Integrated Global Greenhouse Gas Information System

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WORLD METEOROLOGICAL ORGANIZATION

International, national, local commitment to emissions mitigation

ZERO CARBON ACT NZ

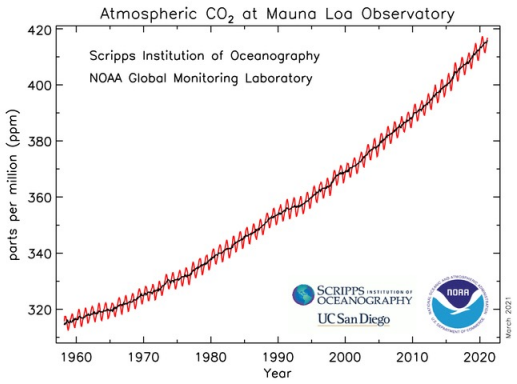
Committee on Climate Change

Climate Change Act 2008

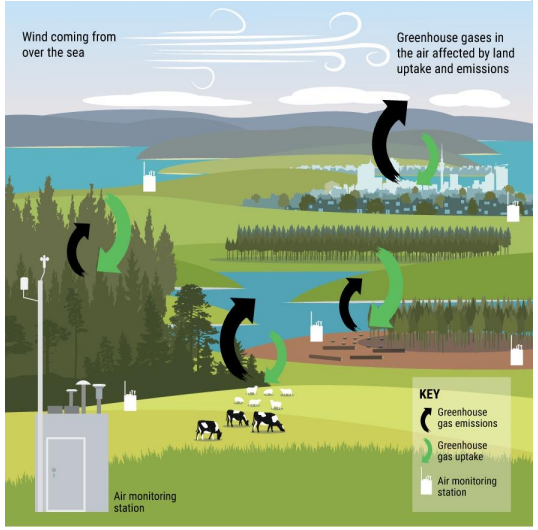
United Nations

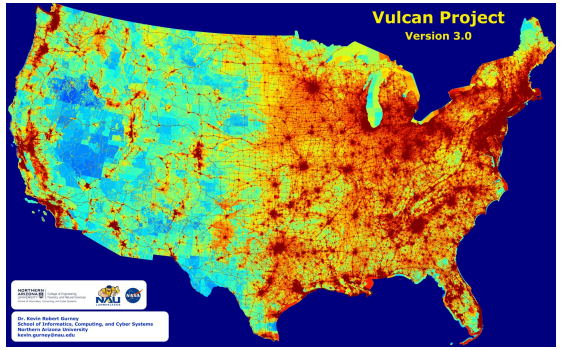
Framework Convention on Climate Change

Researchers are developing methods to evaluate greenhouse gas emissions



CarbonWatch NZ
GUIDING CARBON MITIGATION STRATEGIES





COS develops a world-class greenhouse gas measurement concept for cities

1 May 2021

COS has been granted an EU funded project to develop a reenhouse gas measurement system for urban areas. The aim is o bring together and evaluate different measurement pproaches, and determine fossil fuel related emissions from the est of the carbon dioxide in the atmosphere. The 4-year project ims to develop tools and services for cities to execute their limate action plans.

IG^{3}IS An Integrated Global Greenhouse Gas Information System

World Meteorological Organization initiative

IG^{3}IS is the bridge connecting atmospheric greenhouse gas science with stakeholders and policy outcomes

IG^{3}IS Integrated Global Greenhouse Gas Information System

World Meteorological Organization programme

Combines atmospheric GHG observations with human-activity data in a modeling and analysis framework to help decision-makers take better-informed action to reduce emissions of greenhouse gases and pollutants that reduce air quality.

National: Provide information to inventory builders in support of their efforts to reduce uncertainty of national emission inventory reporting to United Nations Framework Convention on Climate Change (UNFCCC)

Cities: Support subnational government entities such as cities and states that represent large greenhouse gas (GHG) source regions (e.g., megacities) with actionable information on their GHG emissions at the needed spatial, temporal and sectoral resolution to evaluate and guide progress towards emission reduction goals

Industry: Provide information to industry and private sector businesses that will help locate and quantify previously unknown emission reduction opportunities such as fugitive methane emissions from industrial sources

