World Meteorological Organization

Weather • Climate • Water

Updates from WMO GAW Programme

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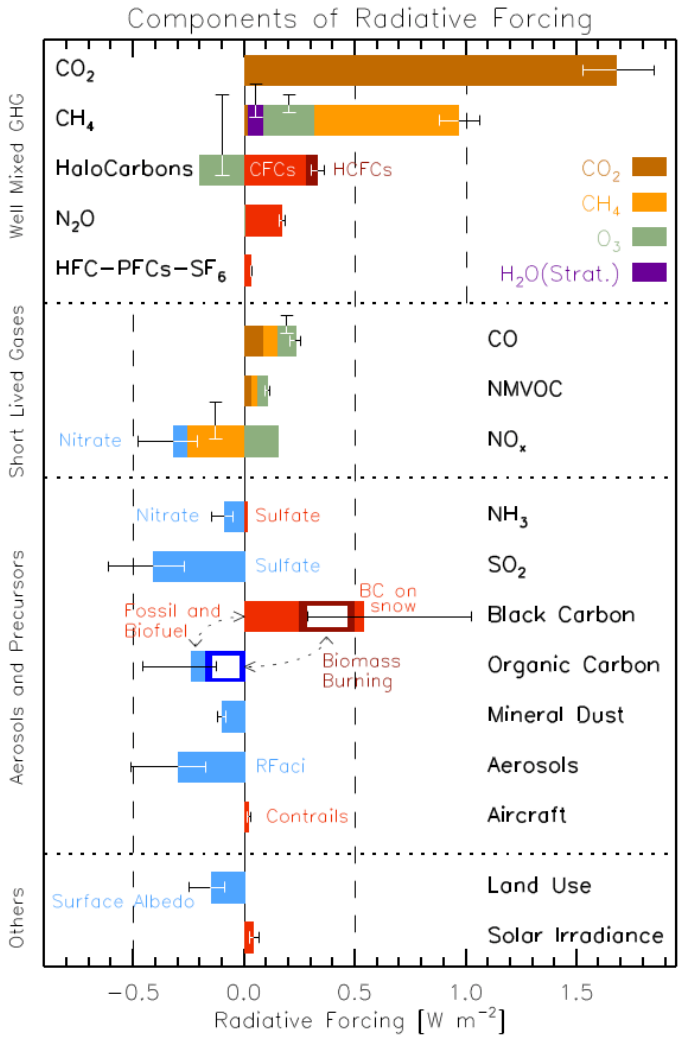
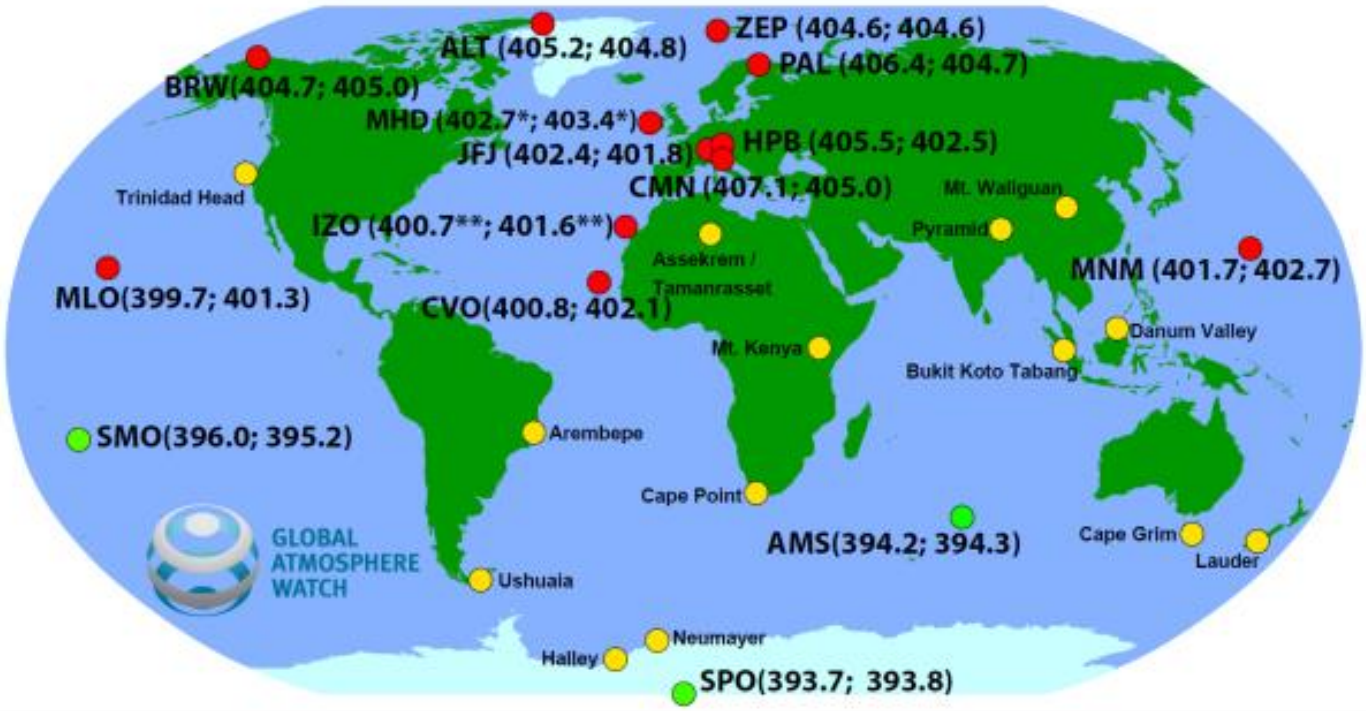
Recent happening in the area of Greenhouse Gases



