



PTB for Climate Sciences: Combined efforts supporting the European Metrology Network for Climate and Ocean Observation

Olav Werhahn, Christian Monte, and Steffen Seitz

Physikalisch-Technische Bundesanstalt (PTB), 38116 Braunschweig, Germany (olav.werhahn@ptb.de)

The German national metrology institute Physikalisch-Technische Bundesanstalt (PTB) is organized in typical different sections and divisions, each of them bringing in their own portfolio on specific calibration and measurement capabilities. Customer are being served on various fields of work and metrological SI-traceability strategies are developed for all the units of measurements. However, despite many third-party projects driven by individual PTB groups [1], as for example within the European Metrology Programme for Innovation and Research (EMPIR, [2]) and its different Environmental calls, PTB has never been seen itself as a climate research institute. With the foundation of the European Metrology Network for Climate and Ocean Observation (EMN) [3], PTB has now brought its various expertise on metrology for climate research to a new level of combination.

The presentation highlights the input from three different working groups of PTB to the EMN related to its sections "Atmosphere", "Ocean", and "Land" as being addressed by the groups for Spectrometric Gas Analysis [4], Electrochemistry [5], and Infrared Radiation Thermometry [6], respectively. With those expertise PTB seeks to support the idea of the EMN bringing in measurement techniques like in situ laser spectroscopy-based species quantification, FTIR-based analysis of atmospheric gases and related spectral line parameters of key greenhouse gases and offering its consulting services to the EMN in the "Atmosphere" section. On the "Ocean" section of the EMN PTB offers its expertise based on pH-measurements, salinity definitions and respective calibration and measurement capabilities, whereas the "Land" section of the EMN is benefitting from PTB's application-specific traceability concepts for infrared radiation thermometry and infrared radiometry and for quantitative thermography and for emissivity measurements in the field of satellite-, aircraft- and ground-based optical remote sensing of the atmosphere and Earth (-90 °C to 100 °C).

Examples for all three working groups will be presented and discussed in view of their benefit to the EMN. Collaboration with European partners will be shown.

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Ocean Observation.

References:

- [1] EMPIR 16ENV05 MetNO2 (<http://empir.npl.co.uk/metno2/>), EMPIR 16ENV06 SIRS (<https://www.vtt.fi/sites/SIRS/>), EMPIR 16ENV08 (<http://empir.npl.co.uk/impress/>)
- [2] European Metrology Programme for Innovation and Research, <https://www.euramet.org/research-innovation/research-empir/?L=0>
- [3] European Metrology Network for Climate and Ocean Observation, <https://www.euramet.org/european-metrology-networks/climate-and-ocean-observation/?L=0>
- [4] PTB working group Spectrometric Gas Analysis, <https://www.ptb.de/cms/en/ptb/fachabteilungen/abt3/fb-34/ag-342.html>
- [5] PTB working group Electrochemistry, <https://www.ptb.de/cms/en/ptb/fachabteilungen/abt3/fb-31/ag-313.html>
- [6] PTB working group Infrared Radiation Thermometry <https://www.ptb.de/cms/en/ptb/fachabteilungen/abt7/fb-73/ag-732.html>