in brief

Seabed mapping off northern Australia

Nine Geoscience Australia scientists participated in a month-long seabed mapping survey to the Van Diemen Rise, eastern Timor Sea, off the coast of the Northern Territory. The survey, which ran from 30 July to 26 August 2010, was the second survey in the area following an initial survey to the region in 2009 (*AusGeo News* 97).

This second survey added more detail to the 2009 survey results and addressed specific research questions posed by Australia's offshore oil and gas industry regarding the distribution of unique and sensitive seabed habitats and potential geohazards such as petroleum seeps in the region.

More than 600 square kilometres of additional seabed environments were mapped. Initial findings show shallow carbonate banks that are partially covered by a hard crust that supports luxurious sponge and coral gardens. The deeper channels are characterised by strong tidal currents with floors covered by muddy sands that contain abundant animals. Conversely, the sediment plains are characterised by muddy sands and relatively sparse biota. Large areas of the seabed on the soft sediment plains and on the floor and sides of the channels contain pock marks up to two metres deep and 20 metres in diameter. Abundant branching coral debris was also observed at one location on the outer shelf indicating that hard corals were once more extensive than at present. Several new species have already been identified from the 2009 survey, and more discoveries are likely from the new samples.

Data from the survey will be used to more fully characterise seabed environments in Northern Australia; namely, shallow (less than 200 metres) carbonate banks, deeper intervening channels, and flat sediment plains.

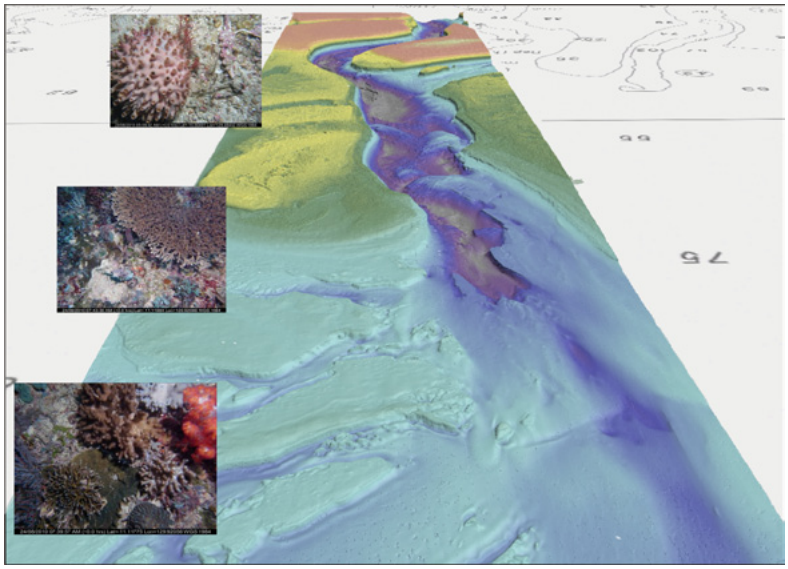

Figure 1. A 3D perspective of new bathymetry data and seabed biota collected on the Van Diemen Rise, Timor Sea off northern Australia.

This survey was part of a three-year collaboration between Geoscience Australia and the Australian Institute of Marine Science (AIMS) involving marine surveys off northern Australia using Geoscience Australia's shallow multibeam sonar system and AIMS' research vessel *Solander*. In addition to nine researchers from Geoscience Australia, the survey included researchers from the Australian Hydrographic Office, Museum and Art Gallery of Northern Territory, and Geological Survey of Canada.

It is planned that the major analyses and interpretations from this survey will be completed by mid-2011. These data will be incorporated with other regional data to produce reports and maps that describe and show the location of different seabed environments and geohazards. They will provide pre-competitive information and data for Australia's offshore oil and gas industry as well as support environmental regulation for planned infrastructure development in the region.

For more information

email ausgeo@ga.gov.au

Related websites/articles

AusGeo News 97: Researchers collaborate on marine survey in Northern Australia
www.ga.gov.au/ausgeonews/ausgeonews201003/inbrief.jsp#inbrief1

in brief

Geothermal Project update

Geoscience Australia's Geothermal Energy Project has been collecting precompetitive data to support the emerging geothermal industry as part of the agency's Onshore Energy Security Program. This has included field work to record temperature logs in existing boreholes across Australia as well as collecting drillcore samples for laboratory analysis at Geoscience Australia's headquarters.

The data and samples are used to calculate the heat flow, or the amount of heat energy passing through the Earth at any point, which provides an indicator of geothermal potential at each sample location. Heat flow is calculated as the product of the change in temperature with depth (thermal gradient) and the thermal conductivity of the rock. Thermal conductivity varies as a result of a range of factors such as rock type and grain size. Samples taken from the boreholes are measured using a divided bar thermal conductivity instrument in the Geoscience Australia laboratory.

Thermal conductivity analysis and the calculation of the heatflow at each geographic location for a large number of samples are currently underway. Because of the time involved in these processes, Geoscience Australia has recently released the first in a planned series of reports of heatflow determinations. The first report contains data from eleven wells in New South Wales, Queensland and Western Australia.

Currently heat flow data are very sparse with data for only about 150 sample points publicly available through open databases (figure 1). Geoscience Australia plans to significantly increase the number and distribution of heat flow determinations across Australia.

The Geothermal Energy Project has recently released an update to the crustal temperature image, *OzTemp*. The image is an interpretation of the temperature at five kilometres depth below the surface of Earth and provides an indication of geothermal potential across Australia. It also shows the large-scale variations in the temperature field in different parts of the continent. This release marks the first time since 1994 that an interpretation of temperature at five kilometres depth has been published by the agency.

The image is available for download through the Geoscience Australia website in a number of formats including a spatially located version for use in GIS programs. The temperature data from which the *OzTemp* image was derived is also available for download. This database includes 17 000 onshore and offshore temperature records. Approximately 5300 of these records were used in the interpretation of Australia's crustal temperature.

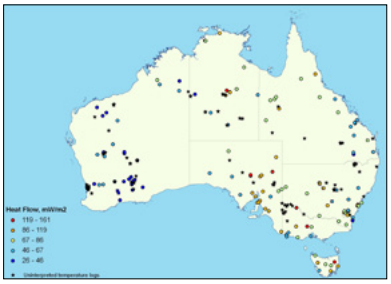

Figure 1. Distribution of publicly available heat flow data which is shown as coloured circles while those holes for which Geoscience Australia has released heat flow data are shown as coloured stars. The new holes logged by Geoscience Australia awaiting heat flow determinations are shown as black stars.

The ongoing release of new temperature and heat flow data aims to support the emerging industry and encourage the development of a new low emission power generation technology.

For more information

email geothermal@ga.gov.au

Related websites/articles

OzTemp-Interpreted Temperature at 5km Depth Image

https://www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=71143

Heat flow interpretations for the Australian continent: Release 1

https://www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=71211

Geoscience Australia's Geothermal Energy Project

www.ga.gov.au/energy/projects/geothermal-energy.html