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**Integrated Petroleum Systems Analysis of Brazil; The high resolution geochemistry of oils is the answer**

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Over the last years, an evolution has taken place in the understanding of the petroleum systems in petroleum exploration and risk assessment, allowing the occurrence of prospects to be accurately predicted, their effectiveness to be modeled, and the resulting petroleum absence or accumulations, in a defined prospect, to be explained. New breakthrough in geochemistry technology have established gas and molecular High Resolution Geochemistry Technology (HRGT) as one of the most effective tools to characterize petroleum in terms of source rock characteristics, age related, thermal evolution, biodegradation, oil and gas cracking, migration pathways and overall geologic history. This paper presents several case histories from deep water Brazilian and Middle East sedimentary basins that demonstrate the central role of new and emerging geochemical techniques in defining petroleum systems in frontier areas and identifying future exploration opportunities.