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Petroleum Potential of Laptev Sea Basins: Geological, Tectonic and Geodynamic Factors

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THEME 9: Hydrocarbon Potential of the Eurasian Margins: Geological and Tectonic Factors

Summary: The regional 2D seismic survey, carried out in the Laptev Sea by Marine Arctic Geological Expedition (MAGE) in 1986-1990, gives a fuller impression of the Laptev Sea sedimentary cover. Structural patterns, tectonic compilations and seismic stratigraphic analysis allowed geological zoning for hydrocarbon prospects and may serve as a basis for the planning and onset of geological and geophysical research for oil and gas exploration in the region. In accordance with the geological-geographical concept of hydrocarbon zoning, the Laptev Sea may be divided into three oil and gas-bearing basins (OGB): (i) West Laptev shelf, (ii) Laptev to East Siberian shelf and (iii) Laptev deep margin. On the basis of data on the lithologic composition, spatial distribution and thickness of the sedimentary cover, the West Laptev shelf OGB is identified as the most prospective within the Laptev Sea. Two long anticlines, Trofimov High and Minin Swell, and also the large isometric structure, West-Lena Dome, deserve particular interest as highly prospective oil and gas prospects.

INTRODUCTION

Evaluations of potential hydrocarbon resources within the Laptev Sea have been described in papers by geologists of "Sevmorgeo" (GRAMBERG et al. 1976, IVANOV et al. 1976, VINOGRADOV 1984, LAZURKIN 1987). Before 1985-1986 the prognosis of productive horizons in the sedimentary cover of the Laptev shelf was founded on extrapolation of the geological structure on surrounding land and islands, paleoreconstructions and on several seismic refraction lines. Data on the composition, structure and thickness of the sedimentary cover within the Laptev shelf were practically absent. A thick sediment cover up to 8-12 km was thought to be present only within the South Laptev Depression, while on most of the shelf it was estimated to be 2-3 km (VINOGRADOV et al. 1974, 1976, 1984). So estimates of potential resources of hydrocarbons for the most of the Laptev Sea were low.

The regional 2D seismic survey, carried out in the Laptev Sea by Marine Arctic Geological Expedition (MAGE) in 19861990, gives a fuller impression of the Laptev Sea sedimentary cover and enables a regional seismic stratigraphy scheme to be deduced. Regional seismogeological complexes and successions have been determined as well as their spatial distribuion, thickness and internal structure. The stratigraphic succession, its completeness and probable lithologic composition have been inferred. In spite of the absence of the offshore wells, early beliefs about the structure of Laptev Sea sedimentary basin were generally confirmed and developed (IVANOVA et al. 1989, SEKRETOV 1993). Structural patterns, tectonic compilations and seismic stratigraphic analysis allowed geological zoning for hydrocarbon prospects and may serve as a basis for the planning and onset of geological and geophysical research for oil and gas exploration in the region (Fig. 1).

RESULTS

In accordance with the geological-geographical concept of hydrocarbon zoning, the Laptev Sea may be divided into three oil and gas-bearing basins (OGB): (i) West Laptev shelf, (ii) Laptev - East Siberian shelf and (iii) Laptev deep margin. The Yenisei-Khatanga and Lena-Anabar oil and gas-bearing areas (OGA) of the Khatanga-Viluy OGB are distinguished south of Laptev Sea within the north of Siberian Platform (KONTOROVICH et al. 1981). On the basis of data on the lithologic composition, spatial distribution and thickness of the sedimentary cover, the West Laptev shelf OGB is identified as the most prospective within the Laptev Sea. Three OGAs are defined in the West Laptev shelf OGB. They are West Laptev, South Taimyr and North Taimyr (Fig. 1).

