



Monitoring fossil fuel sources of methane in Australia

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CSIRO has been active in identifying and quantifying methane emissions from a range of fossil fuel sources in Australia over the past decade. We present here a history of the development of our work in this domain. While we have principally focused on optimising the use of long term, fixed location, high precision monitoring, paired with both forward and inverse modelling techniques suitable either local or regional scales, we have also incorporated mobile ground surveys and flux calculations from plumes in some contexts.

We initially developed leak detection methodologies for geological carbon storage at a local scale using a Bayesian probabilistic approach coupled to a backward Lagrangian particle dispersion model (Luhar et al. JGR, 2014), and single point monitoring with sector analysis (Etheridge et al. In prep.) We have since expanded our modelling techniques to regional scales using both forward and inverse approaches to constrain methane emissions from coal mining and coal seam gas (CSG) production.

The Surat Basin (Queensland, Australia) is a region of rapidly expanding CSG production, in which we have established a pair of carefully located, well-intercalibrated monitoring stations. These data sets provide an almost continuous record of (i) background air arriving at the Surat Basin, and (ii) the signal resulting from methane emissions within the Basin, i.e. total downwind methane concentration (comprising emissions including natural geological seeps, agricultural and biogenic sources and fugitive emissions from CSG production) minus background or upwind concentration. We will present our latest results on monitoring from the Surat Basin and their application to estimating methane emissions.