Metrology in chemistry at the BIPM
Coordinating CCQM key comparisons for greenhouse and air quality gas standards

O₃ Reference Facility
Ongoing comparisons and calibrations underpinning Member State capabilities in ozone – GHG & air pollutant
- Set of 3 Standard Reference Photometers (UV photometry)
- Series of bilateral comparisons between participants and BIPM
- 28 Member States, 2 international organizations

Ozone Reference Facility
Ongoing comparisons and calibrations underpinning Member State capabilities in ozone – GHG & air pollutant

Greenhouse Gases (GHG)
GHG comparisons with key players to meet highly demanding targets of measurement compatibility and underpin increasing number of measurements
- Set of analytical instruments run under repeatability conditions
- Use of most recent measurement techniques (spectroscopic)
- Participation of WMO Central Calibration Laboratory

CH₄
Gas Chromatography
Cavity Ring Down Spectroscopy
Fourier Transformed Infra-Red analyser for the analysis of impurities

Impact: Ten fold improvement in equivalence of standards between 2003 and 2013. Target uncertainty for standards is 0.3 nmol mol⁻¹ for optimum global monitoring of methane in the atmosphere.

CO₂ Validation study for CCQM-K120
Background and urban concentrations covered
Target $\delta^{13}$C < 0.025 ppm
$\delta^{13}$C to be measured

CO₂/air, ambient levels, 2016

Impact: Global surface O₃ concentrations 1.8 % higher than currently measured.

Absorption cross-section measurements
- Pure O₃ generation 99 %
- Accurate measurement of O₃ absorption cross-section to solve primary methods disagreement
- Paper published in ATMD—Beginning of consultation of stakeholders to implement the new value

Air Quality Gas Standards
Comparisons on selected challenging gases underpinning Member States service to meet demanding air quality legislation

CO₂/air, ambient levels, 2016

Impact: Nitric Oxide (NO) standards of known quality now available for calibration of new spectroscopic measurement techniques for air monitoring.

Air Quality Gas Standards
Comparisons on selected challenging gases underpinning Member States service to meet demanding air quality legislation