- IPCC AR5 reinforces conclusions of AR4
  - Climate is changing
  - GHGs are causing it
  - Increasing atmospheric CO_2 is causing ocean acidification
  - RF keeps going up, driven mainly by increasing CO_2
- Emission reduction commitments still being made (through Intended Nationally Determined Contributions)
- **Key negotiation stage – COP21 in Paris in December 2015**

400 ppm CO_2

Preliminary CO_2 mole fractions at the GAW Global stations (March 2014; April 2014)

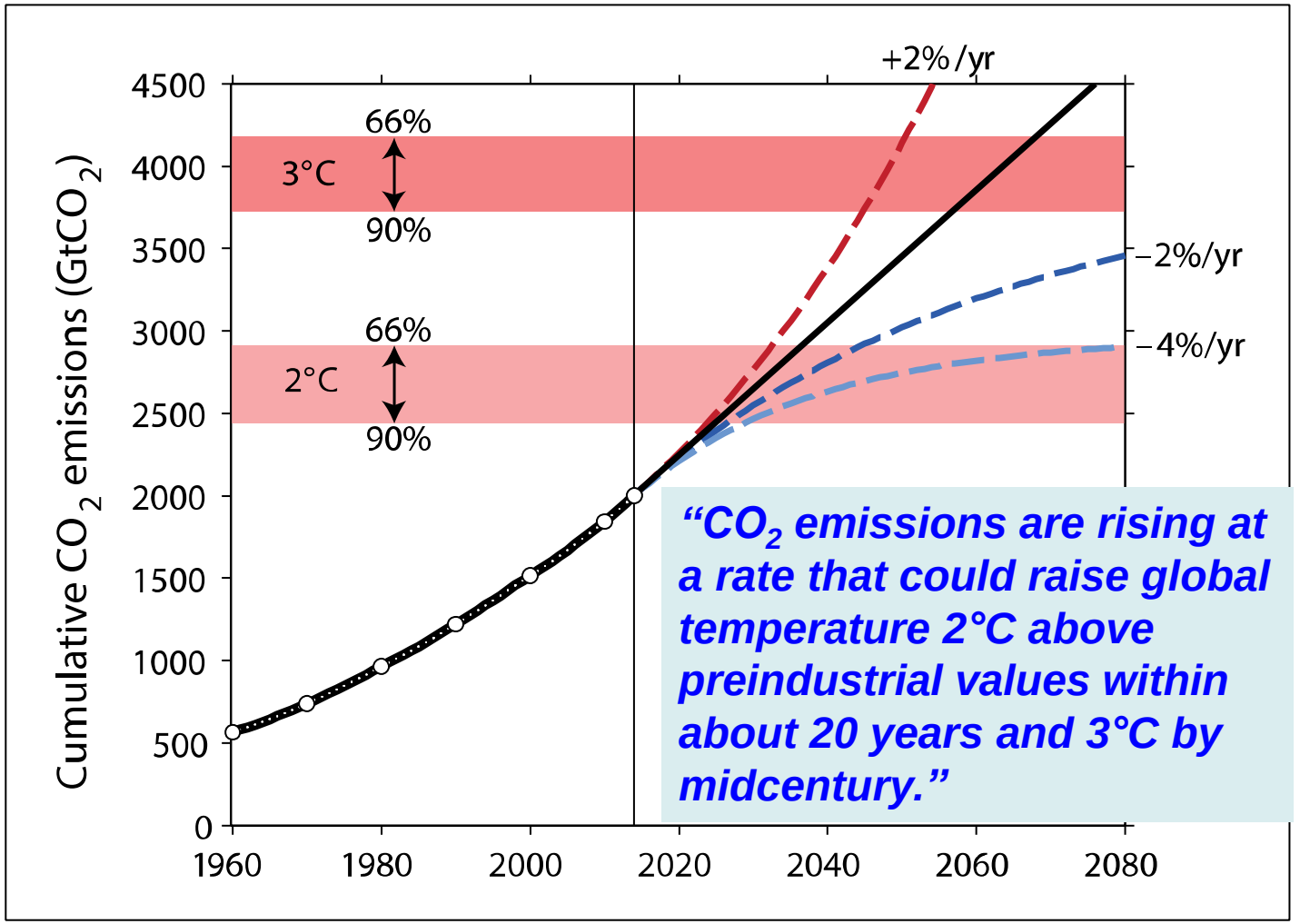


Global average CO_2 reached 400 ppm in March 2015

Special thanks to:
Environment Canada,
LSCE,
NOAA,
Italian Air Force Mountain Centre,
MPI-BG,
DWD,
Aemet,
Empa,
JMA,
FMI,
NILU

Where do we go with climate (Options?)

Two or Three Degrees: CO_2 Emissions and Global Temperature Impacts by Robert B. Jackson, Pierre Friedlingstein, Josep G. Canadell, and Robbie M. Andrew



(The Bridge, 2015)

Recent development of GAW

- Meeting of WMO Commission for Atmospheric Sciences (November 2013) set up the priorities for research for the next 10 years period
- Meeting of the Environmental Pollution and Atmospheric Chemistry Scientific Steering Committee (18-20 February 2015) took several decision about GAW priorities and made several adjustments to the GAW structure to address the scientific challenges of the programme
- 17th World Meteorological Congress (25 May-12 June 2015) took decisions on the strategic priorities of WMO as organization and decided about its budget for the next financial period

CAS-16 priorities

A TEN-YEAR FUTURE VIEW:

- High Impact Weather and its socio-economic effects in the context of global change
- Water: Modelling and predicting the water cycle for improved DRR and resource management
- Integrated GHG Information System: Serving society and supporting policy
- Aerosols: Impacts on air quality, weather and climate
- Urbanization: Research and services for megacities and large urban complexes
- Evolving Technologies: Their impact on science and its use

GAW Implementation Plan (2016-2023)

- The plan concerns only implementation of the GAW Programme, WMO Strategic Plan is taken as an overall strategy
- Short (focuses on the major principles, SAG specific tasks are in the annex)
- Follows the concept "**research enabling services**" – the activities are around application areas rather than focused on GAW parameter specific areas
- More focus on modelling tools and value added products
- Provides clear framework for the programme implementation concerning network design, modelling tools, quality assurance principles, data management, collaboration with the other programmes

IP builds upon the premise that **atmospheric composition matters** - to climate, weather forecasting, human health, terrestrial and aquatic ecosystems, agricultural productivity, aeronautical operations, renewable energy production, and more.

WMO strategic priorities (2016-2019)

