



Evaluating the impacts of different measurement and model configurations on top-down estimates of UK methane emissions

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The Greenhouse gAs UK and Global Emissions (GAUGE) project aims to quantify the magnitude and uncertainty of key UK greenhouse gas emissions more robustly than previously achieved. Measurements of methane have been taken from a number of tall-tower and surface sites as well as mobile measurement platforms such as a research aircraft and a ferry providing regular transects off the east coast of the UK. Using the UK Met Office's atmospheric transport model, NAME, and a novel Bayesian inversion technique we present estimates of methane emissions from the UK from a number of different combinations of sites to show the robustness of the UK total emissions to network configuration. The impact on uncertainties will be discussed, focusing on the usefulness of the various measurement platforms for constraining UK emissions. We will examine the effects of observation selection and how a priori assumptions about model uncertainty can affect the emission estimates, even within a data-driven hierarchical inversion framework. Finally, we will show the impact of the resolution of the meteorology used to drive the NAME model on emissions estimates, and how to rationalise our understanding of the ability of transport models to represent reality.