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### **Dynamic Gas-Driven Petroleum Systems?**

Large volumes of gas appear to have vented through a north-south transect of the offshore northern Gulf of Mexico. Even though very large quantities of gas appear to be involved, the specific sites of venting are generally highly localized at faults and fractures in the seafloor. Venting may be episodic making the actual hydrocarbon fluxes involved difficult to estimate. This venting gas causes significant changes in compositions of reservoir oils and produces a number of interesting effects at the seafloor. This behavior is not limited to the Gulf of Mexico - similar observations are continuing to be made in oceans worldwide, particularly in river deltas and on continental margins and may play a significant role in destabilizing slope sediment. In addition, it has recently been estimated that natural seafloor methane venting may deliver enough methane to the atmosphere to be important in delivering significant quantities of this green house gas to the atmosphere. This talk will explore the relationship between subsurface petroleum migration and surface sediment oil and gas venting which is commonly localized, volumetrically significant, episodic, rapid, and recent. Examples of gas and oil compositional and isotopic data from the Gulf of Mexico and constraints on gas and oil migration processes will be presented. These observations raise an important fundamental question - to what extent should petroleum systems be viewed as static versus dynamic? Should this distinction make a difference in how petroleum companies explore for gas and oil?