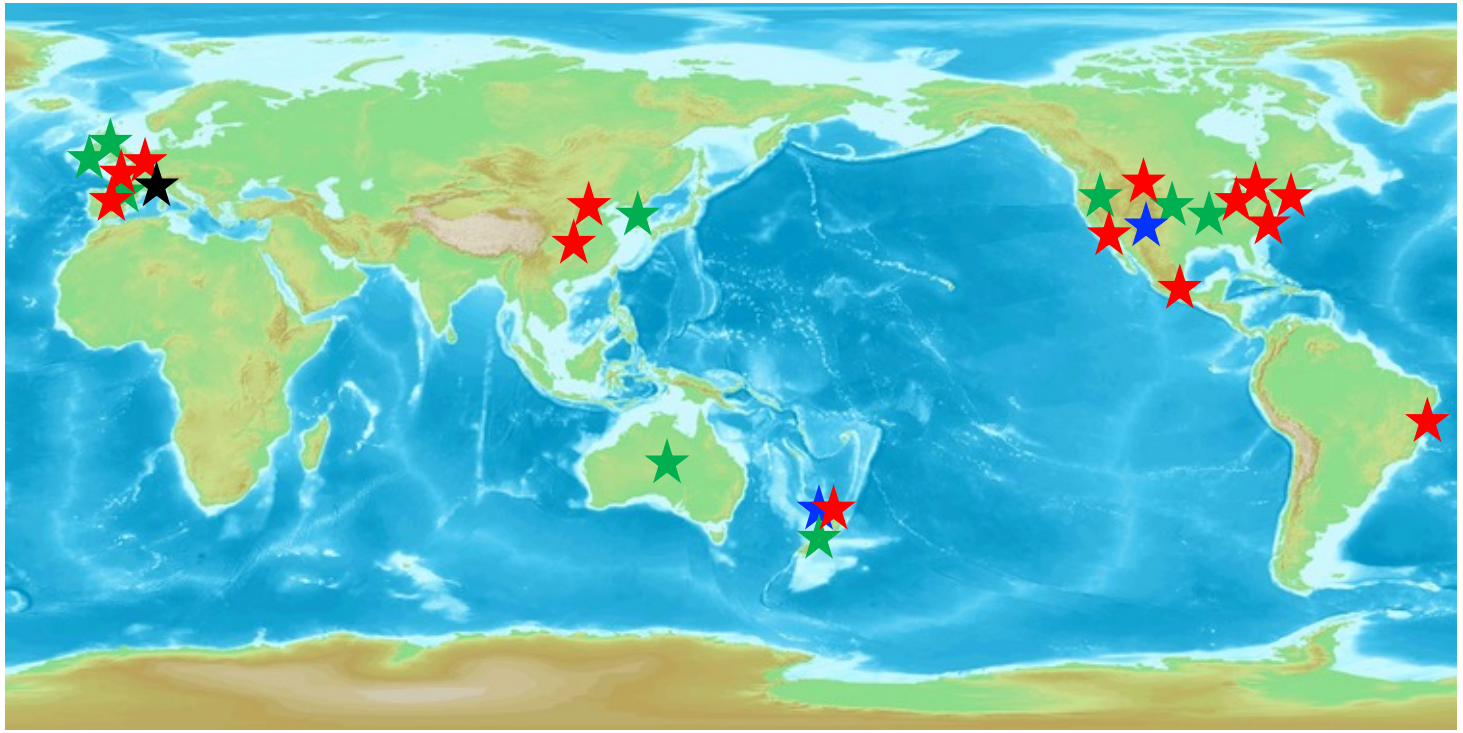
Global stocktake: Support the Paris Agreement's global stock take as governments and the UNFCCC define their requirements.

IG^{3}IS Supports and Endorses GHG Projects around the world

Endorsement Criteria

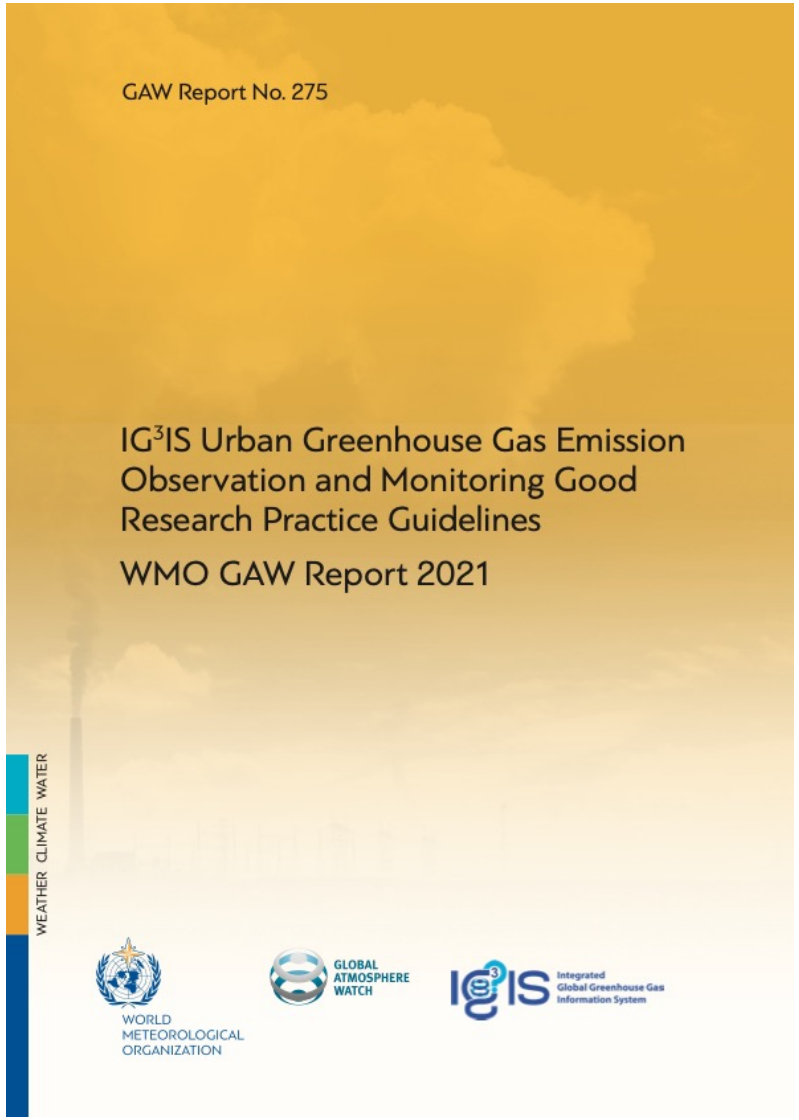
- High quality methodology for greenhouse gas observations, modelling, data products
- Clear link to uptake by stakeholders and policymakers