(a) Disaster risk reduction

(b) Global Framework for Climate Services

(c) WMO Integrated Global Observing system

(d) Aviation meteorological services

(e) Polar and high mountain regions

(f) Capacity Development

(g) WMO Governance

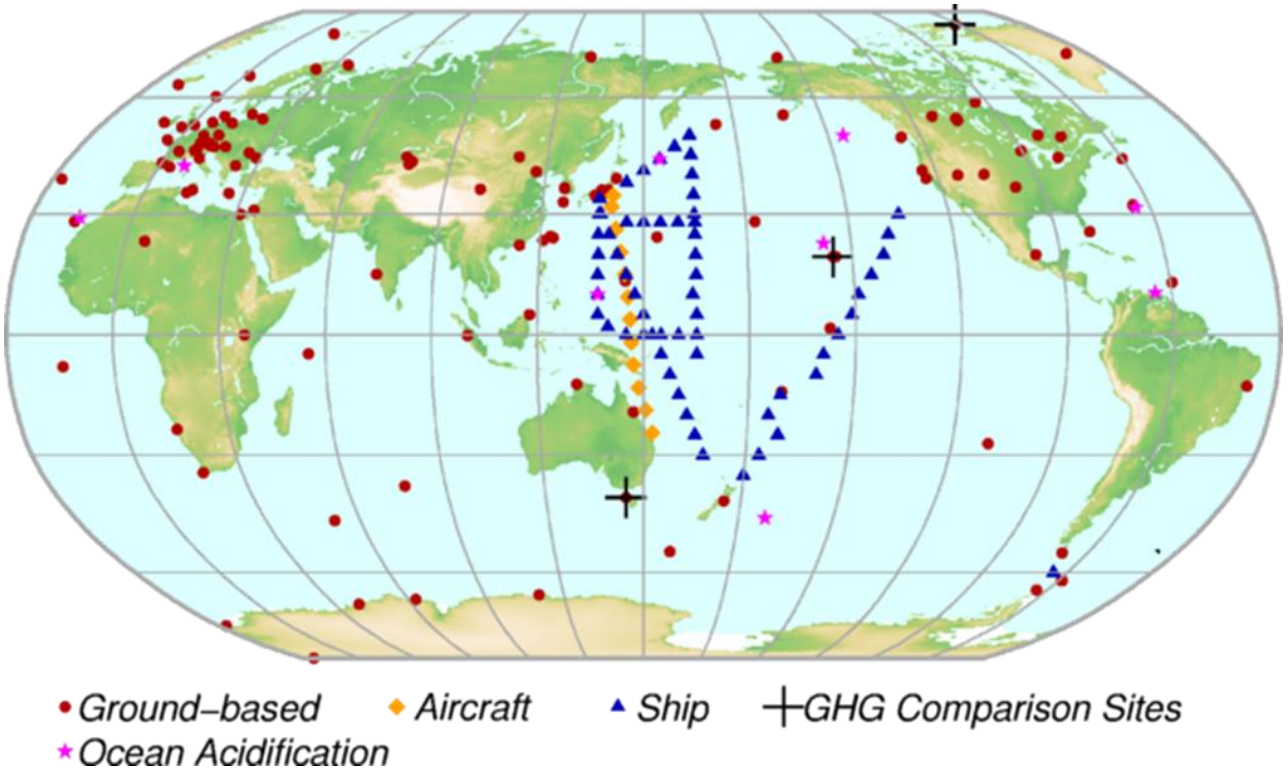
Cg-17 Resolution on the Integrated Global Greenhouse Gas information System

- **IG³IS Purpose:** to provide information on GHG fluxes with attribution on a policy relevant scale.
- **Implementation needs** improved spatial and temporal resolution of GHG observation, increase complexity of the network, involvement of atmospheric, biospheric and ocean communities and improvement of modelling tools.
- Implementation Plan drafting team is met prior to GGMT-2015 meeting
- GGMT-2015 (http://ggmt-2015.com/) includes a presentations on urban observations and on measurements of dissolved greenhouse gases and related ocean tracers.

Implementation of IG³IS fundamentally relies on the current and future joint efforts and activities of the greenhouse gas community!

