

## TECTONIC AND MAGMATIC INFLUENCE ON ORGANIC MATTER MOLECULAR COMPOSITION OF TRIASSIC ROCKS IN THE NE BARENTS SEA REGION

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Triassic deposits are the thickest unit in the sedimentary cover of the Barents Sea region. Parametric and prospecting boreholes penetrated Triassic deposits both on the Franz Josef Land (FJL) archipelago and in the water area, namely, in the South Barents Sea depression and on the Admiralteiskii Rise. Evaluation of hydrocarbon potential has shown that the catagenetic maturity of dissolved organic matter (DOM) of synchronously accumulated strata varies over the area and reaches an abnormally high degree in some sections (Gramberg et al., 2001).

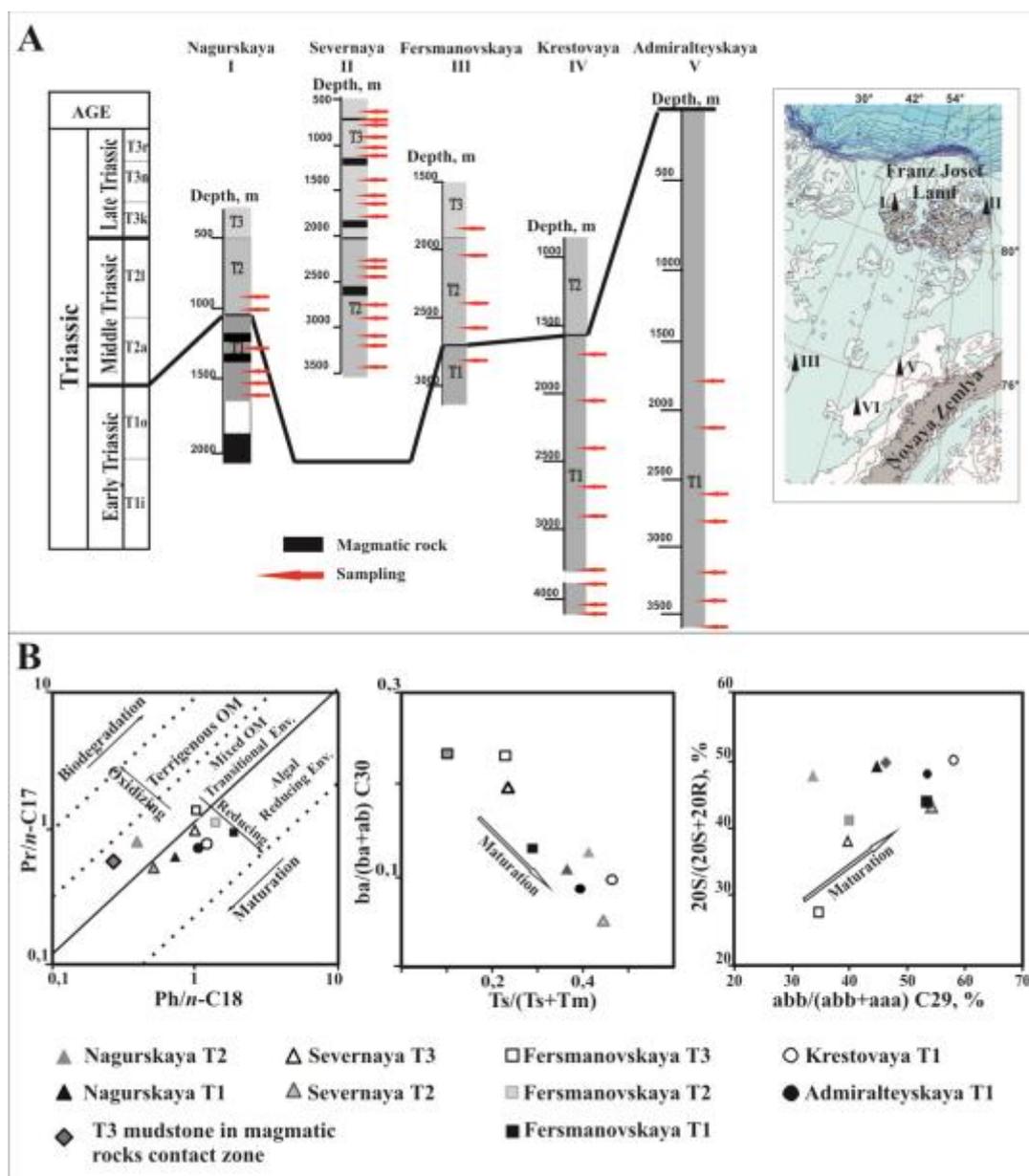
It was shown that along with the regular increase in  $R^0$  values with depth in the Triassic section of the FJL, its abnormally high values (up to stage MC<sub>5</sub>) are observed near igneous bodies. The boundary between stages MC<sub>2</sub> and MC<sub>3</sub> in the Triassic section of the Admiralteiskii Rise lies significantly higher than that in the Barents Sea megadepression. Joint contact metamorphism and tectonic processes must inevitably be reflected in the specific molecular composition of DOM of the regional Triassic rocks. It is worthwhile to assess the influence of each of these factors.

