

## **Direct Hydrocarbon Detection Technologies Applied to Minimize Exploration Risk in Deep Water Probes**

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Oil and gas seeps are of great significance to modern petroleum exploration. Foremost, they indicate the presence of generative hydrocarbon source rocks, without which there can be no accumulations. Surface geochemical techniques have gained increasing acceptance as a risk-assessment tool in deep offshore exploration. In deep water where the exploration costs are high and few wells have been drilled, the occurrence and nature of hydrocarbon seeps is one of the few available means for assessing prospective areas. In some areas, it has been demonstrated that the classical analytical methods do not work properly because of the geological characteristics of the petroleum systems and the overprint of the recent organic matter. The emergence of sophisticated analytical techniques such as microbiology, gas analysis, diamandoids, GC-MS-MS and isotopes (CSAI-B and CSAI-D) allow the detection of low levels of migrated hydrocarbons and is being used in our surveys to enhance the detection of hydrocarbon anomalies. This leading-edge integrated technology enables the identification, characterization of depositional environment, age, thermal evolution cracking and oil pulsing. Moreover, it enables the correlation of generative hydrocarbons observed in seabed sediments with hydrocarbons present in petroleum systems minimizing the exploration risk in deep waters. Several case histories of Gulf of Mexico and Brazil will be discussed.

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