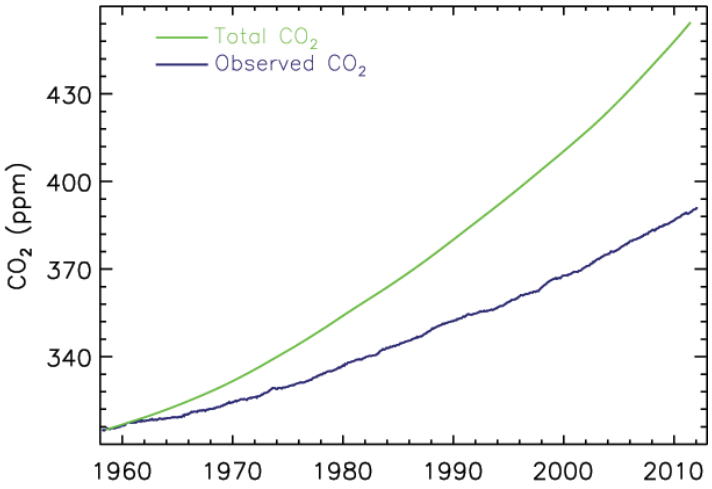
The role of the global GHG community

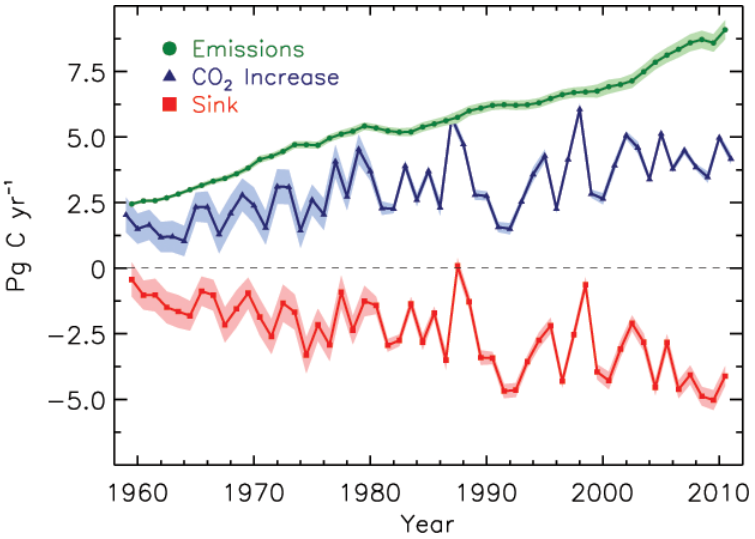
- Everything we learn about state of the greenhouse gases in the global atmosphere is based on the **high quality long-term globally harmonized** observations

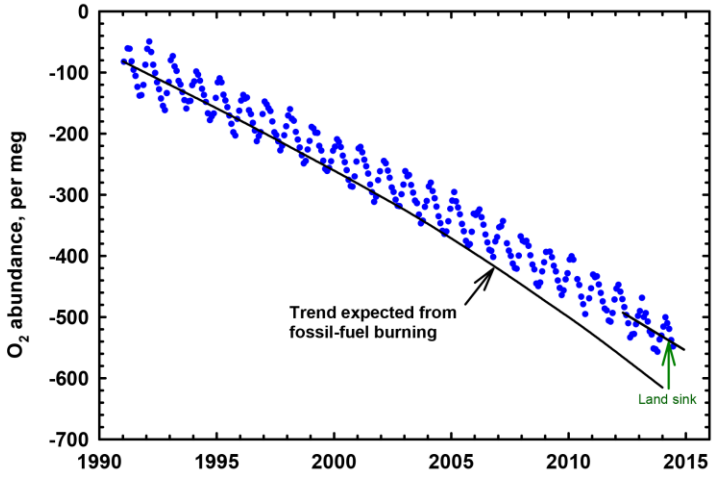


Insufficient density of the observations over the ground, sea and in the free atmosphere

