TERTIARY DEEP-WATER CORAL SUPPORTS COLD SEEPS IN THE CEDUNA SUB-BASIN

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The analysis of new 3D seismic and the acquisition of unique core data enables an in-depth interpretation of outboard Eocene mounds in the central Ceduna Sub-basin and a more accurate model of their origin.

Seismic attributes and spectral decomposition clearly image the 3D morphology and internal architecture of the mounds and enable building episodes to be defined. Mounds have length of 5-35km, width of 1-4km and heights of 50-110m and developed at water depth 300-600m. Gravity core of the top of one mound indicates that it consists, at least partly, of corals typical of a deep-water reef. This initial interpretation is based on comparison with modern reef-forming biota, the presence of suspected brachiopods and lack of gastropods.

The underlying faults control the initial localisation of the mounds. These faults were active in the Cretaceous and reactivated in the Tertiary and intersect sequences modelled as oil- and gas-mature.

One main control for deep-water coral is the need for suitable hard substrates for initial attachment. The distribution of the mounds supports a development mechanism that relies on carbonate hardgrounds produced by chemosynthetic communities metabolizing nutrients from natural hydrocarbon cold seeps along reactivated faults and segments intersections. A hydrothermal feedstock for these communities is possible but less likely due to the distance to the nearest volcanic bodies. Once the substrates are in place the mounds growth is not directly dependant on ongoing cold seeps and could be as well related to the specifics of hydrodynamics in the areas.

The Australasian Exploration Geoscience Conference (AEGC) Sydney, NSW, Australia; February 18-21, 2018
Central Australian Basins Symposium (CABS)