WMO Integrated Global Greenhouse Gas Information System: targeting and tracking climate actions

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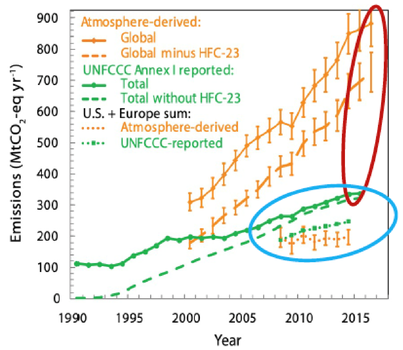
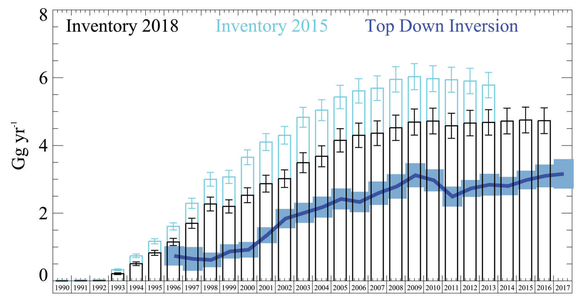
Improving knowledge of HFC emissions

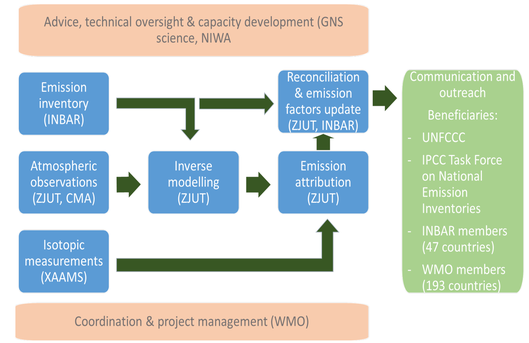


Comparison of the aggregate HFC emissions reported to the UNFCCC in 2015 (*solid green line*) with total global HFC emissions derived from atmospheric mole fraction changes measured in the remote atmosphere (*top solid orange line*) demonstrates 60% emissions gap (*red circle*) between those estimates. Current observational network is not optimal for identification of emissions sources.

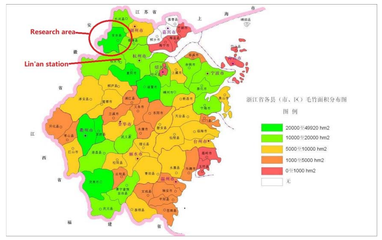


The inventory of the United Kingdom for the national total HFC-134a emissions has an uncertainty of 8%. The top-down estimate based on atmospheric observations show 50% lower values. Updated inventory that revised the market uptake of mobile air conditioners (penetration rate) led to improved agreement. The remaining discrepancy is believed to arise from the use of assumption on a refill rate.

Improving knowledge of carbon uptake



LULUCF emissions and uptakes are associated with large uncertainties: Observation based estimates capture net effect of direct and indirect anthropogenic and natural changes incl. those from disturbances and climate change, explain variations in atmospheric CO_2.



"Utilization of Atmospheric Measurements to Establish the Carbon Sequestration Capacity of Bamboo forests" was supported by Quadrature Foundation to evaluate capacity of bamboo to take up CO_2. Two towers will be set up around the studied area and measurements of CO_2, $^{14}CO_2$ and SOC will be used in combination with inverse modelling. Emission factors for bamboo will be then revised.