The ultimate criterion for success is that the information produced guides additional and valuable emission-reduction actions.



IG^{3}IS endorsed projects

IG³IS Urban Greenhouse Gas Emission Observation and Monitoring Good Research Practice Guidelines



Expand on existing whole city inventory methods with information from the atmosphere

- Lay out the available methodologies
- Allow stakeholders to assess the quality of existing and proposed urban greenhouse gas research
- Provide clear guidelines against which current and new practitioners can evaluate their research plans and outcomes
- Consolidate detailed information on particular methodologies, including “tips and tricks”, to guide new researchers

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.

Solutions for Targeted Mitigation

Increasing ability for targeted mitigation

Tier of solution

Determine total city emissions	Track total city emission trends	Attribute emissions by sector	Identify major emitters and detect anomalies	Resolve spatial and temporal emission patterns	Understand emission processes and drivers

Urban Inventory and Flux Models
Simple inventory < ====== > Process-based model using near-real time data

Direct Observational Methods
Short-term campaigns < ====== > Integrated long-term network

Data Assimilation Systems
Simple scaling <======> Near-real time data assimilation

Content of report

Urban Inventory and Flux Models

- Fossil fuel CO_2 (CO_2ff) emission data products
- Biogenic CO_2 flux models/products
- Methane flux models/products

Direct Observational Methods

- Tower and other elevated point observations
- Tower and elevated point measurement data analysis
- Greenhouse gas and other trace gas vertical profile measurements
- Mobile (ground based) surveys
- In situ airborne GHG mole fraction observations
- Mass Balance Analysis
- Discrete flask sampling
- Isotope, correlate tracer and tracer:tracer analysis
- Eddy covariance flux observations
- Ground-based remote sensing for urban monitoring
- Dense networks
- Choice of background
- Meteorological observations for urban greenhouse gas analysis
- Satellite observations

Data Assimilation Systems

- Meteorological inputs needed for urban monitoring systems
- Forward modelling for passive tracers
- Calculation of atmospheric footprints needed for urban modelling
- Use of inverse modelling methods for urban monitoring