WEST LAPTEV BASIN

West Laptev area

The West Laptev OGA corresponds tectonically to the pericratonic block of the Siberian platform and seems to be the most prospective. The Lena-Taimyr Zone of frontier uplifts, South Laptev and West Laptev Depressions, Trofimov High, Ust' Lena and Omoloi Grabens, Central Laptev High and North Laptev Depression of the shelf frontier are first order structures, outlined within the Laptev block of Siberia. The Minin Swell, Intensivnoye Uplift, Dunay Trough and West Lena Dome are referred to as second order structures (Fig. 1). The total thickness of the sedimentary cover ranges from 4 km within the Lena-Taymyr Zone of frontier uplifts to 12 km in the axial parts of South Laptev Depression and Ust' Lena Graben, but in most of

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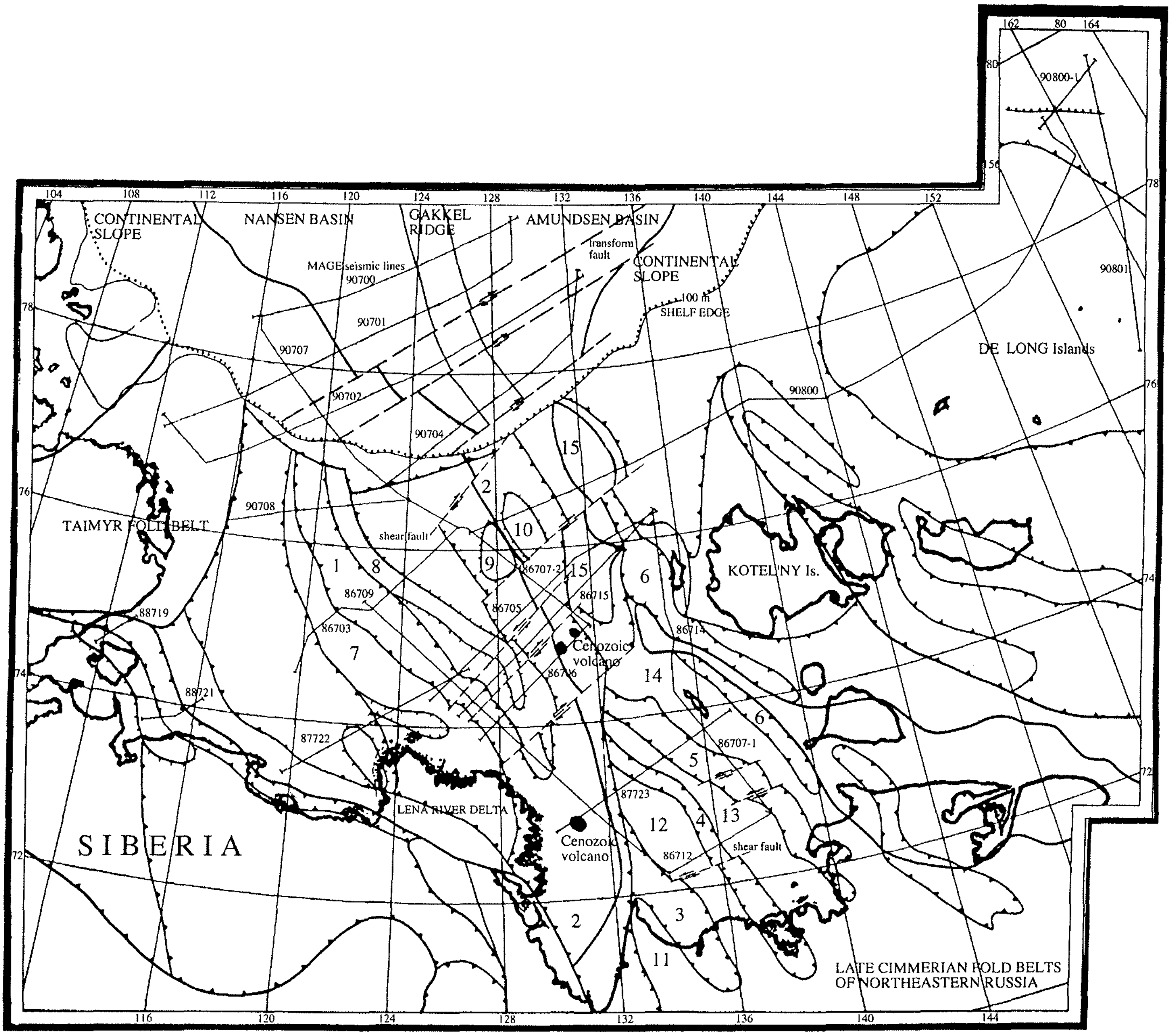

