

New Petroleum Systems Detected in the Deep-water Mexican Gulf by Satellite Radar Imagery

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A remote sensing study of the southern part of the Gulf of Mexico (Mexican waters) using multiple-pass radar satellite images has detected a remarkable number of large-scale repeating oil seeps, inferring the presence of entirely new petroleum systems in this frontier area. Furthermore, the contrast in seep distribution patterns observed across the region, specifically size, apparent thickness and repeatability, can be related to basic differences between geological provinces that have been mapped by PEMEX in the offshore areas.

This survey was undertaken between 2000 and 2002 and was the first time that the entire area had been studied in a single survey. The study covered an area of c.495,000 km² using ERS and Radarsat imagery with a minimum of two passes although in some areas quintuple coverage was achieved.

By analogy with the US Gulf of Mexico, it was anticipated that oil seeps would be associated with an area of known salt diapirism in Bahía de Campeche. However, there was uncertainty as to whether oil seeps could be detected on the surface in areas where water depths were between 2500 and 3600m. The results dramatically exceeded expectations and more than 1000 seeps were detected. The majority of the seepage slicks were associated with areas of salt diapirism but others were also observed in varying water depths and with quite different characteristics that correlate with changes in the regional geology. Most of the seeps repeat in time and show a remarkable coincidence in emission points, even at extreme water depths.
