

SEEKING NATURAL SEEPS: A SIGN OF PETROLEUM SYSTEMS IN THE BIGHT

At a glance

Project title

Delineation and characterisation of cold hydrocarbon seeps and their associated benthic communities

Project summary

To understand possible mechanisms for, and identify, hydrocarbon seeps and their associated benthic communities.

Project investigators

CSIRO

Program partners

CSIRO, BP, SARDI, the University of Adelaide and Flinders University are working on a \$20 million research program to better understand the environmental, economic and social value of the Great Australian Bight.

Project contacts

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Overview

Valuable hydrocarbon resources may be present in the Great Australian Bight, however there are major knowledge gaps that limit our understanding of what wealth is hidden in its depths, and how, and if these assets interact with the deep water marine ecosystem.

The hydrocarbon seeps project is focused on the multidisciplinary study of both the subsurface geology, benthic environment and water column to identify and understand if hydrocarbon seeps exist in the Great Australian Bight.

In many other geological basins around the world undersea natural hydrocarbon seeps support diverse chemosynthetic biological communities and provide geologists with information about subsurface hydrocarbons.

Researchers will examine the geological pathways for potential seafloor seeps, use acoustic mapping and characterisation tools combined with seafloor sampling to identify potential hydrocarbon seepage sites and collect baseline sediment and water hydrocarbon concentration data.

The Challenge

Hydrocarbons have not yet been recovered from the Great Australian Bight, despite evidence that they exist. Establishing further proof of an active petroleum system pre-drill will help reduce exploration risks associated with this deep water oil and gas exploration frontier.

One method of achieving this goal is through identification and sampling of

natural hydrocarbon seeps that have geological connections to deeply buried petroleum systems. To date whilst there have been limited previous hydrocarbon seep studies, no active seep sites have been identified in the Great Australian Bight.

The identification and sampling of hydrocarbon seeps and their associated benthic communities in the Great Australian Bight is highly challenging due to the geographic extent of the basin, deep water and paucity of available data.



Above : Deployment of CSIRO Instrumented Coring Platform from the Southern Surveyor during the 2013 reconnaissance survey.

The Research

The project will utilise existing public domain data sets and collect new data and samples. Existing publicly available seismic data sets will be reinterpreted to understand potential mechanisms of hydrocarbon seepage. This will be combined with remote sensing data to identify potential oil slicks.

A marine reconnaissance survey will acoustically map plumes of escaping hydrocarbons in the water column and characterise the seafloor. Seafloor and water column sampling to establish background hydrocarbon concentrations in water, sediment and biota.

The Impact

Identification of potential areas of natural hydrocarbon seeps that have geological connections to deeply buried petroleum systems will help with the understanding

of petroleum systems of the Great Australian Bight.

Sampling and analysis of sediment and waters for hydrocarbons will establish baseline information on the natural abundances of hydrocarbons before exploration activities are undertaken.

The People

Dr Andrew Ross of CSIRO is both a marine scientist and petroleum geologist. His interests are in hydrocarbon exploration, hydrocarbon sensors, marine geology and oil spill science research.

Dr Laurent Langhi of CSIRO is a geologist and geophysicist with extensive experience as a leader of research relating to oil and gas exploration and production, and carbon capture and sequestration.

