WCC-Empa – Activities and Achievements

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Empa operates the World Calibration Centre for Carbon Monoxide (CO), Methane (CH_4), Carbon Dioxide (CO_2) and Surface Ozone (WCC-Empa) since 1996 as a Swiss contribution to the Global Atmosphere Watch (GAW) programme and has conducted over 80 system- and performance audits over the past 20 years. To increase the number of N_2O audit at GAW stations. WCC-Empa collaborates with the World Calibration Centre for Nitrous Oxide (WCC-N_2O) hosted by the Karlsruhe Institute of Technology (KIT), Institute of Meteorology and Climate Research (IMK-IFU).

WCC-Empa is responsible for verifying the traceability of the measurements to the designated GAW reference maintained by Central Calibration Laboratories. The activities of WCC-Empa are a key element to sustain and improve the data quality required for climate and environmental research. The concept of the performance audits was recently expanded by the addition of parallel measurements with a travelling instrument using an entirely independent inlet system and calibration scheme (Zellweger et al., 2016).

The paper will give a comprehensive overview of WCC-Empa activities and summarise results and achievements of system- and performance audits at GAW stations. The focus will be on CO and N_2O comparisons, which will be analysed according to the method described by Zellweger et al. (2016). Audit results of these two parameters show that the WMO/GAW compatibility goals are often not met, and further improvements both on analytical techniques and calibration standards are needed to solve this issue. Furthermore, the results will be discussed in the context of comparisons made within the European Metrology Research Programme HIGHGAS project.

References

Zellweger, C., Emmenegger, L., Firdaus, M., Hatakka, J., Heimann, M., Kozlova, E., Spain, T. G., Steinbacher, M., van der Schoot, M. V., and Buchmann, B.: Assessment of recent advances in measurement techniques for atmospheric carbon dioxide and methane observations, *Atmos. Meas. Tech., 9*, 4737-4757, doi:10.5194/amt-9-4737-2016, 2016.