

Characteristics of methane seeps

The Surat Basin is one of Australia's largest coal seam gas regions. Over the coming years, production of gas will increase as Liquefied Natural Gas (LNG) facilities come online.

CSIRO is undertaking study to develop a better understanding and characterise methane sources across the region. It is important to distinguish between methane sources that occur naturally and those that are referred to as anthropogenic, or occur after some kind of human involvement.

What is methane?

Methane is a naturally occurring gas that is colourless, odourless and is lighter than air. It is non-toxic but there are risks of ignition and suffocation if left unchecked in confined spaces. Methane is also an important greenhouse gas.

What is a methane seep?

Methane seepage to the atmosphere is a common phenomenon in some sedimentary basins containing coal deposits, such as the Surat Basin. Natural connectivity between coal seams and coal bearing aquifers and the atmosphere can result in the seepage of 'background' emissions of methane to the atmosphere.

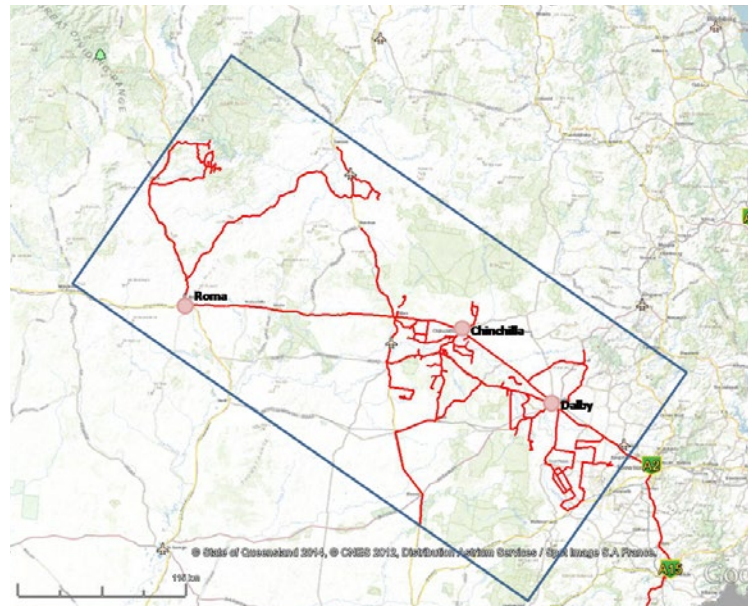
Important geological sources of methane enter the atmosphere through natural seeps and crevices occurring in terrestrial and marine settings. The potential natural sources of methane to the atmosphere from sedimentary basins include surface exposed outcrops of shale and near-surface coal and via connectivity pathways along faults, cleavages, and alluvial sediments associated with rivers.

'Background' methane emissions (i.e. those not associated with the CSG production) occur in soils, wetlands, swamps, rivers, agriculture and dams. In some locations, further background sources of methane are agricultural bores, feed lots, old exploration wells, landfill, wastewater and crop or stubble burning. Emissions from all of these sources are often intermittent, temporary and difficult to observe.

What is the difference between a methane seep and fugitive emission?

A methane seep occurs naturally between the coal seams and aquifer. The methane seeps into the environment through naturally occurring means. Onshore this may be through water in waterways, wetlands or peat or offshore through the sea floor.

Fugitive emissions are seepages and intentional releases that occur and are influenced by human development. They are leaks of gas or a pollutant into the atmosphere from leaks in pipelines, valves, mechanical seals or similar pressurised equipment. Coal mining is also a major source of fugitive emissions.



Map of the study area in the Surat Basin.

What is the work being undertaken by CSIRO on Methane Seeps?

CSIRO is undertaking a pilot study to detect and quantify methane sources, identifying and locating sources of background methane and in some cases estimating how fast methane flows from the source. The study is aimed at identifying the sources and rate of emissions but also understanding how these sources contribute to the overall methane emissions across the Surat Basin.

This is critical as the information can then be used to compare against future methane emissions as CSG production in the Surat Basin increases, providing a guide as to what portion of methane belongs to the CSG industry.

What have CSIRO found so far?

Using a methane analyser attached to a vehicle and travelling between Roma and Dalby, ground surveys showed that background levels of methane were consistent with other regional areas of Queensland.

To accurately measure how fast methane is emitted from ground sources, two methods are used.

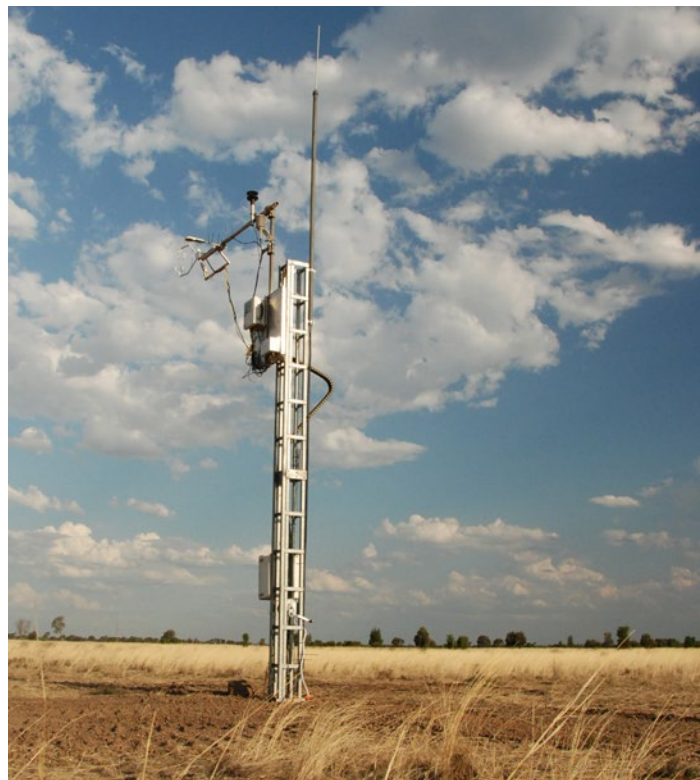
- **Fixed Chambers:** This method accurately measures emission rates but requires a large number of individual measurements so is best suited to assessing localised sources rather than over regional areas.
- **Stationary monitoring facility:** This measures atmospheric methane emission rates continuously on a regional scale. The primary challenge with this method is differentiating between sources of methane.

One methane stationary monitoring station was installed 57km southwest of Chinchilla in November 2014.

The next phase

The third part of this study will be collection of longer term data and the installation of a second monitoring station in the Surat Basin in May 2015. These two stations will continuously measure the methane and other gas concentrations and calculate the rate of emission over time. This will allow CSIRO to establish whether methane emissions are shifting up or down.

More vehicle surveys will be carried out throughout 2015 and a trial of an imaging remote sensor system for locating terrestrial seeps will also be carried out.



Stationary monitoring station or Flux tower.
Photo: David Etheridge (CSIRO)

ABOUT GISERA

The Gas Industry Social and Environmental Research Alliance (GISERA) is a collaboration between CSIRO, Commonwealth and state governments and industry established to undertake publicly-reported independent research. The purpose of GISERA is to provide quality assured scientific research and information to communities living in gas development regions focusing on social and environmental topics including: groundwater and surface water, biodiversity, land management, the marine environment, and socio-economic impacts. The governance structure for GISERA is designed to provide for and protect research independence and transparency of research. Visit gisera.org.au for more information about GISERA's governance structure, projects and research findings.

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