparability of N₂O measurements, the maximum acceptable uncertainty levels that laboratories and stations should comply with are defined as: 0.5 ppb for the range 310 - 330 ppb, and 0.8 ppb for the upper and lower wings. Uncertainties larger than 1 ppb in the range 310 - 330 ppb (1.5 ppb for the upper and lower wings) will not be accepted for the GAW network. Data that fall between the requested and the acceptable uncertainty can be included in the GAW database, but will be flagged.