



Gas emission and composition from mud volcanoes in the eastern Mediterranean: Nile and Anaximander areas

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Mud volcanoes at the Nile deep-sea fan (NDSF, African passive margin) and Anaximander (Mediterranean ridge) area have recently been the targets for the integrated study of fluid systems and related phenomena (NAUTINIL (Sept. 2003), AEGEO (May 2003, Nov.2004) and MIMES (May 2004). High gas concentrations have been measured in the water column above mud volcanoes located between 1000 and 3000 m water depth, indicating a high venting activity in these areas. At Isis mud volcano, in the eastern part of the NDSF (1000 m water depth), a 50 m high methane plume has been detected just above the seafloor, with CH₄ concentrations ranging from 660 nmol/L (September 2003) to 1500 nmol/L (May 2004). The vertical profiles show scattered patterns which may be related to bubble degassing observed from the submersible during the NAUTINIL cruise. Moreover, high ethane and propane concentrations have also been detected in the water column and mimic perfectly the methane distribution profiles. Within the sediment, gas concentrations are well above the atmospheric saturation value, and rapidly decrease from the center to the peripheral zone of the mud volcano, showing the presence of a narrow feeder channel in the center of the structure. Furthermore, carbon and hydrogen stable isotopes of hydrocarbons in the sediment indicate that (a) methane is a mixture of bacterial gas with thermogenic gas and (b), during their migration, hydrocarbon gases are subject to bacterial degradation. Isis mud volcano is an active site in terms of gas release. At other sites in the Nile and Anaximander areas, similar results were obtained but also intriguing differences were observed.

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