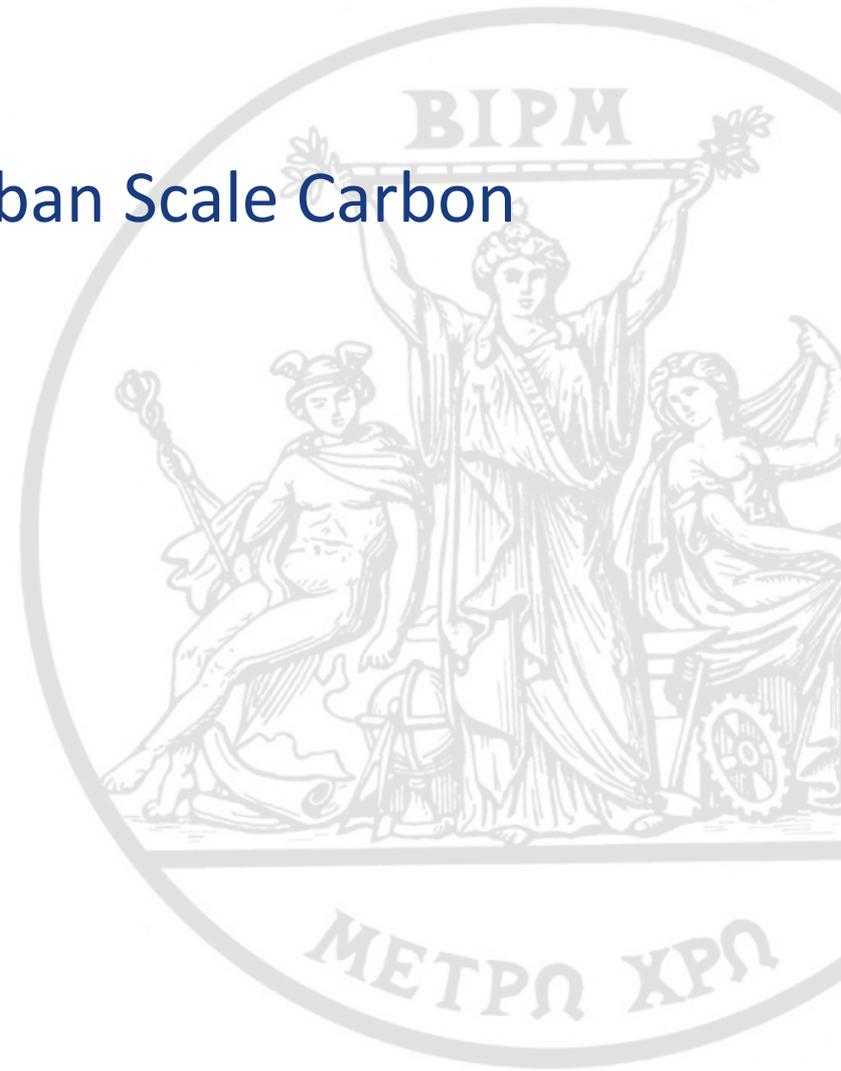


BIPM Workshop on Global to Urban Scale Carbon Measurements

Dr Martin J T Milton
BIPM Director

30 June-1 July 2015

Bureau
| **I**nternational des
| **P**oids et
| **M**esures



Bureau International des Poids et Mesures

- An inter-governmental organization financed jointly by the Member States and Associates of the Metre Convention, and operating under the exclusive supervision of the CIPM.
 - ♦ Founded in 1875 by 17 Member States.
 - ♦ Now involving about 100 states and economies as Members or Associates.
- Our mission is **to ensure and promote the global comparability of measurements.**
- This is achieved both through technical activities in our laboratories and through international coordination:
 - operate laboratories in: mass, time, electricity, ionizing radiation and chemistry.
 - an international staff of around 75 with budget of approximately 12 million euros.



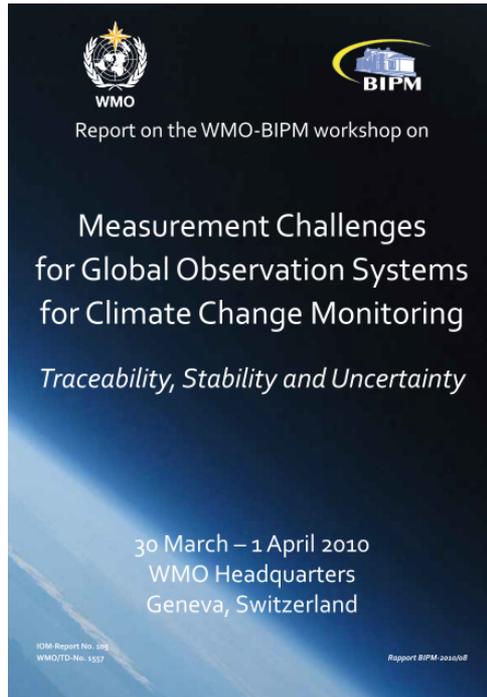
The mission statement of the BIPM

The mission of the BIPM is to ensure and promote the global comparability of measurements, including providing a coherent international system of units for:

- ◆ Scientific discovery and innovation,
- ◆ Industrial manufacturing and international trade,
- ◆ Sustaining the quality of life and the global environment.



