

have a similar composition. Geochemical analyses on gas extracted from sediments associated with authigenic carbonates reveal that methane is the main gas component. Compositional gas signature indicates that each structure has differently rooted gas. Methane carbon isotopes helped to distinguish between the thermogenic and biogenic gases. Comparison between methane and authigenic carbonate carbon isotopes shows that they follow a similar ^{13}C depletion trend for each studied feature. The distinct signature shared by gas and authigenic carbonates further indicates that they are intimately related. Similarly, pore water compositional analyses provided relevant information about the mud volcanoes' activity and their fluid compositions.

LITHOLOGY AND ORGANIC MATTER IN ROCK FRAGMENTS FROM MUD BRECCIA OF CAPTAIN ARUTYUNOV MUD VOLCANO

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The Captain Arutyunov mud volcano is located in the central part of the Gulf of Cadiz at 35°39.5'N - 7°20.0'W. It has a conic form of about 80 m high with a base of 3 km in diameter. This mud volcano was recently active and is characterized by gas venting and presence of gas hydrates. Using a TV-controlled grab a large sample of mud volcanic deposits was collected (TTR-12-AT393GR). The main aim of this investigation was to study lithology of rock clasts from mud volcanic deposits and to determine the content and composition of organic matter in these clasts.

Rock fragments were studied in thin sections under polarizing microscope. Lithological characteristics such as color, structure and composition were defined. Dating of some rocks was based on studying calcareous nannofossil assemblages (performed by A. Sautkin). The age of the others was determined by comparing them with rocks from other mud volcanoes of the Gulf of Cadiz (Ovsyannikov, 2000). Then geochemical investigations were carried out using fluorescent-bituminological analysis (to characterize extractable organic matter (EOM)), determination of total organic carbon (TOC) content and Rock-Eval pyrolysis.

On the base of lithological investigations and micropaleontological studying all clasts, separated from mud breccia from Captain Arutyunov mud volcano, were subdivided into 15 groups. They are mainly represented by limestones, claystones and sandstones. The age of rocks varies from Upper Cretaceous to Pliocene. The Upper Cretaceous rocks are represented by claystones and limestones. Most limestones are of the Miocene-Pliocene. The sandstones were formed during Eocene and Miocene. The values of TOC content in the majority of rocks are relatively low - 0.2 % in average, but several samples are characterized by TOC > 0.5 %.

In the claystones the values of TOC content vary from 0.18 % to 1.69 %, EOM content - from 0.01 % to 0.31%.

The limestones are characterized by TOC = 0.26 - 0.54 %, EOM = 0.005 % - 0.01%.

The sandstones are poor in organic matter: TOC = 0.05 - 0.07 %, EOM - 0.01%.

According to the results of pyrolysis of several samples, the organic matter belongs to kerogen of types II and III (humic/sapropel mixed and humic matter (Tissot, Welte, 1984)). The maturity of these rocks is corresponded to the beginning of oil window ($T_{\text{max}} = 430 - 436\text{ }^{\circ}\text{C}$).

References

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