

EMERGING SENSING TECHNOLOGIES FOR HYDROCARBONS AND THEIR POTENTIAL USE AS EXPLORATION DEVICES

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Australian waters contain a number of under-explored offshore sedimentary basins, which have or could have significant hydrocarbon accumulations. Current exploration strategies are based primarily upon seismic data acquisition, with other data type acquisition, (e.g. geochemical sampling) requiring further survey cruises. This multiple survey strategy significantly increases exploration costs leading to tough decisions being made upon which surveys to perform when exploration budgets are tight. The attraction of using a single cruise to achieve multiple surveys is therefore of interest in reducing costs and increasing the impact of each exploration dollar.

New chemical-physical sensing devices offer potential for useful new technology to explore large areas of offshore basins to detect microseeps and provide molecular information that is indicative of fluid type. These sensors when mounted on current survey platforms could be run continuously in marine surveys to obtain profiles of hydrocarbons in water that can be mapped in a similar way to seismic, electromagnetic, and magnetic data.

This paper reviews currently available technologies and presents the collaborative research being conducted by CSIRO Divisions of Petroleum and Industrial Physics, Curtin University, and University of Western Australia. This research is focusing upon the two essential parts of chemical sensing systems, the nanochemical molecular binding element that is often a surface designed to be specific for certain classes of molecule, and a transduction element that provides a physical signal that binding has taken place. These elements will then be integrated into a robust marine deployable sensor system that can be used for hydrocarbon exploration.

Technical Area: General – Radar and remote sensing or Instrument forum