



Mineralogical and geochemical characterization of the Gulf of Cadiz (SW Spain) mud volcanoes: main trends and biochemical processes.

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Carbonate crusts and concretions from the Diasom Field and Tasyo Field (Gulf of Cádiz, Spain) were obtained during the cruises Anastasya 00/09 and Anastasya 01/09 (years 2000 and 2001). These carbonates were dredged from the Ibérico, Cornide, Arcos and Hesperides mud volcanoes. The circulation of methane associated to the mud volcanoes seems to be the main geochemical process that takes place on the formation of these deposits.

The main objectives of these study are: 1) petrographic, mineralogical and geochemical characterization of the different carbonates based on the different mud volcanoes, 2) provide insights about the source of CH₄ and 3) characterize the different process that take place on the formation of these carbonates (sulphate-reduction, anaerobic methane oxidation) A total of 90 samples were characterized petrographically using conventional microscopy and cathodoluminescence on thin and thick sections. These thick sections were subsampled according the petrographical results in specific areas employing a dentist drill and a computer-monitored microdrill. A total of 143 samples were characterized using x-ray diffraction and stable isotopes ($\delta^{13}\text{C}$ and $\delta^{18}\text{O}$).

The most abundant minerals in these carbonates are calcite and dolomite, quartz and

feldspats. The very low $\delta^{13}\text{C}$ values (up to -45 permil V-PDB) suggest the influence of CO_2 derived from the oxidation of methane during carbonate precipitation. Some high $\delta^{18}\text{O}$ values (up to +7 permil V-PDB) indicates the inflow of deep-seated fluids.

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