Fig.1: Structural elements map for hydrocarbon zoning of the Laptev Sea. Oil and gas-bearing basins (OGB) and areas (OGA): I = West Laptev shelf OGB; Ia = West Laptev OGA; Ib = South Taimyr OGA; Ic = North Taimyr OGA; II = Laptev – East Siberian shelf OGB; IIa = East Laptev OGA; IIb = Kotel'nyi OGA; IIc = East Siberian OGA; III = Laptev deep margin OGB; IV = Khatanga – Viluy OGB; IVa = Enisei – Khatanga OGA; IVb = Lena – Anabar OGA.
Structures: 1 = Lena – Taimyr zone of frontier uplifts; 2 = South Laptev Depression; 3 = West Laptev Depression; 4 = Trofimov High; 5 = Ust' Lena Graben; 6 = Omoloi Graben; 7 = Central Laptev High; 8 = North Laptev Depression of shelf frontier; 9 = Minin Swell; 10 = Intensivnoye Uplift; 11 = Dunay Trough; 12 = West Lena Dome; 13 = Ust' Yana Graben; 14 = Chondon Graben; 15 = Shiroston Graben; 16 = Bel'kovskiy-Svyatonosskiy Graben; 17 = Anisinskiy Depression; 18 = Kotel'nyi-Faddeev Horst; 19 = East Laptev Horst; 20 = Omoloi Horst; 21 = Stolbovoi Horst; 22 = Berelekh Horst; 23 = Ust' Yana Horst; 24 = Buor-Khaya Horst.
MAGE seismic lines: 86703, 86705, 86706, 86707-1, 86707-2, 86709, 86712, 86714, 86715, 87722, 87723, 88719, 88721, 90700, 90701, 90702, 90704, 90707, 90708, 90800, 90800-1, 90801. Locations of Figures 2 through 6 are indicated by bold sections of MAGE seismic lines.

the territory it is 6-8 km. Two structural complexes are distinguished in the sedimentary section: lower Upper Proterozoic to Lower Cretaceous and upper Upper Cretaceous to Cenozoic (Figs. 2-4). The thickness of the Upper Proterozoic-Lower Cretaceous paraplatform complex is not less than 4-9 km. This sedimentary complex is a prospective by analogy with the Epi-Karelian cover of the Khatanga-Viluy OGB in north Siberia. Four main lithologic, stratigraphic sediment successions, divided by regional unconformities, are distinguished in the sedimentary section of the lower complex. They are Upper Proterozoic-Cambrian terrigenous-carbonate with seismic velocities of 5.2-6.4 km/s, Lower to Middle Paleozoic carbonate (4.8-6.0 km/s), Middle Upper Paleozoic carbonate and terrigenous-carbonate (4.4-5.4 km/s) and Upper Paleozoic to Lower Cretaceous terrigenous (3.7-4.5 km/s). The Upper Proterozoic (Riphean to Vendian) terrigenous carbonate sediment succession fills rift depressions in the Karelian Archean to Early Proterozoic basement, where its thickness varies from