Complexity of carbon cycle: complexity of measurements





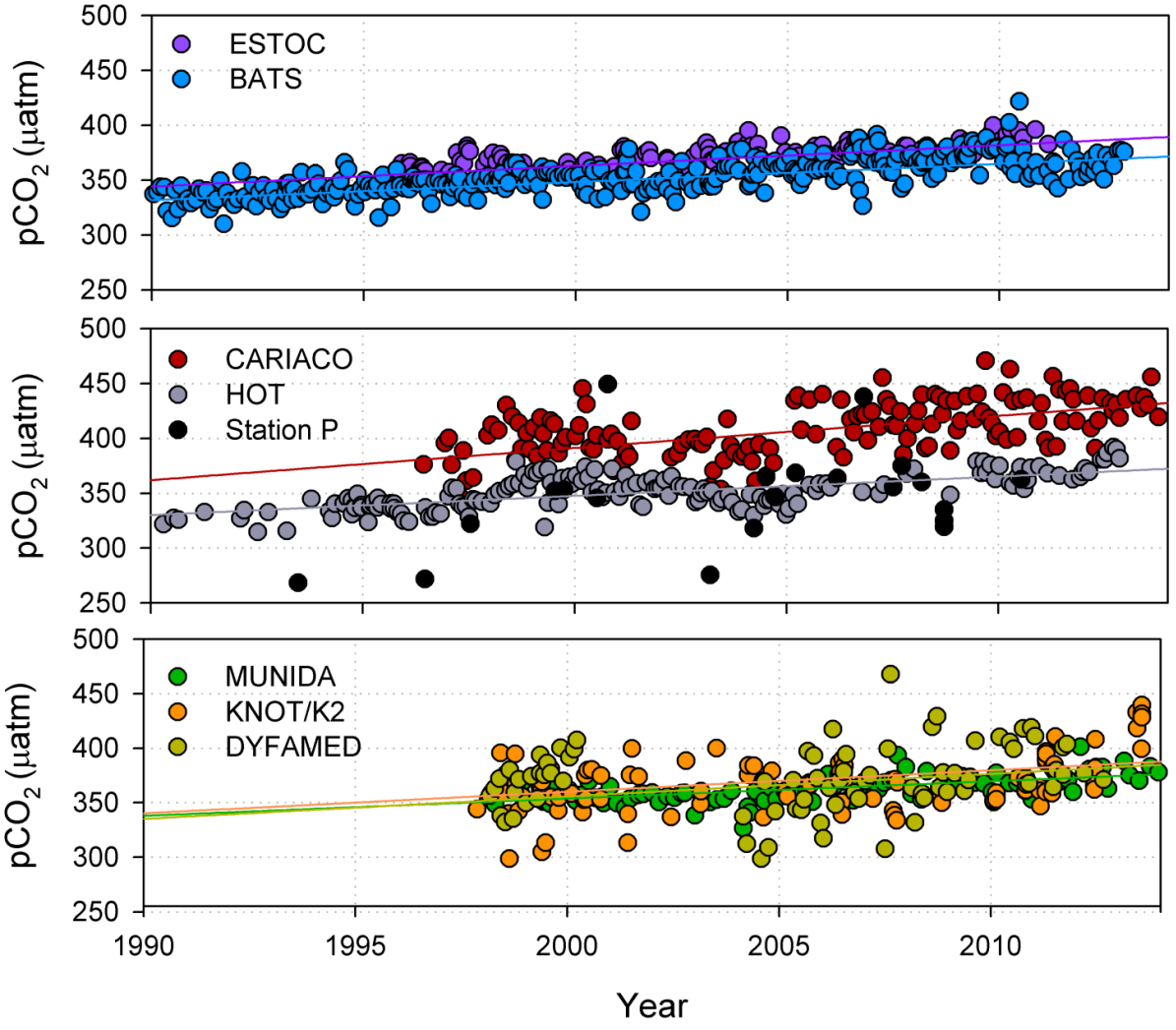


- Identification of sinks needs dedicated measurements
- Knowledge of terrestrial and ocean sinks is essential for definition of **anthropogenic contribution**

Insufficient measurements of isotopes and co-emitted gases for source attribution

Ocean acidification

(Included in the 10th WMO Greenhouse Gas Bulletin, 2014)



Incompatible observations on different scales (e.g. global and local observations) and in different media (e.g. atmospheric observations vs. pCO2 observations)

United Nations Educational, Scientific and Cultural Organization
Intergovernmental Oceanographic Commission
IAEA
Ocean Acidification International Coordination Centre
OA-ICC
SCOR

How to address the present gaps

- Improve current observing system in atmospheric domain (increase of spatial coverage and complexity) – leverage through WIGOS and with the help of GHG community through partnerships
- Ensure the continuity of the observations from different platforms including satellite
- Improve coordination of observations performed at different scales
- Increase complexity and performance of transport models on global/regional and local scales relevant to decision making
- Establish better collaboration between the “spheres” involving GEO, GTOS and GOOS
- Inter-agencies coordination (UNEP, UNESCO, FAO, BIPM and other agencies)
- Build global capacity in greenhouse gas research

Collaboration with BIPM

BIPM Workshop on Global to Urban Scale Carbon Measurements, 30 June – 1 July 2015 at BIPM, Sèvres, France

Topics discussed

- Carbon measurement and other related climate variables: Global systems, principals and traceability
- Megacities and Metrology Needs for Supporting Greenhouse Gas Mitigation - Urban Greenhouse Gas Domes
- Standards for greenhouse gas emission inventories

WMO CCLs take part in BIPM coordinated key comparisons to ensure the quality of the WMO scales

Important upcoming events

- An International Workshop on Atmospheric Chemistry and Agricultural Meteorology will be organized in Pune, India, on 2-4 November 2015 (emissions of greenhouse gases from agriculture)
- 3rd Carbon from Space Workshop , Uni. Exeter, UK, on 26-28th January 2016

- 10 November 2015 –Release of the WMO/GAW Annual Greenhouse Gas Bulletin
- COP21 – 30 November – 11 December 2015

Thank you for your collaboration