Quadrature Climate Foundation

1) GNS Science, New Zealand
2) National Institute of Water and Atmospheric Research (NIWA), New Zealand
3) Chinese Meteorological Administration (CMA), China
4) Zhejiang University of Technology (ZJUT), China
5) Xi'an Accelerator Mass Spectrometry Center of Chinese Academy of Sciences (XAAMS), China
6) International Bamboo and Rattan Organization
7) World Meteorological Organization

Integrated Global Greenhouse Gas Information System (IG³IS)

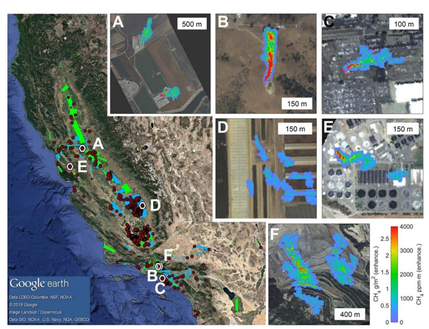
is a common framework for provision of the systematic services to user community who intend to reduce its greenhouse gas emissions that:

- **Supports the use of atmospheric concentration data to improve emission estimates**
- **Establishes consensus on a coherent set of good-practice methods and guidelines Quality control (benchmarking)**
- **Identifies additional emission reduction opportunities**

ig3is.wmo.int

Improving knowledge of methane emissions

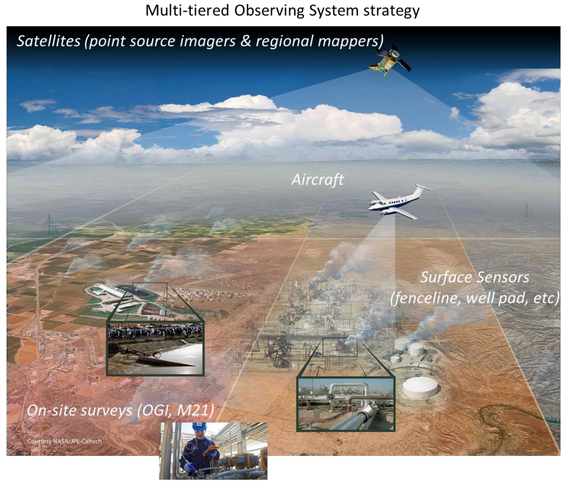
California Methane Survey



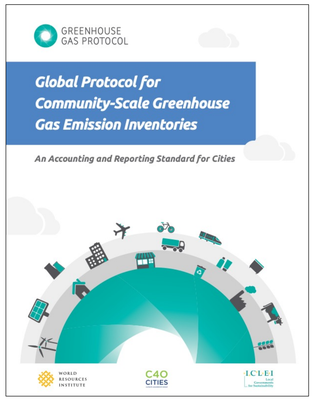
Lessons from regional remote-sensing pilots

- CH_4 super-emitters (typically >50 kg/hr) can contribute up to 30-50% of regional emissions
- Incomplete and inaccessible emissions data represents a challenge to regulators and operators seeking to decarbonize their supply chains
- Barriers: logistics & cost of monitoring intermittent emissions across widely distributed infrastructure

Multi-tiered Observing System strategy



Improving knowledge of urban emissions



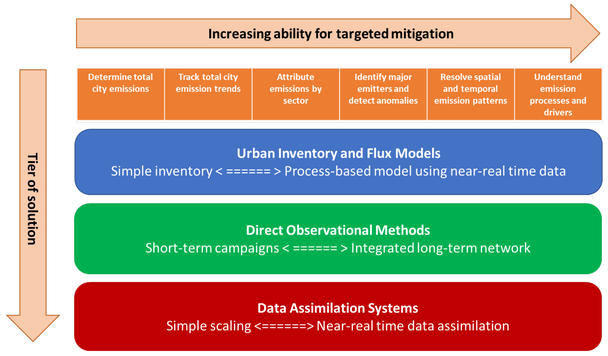
Most commonly used city-scale inventory reporting methodology

Self-reported inventories
- rely on inventory methods

Reporting is voluntary
- No compulsion to follow consistent protocols

Availability/quality of input data is variable

Typically whole city totals
- Divided by source sector



IG³IS Urban Greenhouse Gas Emission Observation and Monitoring Best Research Practices provide the first step on the pathway to documentary standards, as the research best practices coalesce into widely accepted methodologies that can be implemented in operational situations.