

**GEOCHEMICAL CHARACTERIZATION OF ORGANIC MATTER OF MIERS  
BLUFF STRATA SEDIMENTARY ROCKS, LIVINGSTON ISLAND,  
ANTARCTICA**

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The object of investigation were samples collected from pocket 4 - No1 and from the low part of pocket 9 - No 2 of the Miers Bluff strata, Livingston island, Antarctica (Figure 1). Sample No1 represents aleurite argillites and No2 – sandstones. The content of organic carbon ( $C_{org}$ ) in sample No1 is 0.11% and in No2 – 0.07%. The organic matter content amounts to 0.15% and 0.09% for the samples under study. The samples were analyzed by Rock-Eval instrument using a "Turbo" model RE6 pyrolyzer (VINCI Technologies). The values of  $S_1$  peak for the two samples are very close – 0.06 (No1) and 0.07 (No2) while those for  $S_2$  peak are much higher – 0.27 and 0.35, respectively. The values of the HI indicate that the kerogen present in sample No1 is probably of II-III type, while that for No 2 – II type. The magnitude of the OI for sample No1 was found to be 91, and that for sample No2 - much higher, 429. The values of the Production Index ( $S_1/S_1 + S_2$ ), which is a maturity indicator, are relatively low – 0.18 and 0.17, an indication of advanced maturity. The value of  $T_{max}$  is another well known maturity indicator, for sample No1 is 649°C and for sample No2 – 650°C. On the base of Rock Eval data for the organic matter of the investigated sediments the stage of metagenesis  $AK_3$  was proposed.

The samples were subjected to sequential extraction analysis with chloroform and ethanol-benzene (1:1, v/v). The contents of chloroform and ethanol-benzene bitumen A and C were determined. The values for chloroform bitumen A were in the range 0.02-0.03%, and for ethanol-benzene bitumen A in the range 0.015-0.020%, while for bitumen C for the two samples – 0.026%. The ratio of the contents of chloroform bitumen A to the ethanol-benzene bitumen (1.88 and 1.22) suggested a reducing environment of organic matter formation.



Figure 1. Schematic map of the studied area.

Abbreviations: 1-BAE – Spanish Antarctic station; 2 – BAB – Bulgarian Antarctic station; 3 -geological cross section; 4 – sampling point

Asphaltenes have been precipitated and oils and resins were subjected to column chromatography. A dominant content of resins was determined for the samples. The following homologue series were determined. *n*-Alkanes were with smooth distribution and CPI values close to unit. Mid-chain *n*-alkanes (*n*-C<sub>21</sub> to *n*-C<sub>25</sub>) dominated in the samples under study. The slight increase in the contents of higher members (*n*-C<sub>27</sub> to *n*-C<sub>31</sub>) was an indication of the small contribution of terrestrial organic matter. Tri-, tetra- and pentacyclic terpanes have been identified in the samples under study. The pair of H<sub>27</sub> hopanes (T<sub>S</sub>/T<sub>m</sub>) was present in two extracts of disseminated organic matter. T<sub>M</sub> (17 $\alpha$ (H)-22,29,30-trisnorhopane) was supposed to represent a biologically produced structure while T<sub>S</sub> was generated by diagenetic and thermal processes.

The present results should be regarded as the first attempt to characterize disseminated organic matter of Miers bluff strata sedimentary rocks, Livingston Island, Antarctica.