2.5 km to 6 km. Cambrian carbonates are identified in most of the territory. Their thickness is 0.3-1.2 km. The Lower to Middle Paleozoic sediment succession, including Ordovician to Middle Devonian carbonates, are missed out in the Zone of Lena-Taymyr uplifts, south-eastern peripheral part of South Laptev Depression and within the north part of the Laptev shelf. The total thickness of the Ordovician to Middle Devonian carbonates generally varies between 0.5-3 km, but the maximum thickness of 4-4.3 km is detected in the axial part of West Lena Dome. The Middle to Upper Paleozoic succession includes Upper Devonian and Lower Carboniferous carbonate and terrigenous carbonate deposits. It is identified everywhere, excluding the north part of the Laptev shelf. A maximum thickness up to 3 km is observed within South Laptev Depression. The Upper Paleozoic to Lower Cretaceous succession, including terrigenous sediments of Middle and Upper Carboniferous, Permian, Triassic, Jurassic and Lower Cretaceous, has an ubiquitous distribution. Its thickness changes significantly from 3-5 km in northwestern part of the shelf and South Laptev Depression to 0.5-1 km within Lena-Taymyr Zone of frontier uplifts and southeastern part of Central Laptev High. The whole section of these terrigenous sediments, interleaving sandstones, argillites and siltstones, is basically of marine genesis. West of 121 E the Upper Paleozoic to Lower Cretaceous terrigenous succession is subdivided by unconformities on Upper Paleozoic to Induan Lower Triassic, post-Induan Triassic and Jurassic to Lower Cretaceous parts.

Hydrocarbon accumulations in Upper Proterozoic to Lower Carboniferous deposits, in which carbonates predominate, may be related to the stratigraphical traps confined to the regional hiatuses (IVANOV et al. 1976). These are marked by the presence of corresponding reflectors on seismic lines. Stratigraphic, as well as structural and combined traps on the flanks of depressions and on highs can be prospective for hydrocarbon exploration (Figs. 2-4). The hydrocarbon potential of Upper Paleozoic to Lower Cretaceous terrigenous deposits is proved by drilling results on adjoining land within the Enisey – Khatanga OGA. In this succession of sediments the Permian sandstones are the most prospective (GRAMBERG 1968). Oil, gas and multiple hydrocarbon accumulations correspond with this level within South Suolem, North Suolem and Gurimisskaya areas. Minor