Data management, archiving and distribution

Report format

Introduction

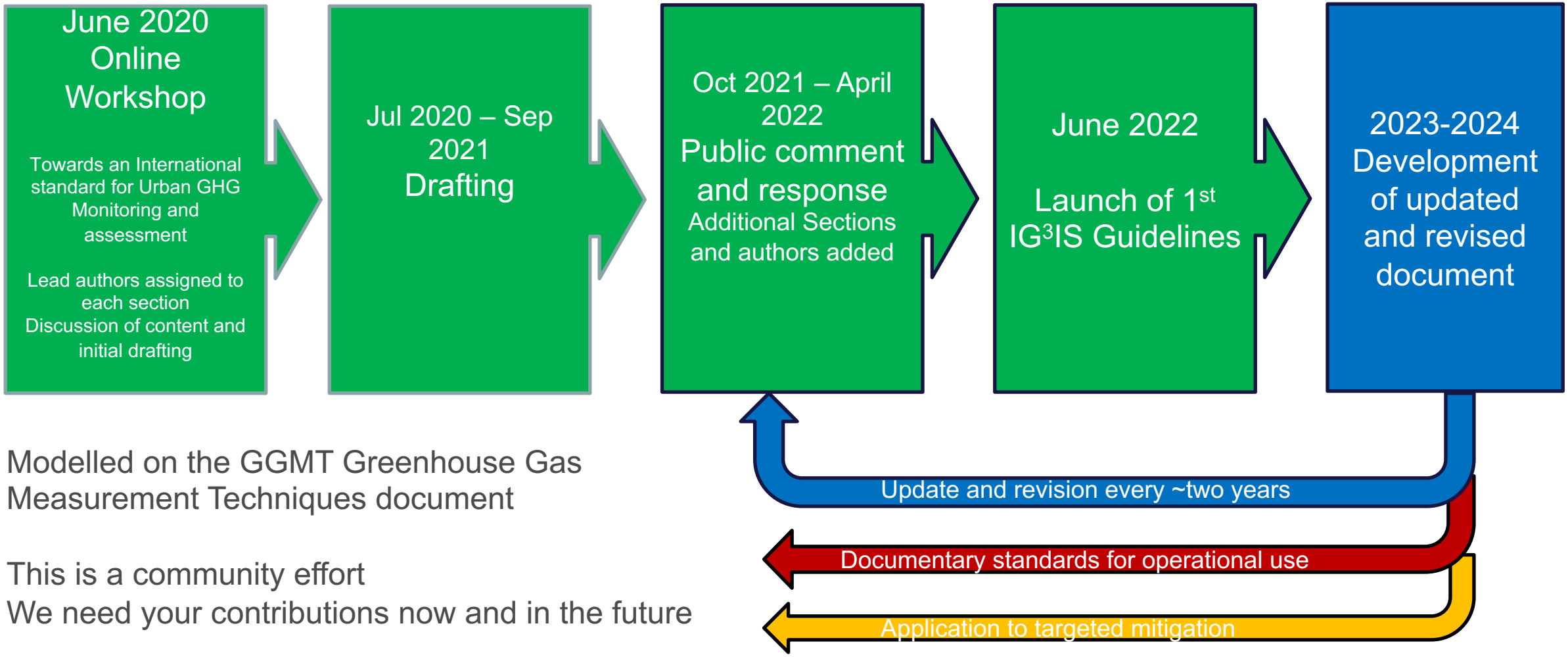
Main Document

One page for each technique
Brief description of the technique and appropriate applications
Considerations – Challenges - Ongoing Research
Intended to provide framework for evaluation of research plans

Annexes

Detailed information on each technique
Can be used to learn and apply particular methods
Includes references to scientific literature
Intended for practitioners

IG³IS Urban Greenhouse Gas Emission Observation and Monitoring Good Research Practice Guidelines



Modelled on the GGMT Greenhouse Gas Measurement Techniques document

This is a community effort
We need your contributions now and in the future

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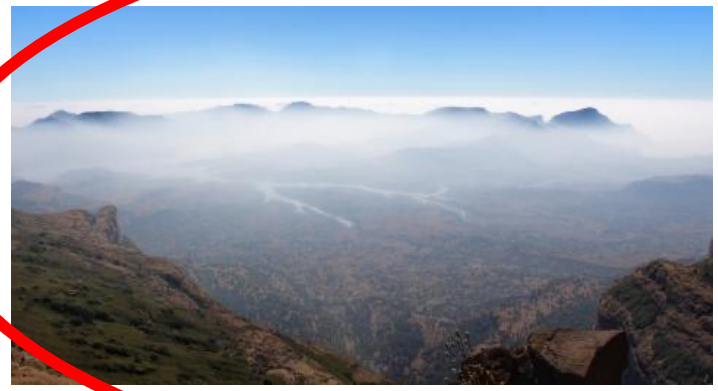

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IG^{3}IS Good Research Practices for National-scale emissions observations and monitoring are being developed for release in 2023.

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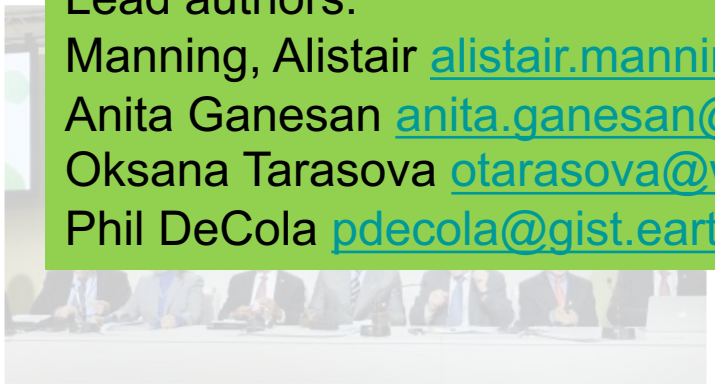
Industry: Provide information to industry and private sector businesses that will help locate and quantify previously unknown emission reduction opportunities such as fugitive methane emissions from industrial sources



IG^{3}IS – bridging greenhouse gas science and policy

ig3is.wmo.int

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