Title: Gas Metrology for carbon surface measurements and other related ECVs

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Session II: Carbon measurement and other related climate variables: Global systems, principals and traceability

Abstract:

National Metrology Institutes (NMIs) provide gas standards for measurements at both ambient and emission levels, demonstrating their international equivalence through comparisons organized by the Gas Analysis Working Group (GAWG) of the BIPM's Consultative Committee in Metrology in Chemistry and Biology (CCQM).

These comparison activities, which have been running for 20 years, have allowed the equivalence of standards and improvements in reported uncertainties to be demonstrated both for long–lived greenhouse gases (GHG), including CO_2, CH_4, N_2O and SF_6, as well as precursors for ozone and aerosol formation including NO_2, SO_2, HCHO and CO. Since 2010, the WMO's Central Calibration Laboratory for the long-lived greenhouse gases, has participated in these comparisons, and joined the GAWG with its membership of thirty-three NMIs. At the same time a number of NMIs have agreed to take on the role of a Central Calibration Laboratory for other priority gases with the WMO's Global Atmosphere Watch (WMO-GAW).

The presentation will focus on research underway to reduce uncertainties for primary gas standards, notably for CO_2 CH_4, and N_2O. The result of these activities is that the uncertainties on primary standards from different institutes are approaching levels of uncertainty that meet the needs of even the most stringent long term monitoring requirements. This will be demonstrated with data from completed comparisons, where uncertainties in comparison measurements have also improved. The future CCQM GAWG programme of GHG standard comparisons will also be presented.

Results of CCQM GAWG Comparisons of Methane in air at nominally 2 µmol/mol over the last 10 years