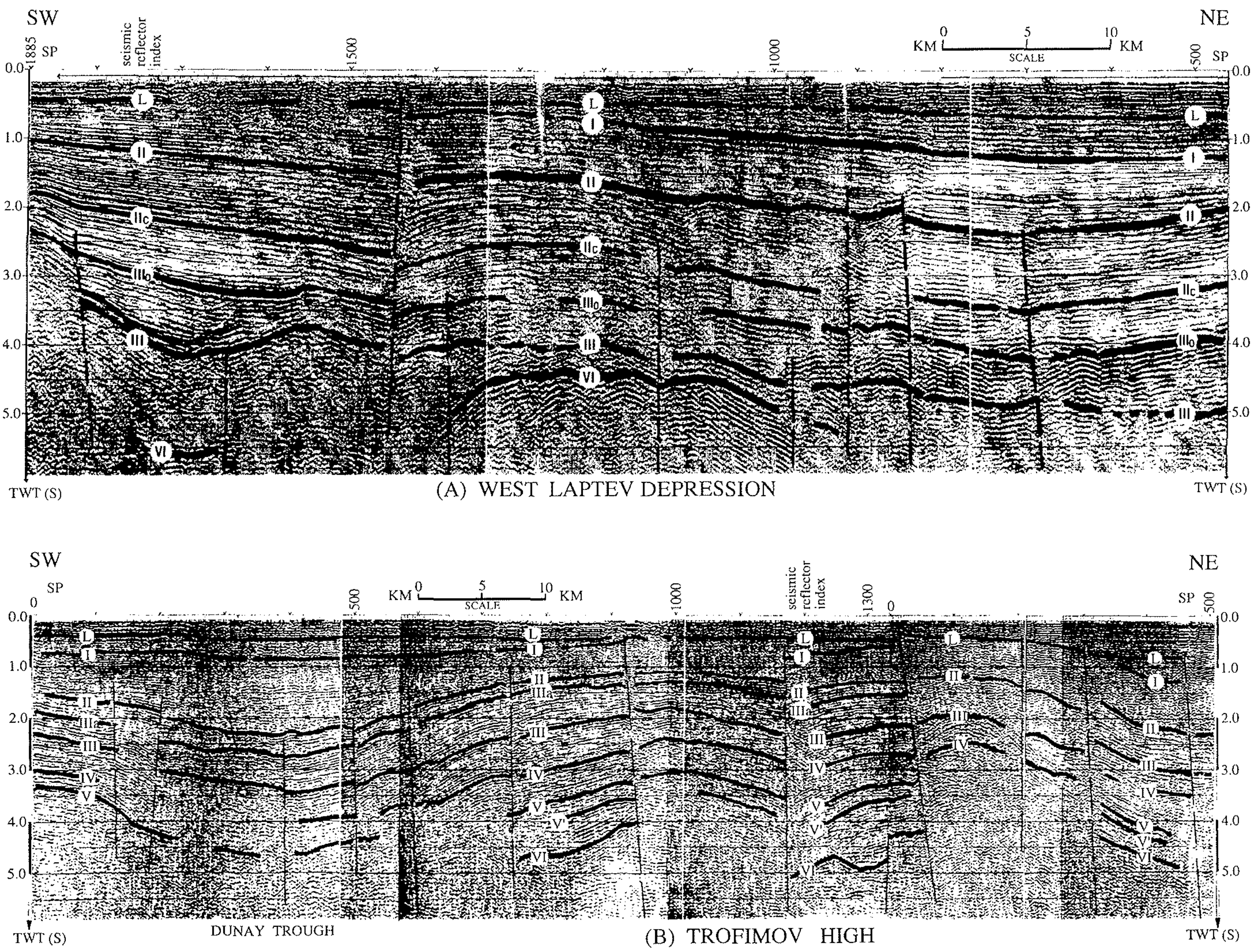

Fig. 2: Parts of seismic lines 90708(A) and 87722(B) across West Laptev Depression and Trofimov High in the West Laptev OGA. Two-way travel time sections (not migrated stacks). TWT scale in seconds. SP = shot points and their numbers. See also Figure 1 for locations (bold lines F2A, F2B) and Figures 4A, 4B for geoseismic depth sections.

