



An overview of the flight campaign for the GAUGE project: airborne greenhouse gas (and other complementary trace gas) measurements around and over the UK between April 2014 and May 2015

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This work highlights data measured during flights by the UK Facility for Airborne Atmospheric Measurement (FAAM) as part of the Greenhouse gAs UK and Global Emissions (GAUGE) campaign. A total of 17 flights (85 flight-hours) have been conducted so far around the UK mainland and Ireland to sample precision in situ CH₄, CO₂, N₂O (and other trace gas) concentrations and meteorological parameters at altitudes up to 9500m throughout the period April 2014 to May 2015. Airborne remote sensing retrievals of greenhouse gas total columns have also been calculated using the Manchester Airborne Retrieval Scheme for the UK Met Office ARIES high resolution FTIR instrument.

This airborne dataset represents a mapped climatology and a series of case studies from which to assess top-down bulk-net-flux snapshots for regions of the UK, and provides for evaluation of inverse modelling approaches that challenge bottom-up inventories, satellite remote sensing measurements, and assessment of model transport uncertainty.

In this paper, we shall describe the instrumentation on the FAAM aircraft and provide a diary of GAUGE FAAM flights (and data highlights) to date; and discuss selected flights of interest to studies such as those above with a focus of net mass flux evaluation.