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The geological structure and petroleum resource potential of the West Spitsbergen continental margin

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The geophysical (24_channel CMP records, hydromagnetic measurements, surface gravity measurements, seismo-acoustic profiling, refraction seismic exploration) and geological (bottom sediment sampling in some areas) data obtained by geologists from the Murmansk Arctic Geological Expedition served as material for this work. In total, the CMP and seismic refraction investigations were accomplished along profiles 109 (16462 km) and 8 (3440 km), respectively. The data obtained by the gravimetric and magnetometric surveys (Scale 1: 1000000) in the southern and eastern parts of the region and by complex geological–geophysical investigations (CMP method, gravity and magnetic measurements, bottom sediment sampling) carried out south of King Karls Land on the scale 1: 200 000 were also used. In total, 31 anticlinal uplifts 1472 km^2 in total and traps of the nonstructural type are defined within the undeformed Cenozoic sedimentary cover. The Paleozoic–Mesozoic sedimentary complex of the Saffolk graben includes 13 local structures 147 km^2 in integral size. The traps confined to the Isfjord along_slope step and West Medvezhii shelf step and traps located within the Norwegian–Spitsbergen zone of steps are most promising with respect of hydrocarbon resources. Thus, the complex geophysical investigations with subsequent processing and interpretation of materials provide grounds for the optimistic assessment of the petroleum resource potential of the Spitsbergen continental margin. Such an assessment is supported by the following facts: (1) significant thickness of the sedimentary cover; (2) high sedimentation rate; (3) the presence of structural and nonstructural hydrocarbon traps; (4) the presumable presence of reservoirs and caps in the sedimentary section; (5) occurrence of gas hydrates in the upper part of the sedimentary section; and (6) the presence of mantle diapirs, which may serve as a catalyst for hydrocarbon maturing. Consequently, the complex investigations make it possible to elucidate a wide spectrum of aspects related to the geological structure of the Spitsbergen continental margin through its entire section, carry out its tectonic zoning, to subdivide the sedimentary cover, and to define potential objects promising with respect to hydrocarbon accumulations.

Biography

G Tarasov is the head of the Geology and Geodinamics Department, Professor. He has published more than 80 papers in reputed journals.

G Kazanin is the director of Marine Arctic Geological Expedition (MAGE), Murmansk, Russia. He has published more than 50 papers in reputed journals.

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