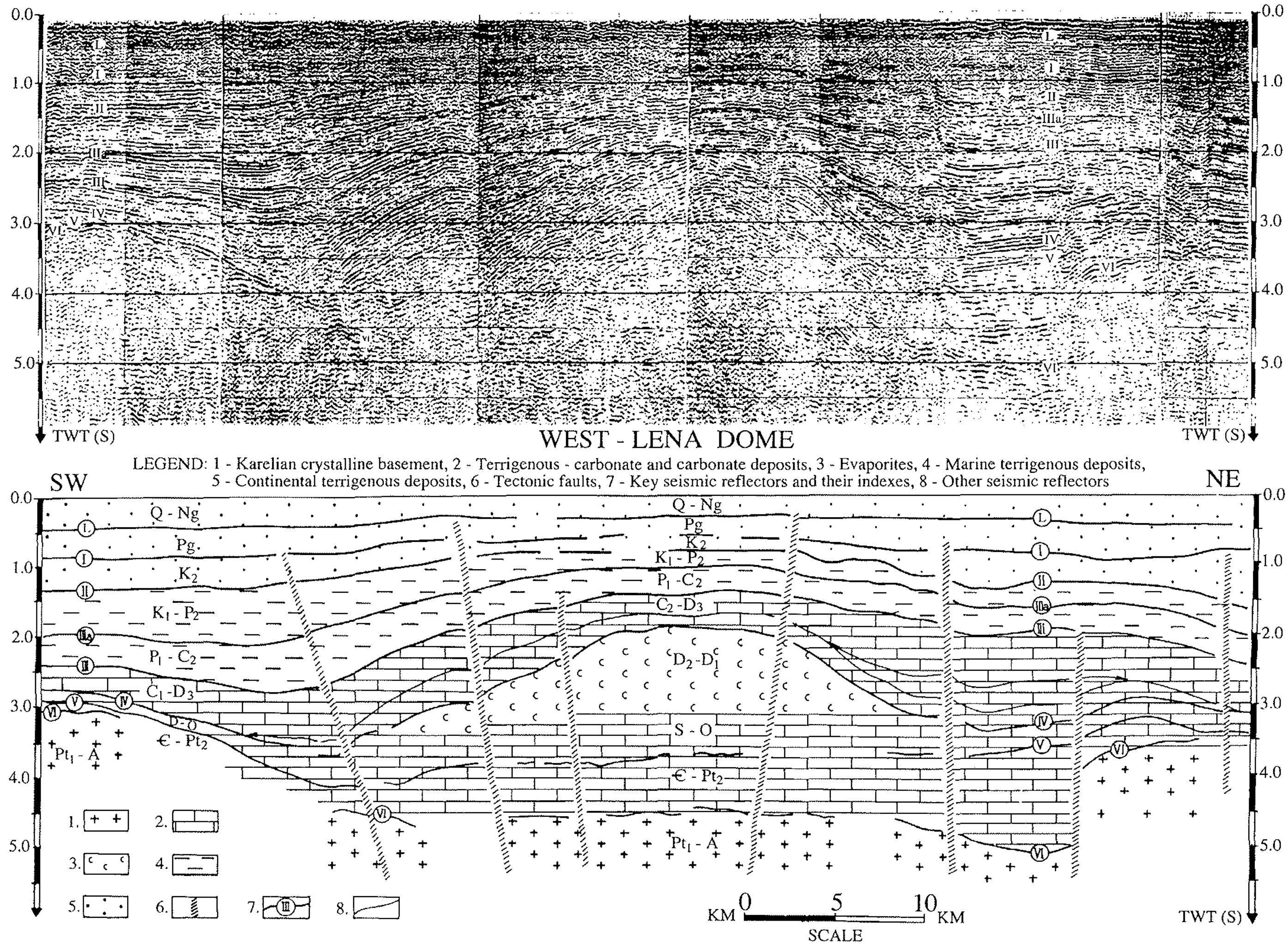

Fig. 3: Detail of seismic line 87722 across West Lena Dome in the West Laptev OGA. Original and interpreted two-way travel time section (not migrated stack). TWT scale in seconds. See also Figure 1 for location (bold line F3) and Fig. 4C for geoseismic depth section.

occurrences of the Triassic oil are known within Nordvick area. The overlying Jurassic and Lower Cretaceous deposits contain a sufficient number of traps in sandstones with clay seals, which can serve reservoirs for oil and gas. The presence of structural and combined traps in the Upper Paleozoic to Lower Cretaceous succession is expected on the flanks of depressions and in the crests of anticline structures (Figs. 2-4).

