

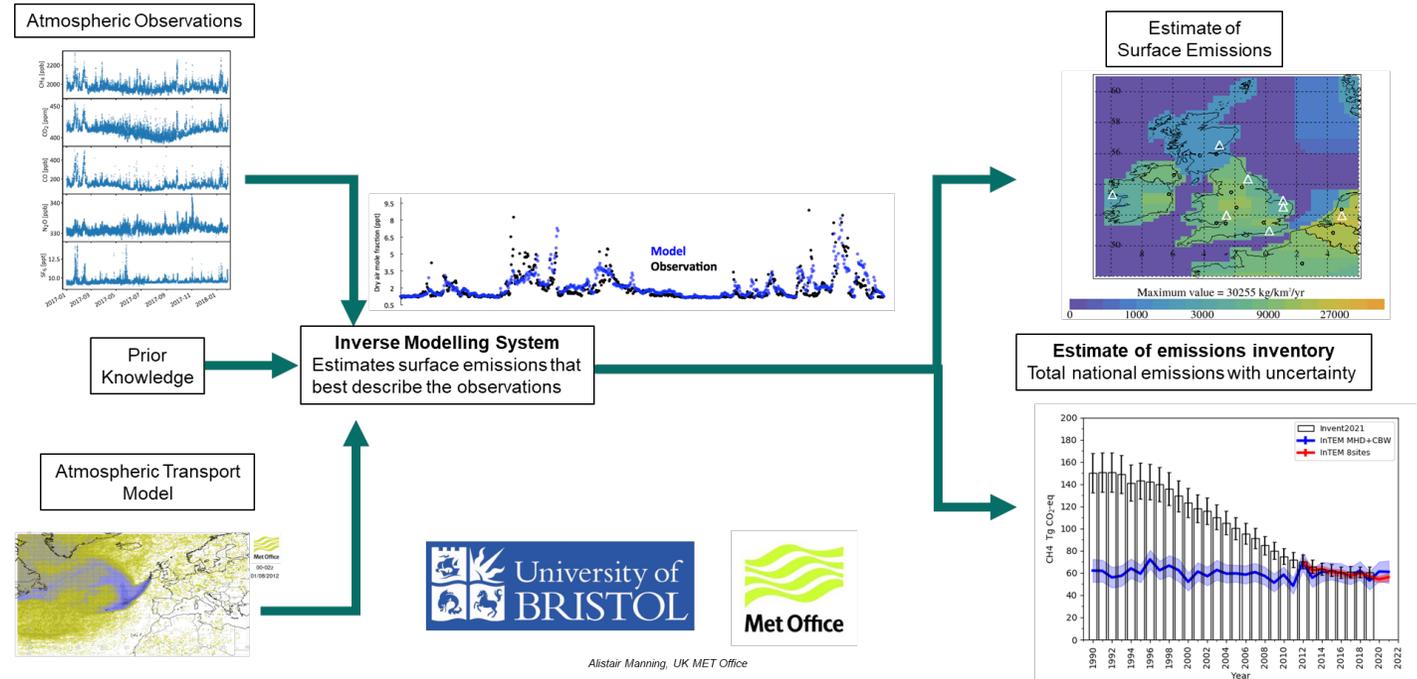
# Progress towards operational GHG inventory verification system in the UK

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# Current UK GHG Inventory Verification Activity



- Independent evaluation of UK greenhouse gas (GHG) emissions provided by in-situ atmospheric observations and top-down inverse modelling system from the "Deriving Emissions linked to Climate Change (DECC)" Network.
- Provides annual emissions estimates, two years in arrears for methane, nitrous oxide, and fluorinated gases as an annex to the UK Government's National Inventory Report

# GEMMA Programme Scope

Increasing need for spatially and temporally resolved, sector-level greenhouse house gas (GHG) emission estimates to track changes in emissions and the progress of GHG reduction actions.

A collaborative UK team are now developing a prototype operational system to address this need through the "Greenhouse gas Emissions Measurement and Modelling Advancement (GEMMA)" programme.

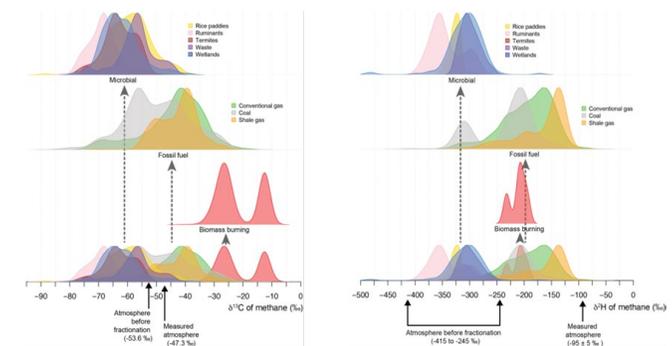
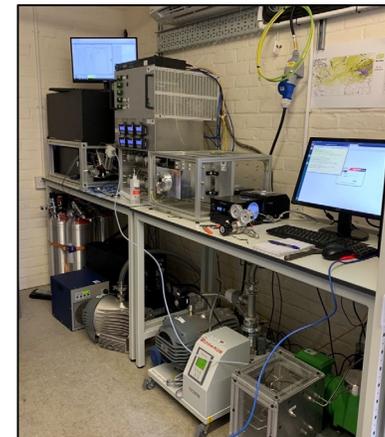
Mission of the first (two-year) phase of the programme is to establish UK science capability as critical infrastructure in a systems approach to net-zero. The programme has been scoped to build on the existing UK verification activities with priority enhancements including:

1. New network sites and sensors including new ground based remote sensing network and planning for future EO data sources
2. Quality infrastructure to underpin validity of "top-down" emissions measurement and support operational development
3. Robust modelling outputs through use of and inter-comparison of multiple models

# Development of Enhanced Greenhouse Gas and Tracer Observations

The GEMMA programme aims to bring several significant technical improvements including:

- Integration of a new ground-based remote sensing network of 12 EM27-Sun FTIRs.
- Addition of new in-situ measurement capabilities and sites, with a focus on source attribution tracers including on-line  $\text{CH}_4$  isotopologue measurements.
- Plans for the future inclusion for other measurement capabilities including earth observation data.

