



## **HYDROCARBON GASES IN MUD VOLCANO DEPOSITS FROM THE SOROKIN TROUGH (NE BLACK SEA)**

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During the MARGASCH cruise 52/1 onboard R/V Meteor to the Black Sea in 2002, several gravity cores were collected from different parts of mud volcanoes. The objective was to determine the composition of the hydrocarbons, their distribution along sediment cores and their relationships to gas hydrate accumulations.

Molecular composition of gas and isotopic values of carbon and hydrogen contain important information on fluid sources. Methane concentrations in the pelagic are relatively low (up to 49 ml/l). The amount of heavy hydrocarbons does not exceed 0.05ml/l and unsaturated homologues are present.

Thermogenic hydrocarbon gas was determined in several mud volcanoes, which were investigated in the Sorokin Through. They are characterized by high methane and homologues concentration.

Gas concentration and composition in mud breccias from active mud volcanoes generally differ from those in the background hemipelagic core. Several cores recovered hemipelagic sediments draping the Sebastopol and Yalta mud volcanoes. In these cores the methane concentration is much higher than in background core (up to 200 ml/l). In addition to methane, there are relatively high concentrations of saturated hydrocarbons (including C<sub>4</sub>) and absence of unsaturated homologues. Isotopic composition  $\delta^{13}C$  of methane is  $\delta^{13}C$  58‰ for both volcanoes.

Cores collected from the crater of the Dvurechenskii mud volcano consist of a mouse-like breccia with small crystals of gas hydrates and there is no typical pelagic sediment in the upper part of cores, suggesting recent activity of this volcano. The content and vertical distribution of hydrocarbon gases in cores unambiguously indicate the presence of migrating gases. Very high concentration of saturated hydrocarbons in

the mud breccia and absence of any unsaturated homologues clearly indicate the thermogenic origin of gas. Also predominance of iso-butane over n-butane suggests high rate of migration.

Hydrocarbons from gas hydrates are represented mostly by methane and low amounts of ethane and propane (less than 0,5%).  $\delta^{13}\text{C}$  ( $\text{CH}_4$ ) varies from  $-62$  to  $-66$ ‰ and  $\delta^2\text{D}$  value is about  $-200$ ‰.