Dr Se Gong of CSIRO is an organic geochemist who develops new

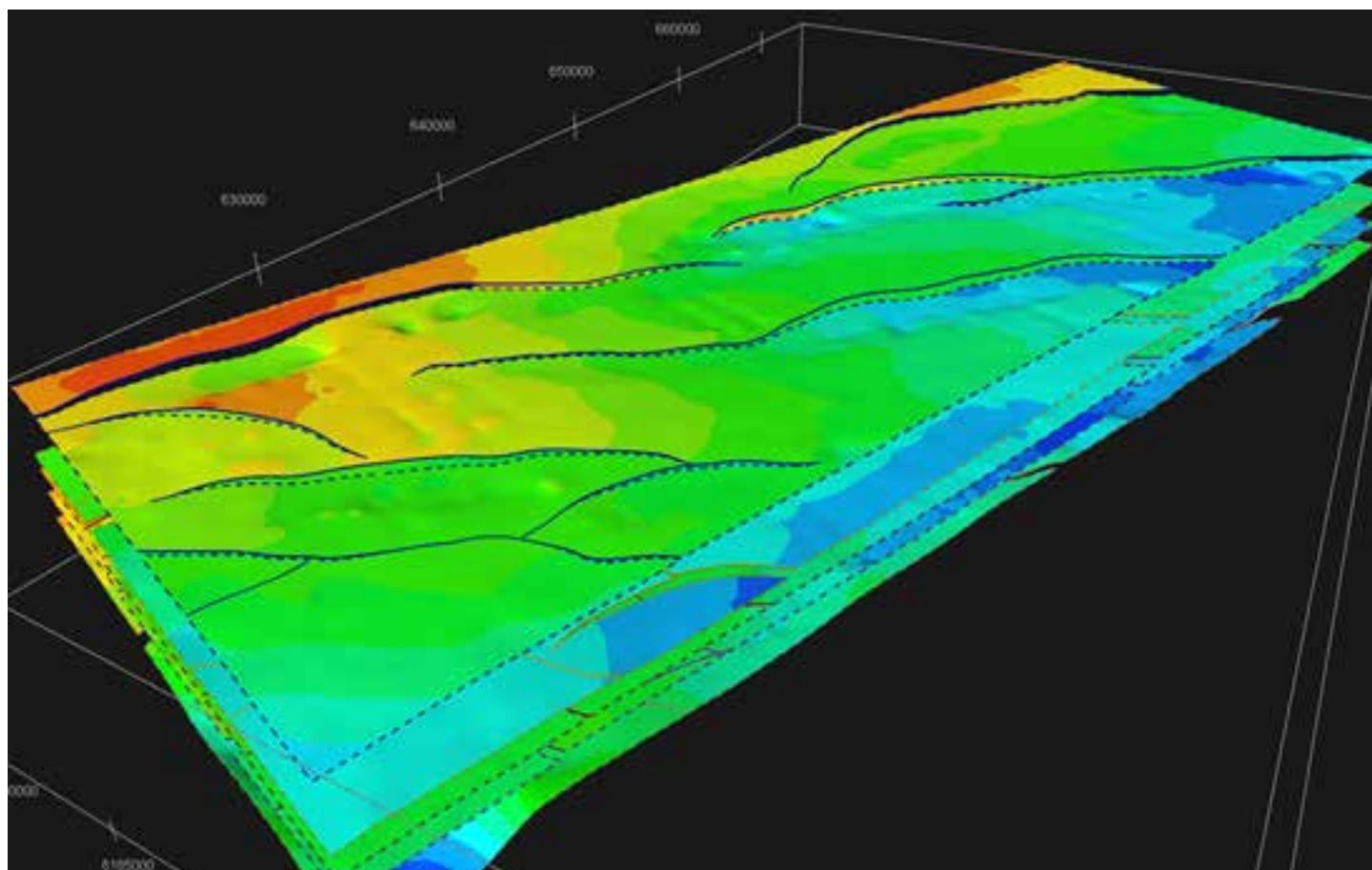


Above: Recovery of a sediment core from the instrumented coring platform during the 2013 Southern Surveyor reconnaissance survey.

technologies for analysing the molecular and isotopic composition of gases from fluid inclusions. She also specialises in geochemical fingerprinting of oils in order to determine their source and processes that have led to their formation.

Charlotte Stalvies of CSIRO is a geologist and geochemist who plans and implements sampling strategies for marine surveys, investigating both natural hydrocarbon seeps and oil spill response.

Below: 3D geological model of an area of the Great Australian Bight showing faults which may be conduits for fluid leakage from the subsurface.



For more information

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