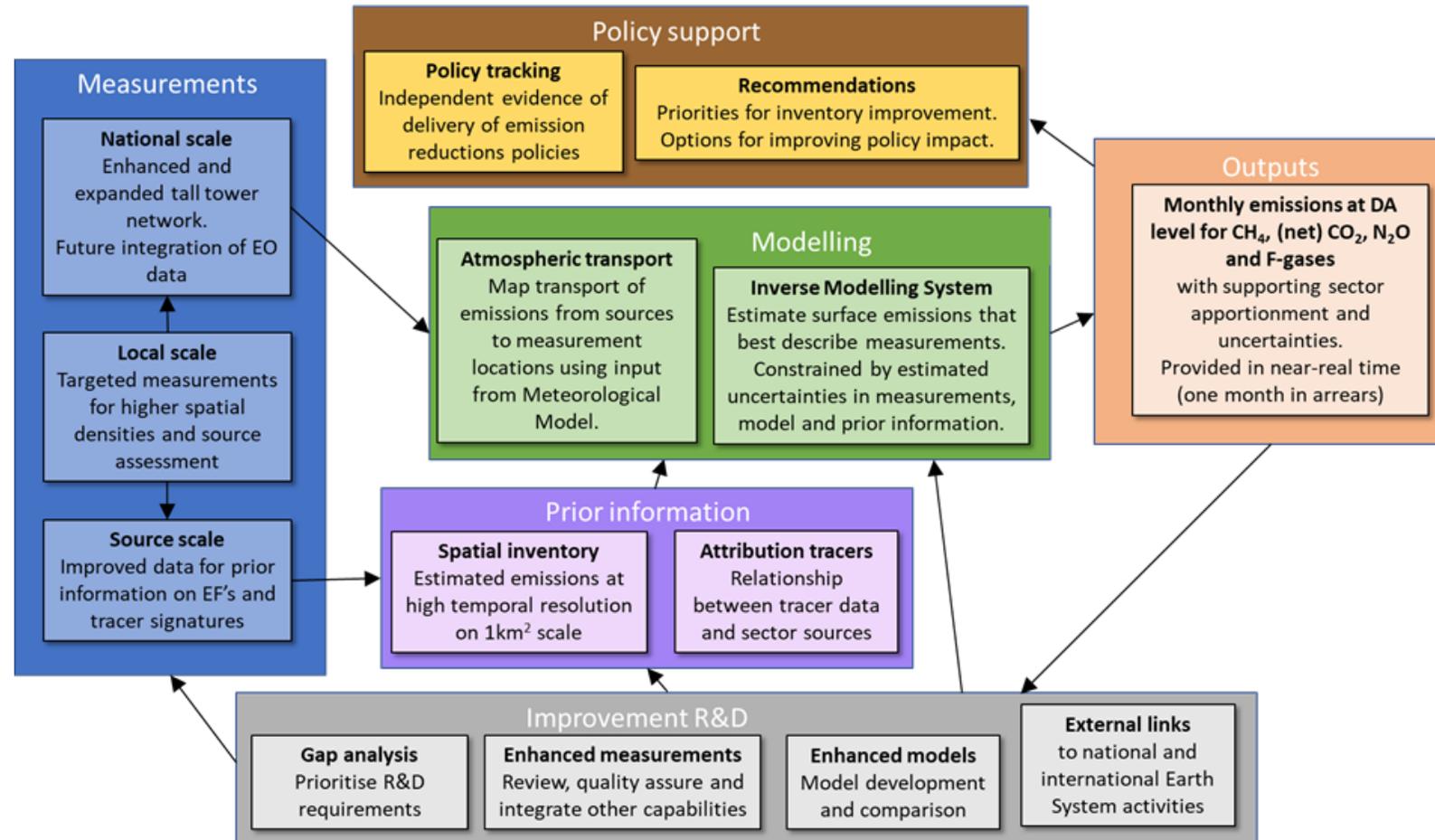


Sherwood et al Earth Syst. Sci. Data, 9, 639–656, 2017

# Operational System Development

Initial two-year goal for the programme is the development of the operational requirements for a long-term national capability with the supporting quality assurance systems, automated data flows and processing, and stakeholder-focused outputs.

Longer term goal is an operational network providing sub-annual emissions updates of net-CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and F-gases, including estimates of sectoral emissions for CH<sub>4</sub>.



# Thank you for your attention

## Acknowledgements to the GEMMA team:

Tim Arnold<sup>1</sup>, Richard Barker<sup>1</sup>, Barbara Brooks<sup>2</sup>, Grant Forster<sup>2</sup>, Paul Green<sup>1</sup>, Neil Humpage<sup>3</sup>, Bryce Lane<sup>1</sup>, Alistair Manning<sup>4</sup>, Charlotte Massey<sup>1</sup>, Simon O'Doherty<sup>5</sup>, Paul Palmer<sup>3</sup>, Robert Parker<sup>3</sup>, Matthew Rigby<sup>5</sup>, Kieran Stanley<sup>5</sup>

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