Progress towards operational GHG inventory verification system in the UK

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• 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.
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 CH₄ isotopologue measurements.

• Plans for the future inclusion for other measurement capabilities including earth observation data.
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-CO₂, CH₄, N₂O and F-gases, including estimates of sectoral emissions for CH₄.
Thank you for your attention

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