The BIPM-WMO Workshop, Geneva, 2010



- **Joint WMO-BIPM Initiative**
- **Addressed Global Observation for both climate studies and NWP.**

A: Climate trends from satellite sounding data

Fuzhong Weng, NOAA NESDIS {US}

B1: Stable time series for key GHGs and other trace species

Robert Wielgosz, BIPM

B2: Remote sensing of atmospheric composition and traceability issues in spectroscopic data

James Whetstone, NIST {US}

C: Radiation and Earth energy balance

Werner Schmutz & Eugene Rozanov, PMOD/WRC

D: Earth surface (land and water) temperature

Pascal Lecomte, ESA

E: Aerosol composition and radiative properties

Urs Baltensperger, Paul Scherrer Institut {CH}

F: Microwave imagery data in climate and NWP

Karen St. Germain, ESA

G: Surface properties: albedo, land cover and ocean colour

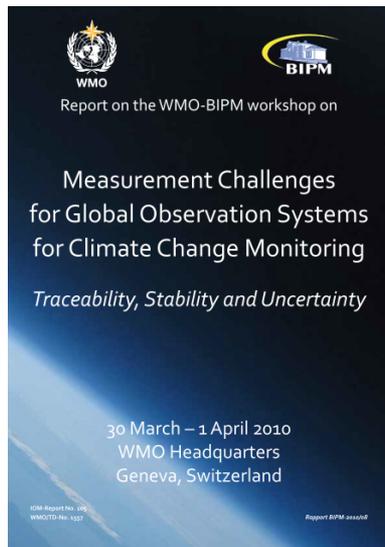
Nigel Fox, NPL {UK}

H: Ocean salinity

Klaus-Dieter Sommer, PTB {DE}

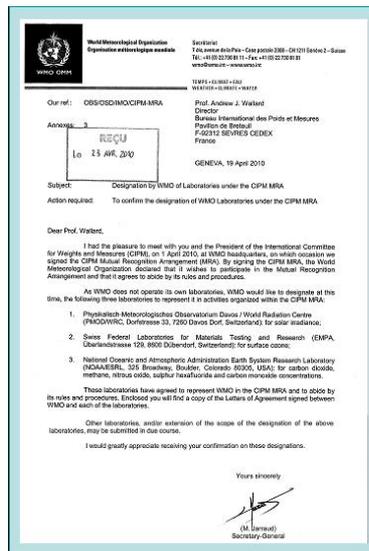
following the Geneva workshop

Recommendations complied and published in full.
- available from the BIPM website.



The WMO signed the CIPM-MRA

Three institutes designated by the WMO can now participate fully in the MRA



Agreement made in 2011 to progress the recommendations through existing structures with a focus on Essential Climate Variables

Table 1: Essential Climate Variables that are both currently feasible for global implementation and have a high impact on UNFCCC requirements

Domain	Essential Climate Variables
Atmospheric (over land, sea and ice)	Surface: ⁸ Air temperature, Wind speed and direction, Water vapour, Pressure, Precipitation, Surface radiation budget.
	Upper-air: ⁹ Temperature, Wind speed and direction, Water vapour, Cloud properties, Earth radiation budget (including solar irradiance).
	Composition: Carbon dioxide, Methane, and other long-lived greenhouse gases ¹⁰ , Ozone and Aerosol, supported by their precursors ¹¹
Oceanic	Surface: ¹² Sea-surface temperature, Sea-surface salinity, Sea level, Sea state, Sea ice, Surface current, Ocean colour, Carbon dioxide partial pressure, Ocean acidity, Phytoplankton.
	Sub-surface: Temperature, Salinity, Current, Nutrients, Carbon dioxide partial pressure, Ocean acidity, Oxygen, Tracers.
Terrestrial	River discharge, Water use, Groundwater, Lakes, Snow cover, Glaciers and ice caps, Ice sheets, Permafrost, Albedo, Land cover (including vegetation type), Fraction of absorbed photosynthetically active radiation (FAPAR), Leaf area index (LAI), Above-ground biomass, Soil carbon, Fire disturbance, Soil moisture.

The workshop is organized around three topic areas:

- ◆ Carbon measurement and other related climate variables: Global systems, principals and traceability

« Elevator pitches »

- ◆ Megacities and metrology needs for supporting Greenhouse Gas mitigation - Urban Greenhouse Gas Domes

Parallel sessions

- ◆ Standards for greenhouse gas emission inventories

Parallel sessions

Today is a live webcast

Workshop sessions

- I. Introduction and keynote presentations
- II. “Carbon measurement and other related climate variables: Global systems, principals and traceability”
- III. “New Challenges - Metrology and Standard needs for GHG Emissions from Megacities and Emission Inventories”
 - a) Megacities and Metrology Needs for Supporting Greenhouse Gas Mitigation - Urban Greenhouse Domes
 - b) Standards for GHG Emission Inventories
- IV. Report Back
- V. “Engaging with key stakeholders in low carbon activity”

Thanks to the Steering Committee

- Dr M.J.T. Milton (Chair) BIPM
- Dr J. Whetstone NIST (United States)
- Ms J. Burston NPL (United Kingdom)
- Dr W. Zhang WMO
- Dr O. Tarasova WMO
- Dr A. Samuel NMIA (Australia)
- Dr R.I. Wielgosz BIPM