The object of our study was rock samples collected from the sections of the Severnaya and Nagurskaya (FJL), Admiralteiskaya-1 and Krestovaya-1 (Admiralteiskii Rise) boreholes. The core samples were compared with the core from the Fersmanovskaya-1 borehole drilled in the area of the Central Barents Sea rises and exemplifying a typical regional Triassic section (T<sub>1</sub>–T<sub>3</sub>; Fig. 1). Analysis of DOM included determination of kerogen composition and contents of total organic carbon and carbonate carbon, extraction of chloroform ( $A_{chl}$ ) and alcohol–benzene bitumens and humic acids, and identification of the group and hydrocarbon compositions of  $A_{chl}$ . Fractions of saturated and aromatic hydrocarbons (HCs) were separated on a gas chromatograph and then were examined on an Agilent 5973/6850 gas chromatograph–mass spectrometer system with a quadrupole mass detector and data processing software.

The composition and distribution of hydrocarbon biomarkers (*n*-alkanes, isoprenoids, cyclic alkanes, and polyaromatic hydrocarbons) were studied using the GC–MS method and provided information about the genesis, facies conditions of sedimentation, and catagenetic maturity stage of DOM of Triassic sediments from the northeastern Barents Sea region (Fig. 2).

Analysis of the molecular composition of DOM in the Triassic rocks of the northeastern part of the Barents Sea has revealed that the lateral variations in the level of DOM maturity are mostly due to the involvement of the sedimentary strata in postsedimentation tectonic and magmatic processes. For example, the vertical catagenetic zoning of the Triassic deposits of the Fersmanovskaya borehole, not subjected to these processes, is similar to the regional catagenesis trend. In the Lower Triassic rocks of the Admiralteiskii Rise, which underwent a

considerable subsidence, DOM reached higher grades of catagenesis (up to MC<sub>3-4</sub>). During the following uplifting, the deposits containing mature DOM rose to an atypical hypsometric level. The joint impact of the Late Mesozoic–Cenozoic uplifting and the abundance of igneous rocks in the section determined the abnormally high grades of DOM maturity in the Triassic FJL deposits, best pronounced in the section of the Nagurskaya borehole (up to AC<sub>1</sub>).



**Figure 1** A – Map of the study area and correlation between the Triassic sections of the northeastern Barents Sea region, compiled from results of parametric drilling; B – Biomarker maturity parameters of Triassic rocks from northeastern part of the Barents Sea sedimentary basin.

## References

Gramberg, I.S., Evdokimova, N.K., Suprunenko, O.I., 2001. Catagenetic zoning and petroleum potential of the sedimentary cover of the Barents Sea shelf. *Geology and Geophysics (Russian Geologiya i Geofizika)* 42(11-12), 1808-1820.