



High methane at enhanced-T brine outflow for Nile fan and at cold low-salinity fluid fluxes for Anaximander area mud expulsion structures

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Mud expulsion structures at Nile fan and Anaximander area have recently been sampled for the integrated study of fluid systems using RV Atalante (Sept. 2003), RV Aegea (May 2003, Nov.2004), and RV Pelagia (May 2004). The active top part of Anaximander mud volcanoes was usually characterized by fluids of reduced salinities, whereas structures in the Nile area had fluids of near-normal salinity to brine composition. In particular the Cheops and Chefren mud volcanoes situated inside the large Menes Caldera, 8 km diameter, had enhanced salinities & temperatures being 150 ‰, & 57°C at Chefren and > 300 ‰, & 37 / 25°C at Cheops Using 3 adapted ME-CTD casts inside these muddy brine structures, the liquid mud was sampled for gas, and was centrifuged and filtered for further geochemical analyses. Furthermore, we took a piston and gravity core.. At both sites, the profiles are rather constant with depth and do not differ between cores and accompanying brine-CTD's (Fig. 4). The depth of the brine is approximately 300 meters at Chefren and 10 meters at Cheops, which needs to be compared to a 80 m depth of the Menes Caldera itself. The Si concentration in the cores is reflecting these temperatures with higher values at Chefren (500-600 μM) and lower values at Cheops (300 μM). Hydrogensulfide was found in

higher concentrations in the central cores of Chefren MV (up to 1.5 mM), and only in minor amount at Cheops.

While the salinity of the advecting fluids originating from underlying Messinien evaporites was dramatically different between the two areas, the measured methane concentrations were similarly high, ranging from 1 to 3 mmol/L for Anaximander and from 1.5 to 3.5 mmol/L for the Nile area. In both areas but in particular that of the Nile, major expulsions of gas occur into the water column (see Mastalerz et al., this meeting); in contrast gas hydrates have been found in the Anaximander structures but have as yet not been detected in the Nile area.

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