Upper Cretaceous-Cenozoic deposits, forming the upper complex in the structure of the sedimentary cover, within the most part of West Laptev OGA are 2-5 km thick and they may be considered as a separate hydrocarbon potential complex. Three main sedimentary sequences, divided by regional unconformities of Danian (Early Paleocene) and Late Oligocene to Early Miocene, are distinguished in the sedimentary section of the plate complex. They are Upper Cretaceous with seismic velocities of 2.5-3.5 km/s, Paleogene (2.3-2.6 km/s), and Neogene to Quaternary (1.9-2.2 km/s). The largest volume of Upper Cretaceous deposits is postulated within the northwestern part of Ust' Lena Graben, southern part of Omoloi Graben, Dunay Trough, synform structures of Central Laptev High and North Laptev Depression of the shelf frontier, where their thickness reaches maximum values of 2-3.5 km. Upper Cretaceous deposits become thinner toward the shore and pinch out the sedimentary section in the coastal band of the shelf of 30-60 km width. The Upper Cretaceous sequence contains mainly continental deposits with widespread lake-alluvial and deltaic facies. The Paleogene sediment succession lies as a continuous cover within South Laptev and West Laptev Depression, where its thickness is almost constant and does not exceed 400-800 m. It is absent from the sedimentary section within Lena-Taymyr Zone of frontier uplifts. Synrift Paleogene sediments fill Ust' Lena and Omoloi Grabens, where their thickness varies from 0.5 km to 2 km. They are absent on uplifts. The maximum thickness of Paleogene sediments is 2.5-3 km within the North-Laptev Depression of the shelf frontier. The Paleogene sequence contains continental and shallow marine deposits with prevalent lake-alluvial and deltaic facies. The Neogene to Quaternary sequence covers the whole shelf and overlies different deposits with a clearly expressed erosional unconformity. Maximum sediment thickness is 1.3-1.8 km, observed within the North Laptev Depression beside the shelf edge. The Neogene to Quaternary succession generally consists of shallow marine sands and clays.

The wide extent of deltaic facies in Upper Cretaceous to Cenozoic deposits, revealed on the basis of seismic stratigraphic analysis and their concentration within specific structures (rift depressions, Ust' Lena and Omoloi grabens) vastly increase the hydrocarbon possibilities of this succession. The important role of deltaic deposits, synrift and pre-rift sedimentary successions for petroleum potential is well-known. The existence of the different traps in the terrigenous, mainly sandy-clayey, Upper Cretaceous to Cenozoic deposits is very probable. Oil and gas is likely to be concentrated on the flanks of grabens and in crests of horst and anticline uplifts.

The tectonic setting of the Laptev shelf in the Cenozoic, caused by the opening of the Eurasian Basin of the Arctic Ocean and propagating of continental rifts on the shelf in Paleogene time (IVANOVA et al. 1989, SEKRETOV 1993), is favourable for stratigraphic and structural control of possible oil and gas accumulations within West Laptev OGA. The existence of numerous tectonic dislocations and faults, most of which disappear in Pre-Miocene deposits, defines a possibility for hydrocarbon migration from lower successions and concentration of oil and gas in the upper part of the section. Besides, the system of crossing longitudinal faults and transverse shifts, formed within the extensive area of continental rifting, creates the basis for fault-bounded hydrocarbon accumulations in the mosaic-like monoclinal rifted blocks.

Two long anticlines, Trofimov High and Minin Swell, and also the large isometric structure West-Lena Dome, deserve particular interest as highly prospective oil and gas prospects. They are outlined on the base of complex interpretation of seismic reflection data and gravity surveys (Figs. 2b, 3, 4b, 4c).

The Trofimov High is a complicated structural area, stretching from Lena river delta in the northwest direction and separating the South-Laptev Depression from the Ust'-Lena Graben (Fig. 1). Extension of this structure is about 500 km, but width decreases from 100 km beside Lena river delta to 10-20 km near the northwest edge of the Laptev shelf. Borders with South Laptev Depression and Ust' Lena Graben are characterized by fracture tectonics. The displacement on faults can reach up 400-500 m. The Trofimov High is clearly evident in the section on all horizons of the sedimentary cover, excluding the base of Neogene to Quaternary deposits (Fig. 2b, 4b). Its structural expression increases downward the section. The depth of the top of the Karelian Archean to Early Proterozoic basement increases in a northwest direction from 6-7 km beside the Lena river delta to 8-10 km within the rest area.

The Minin Swell is delineated within the Central Laptev High. In the northwestern part, the Minin Swell parallels the Ust' Lena Graben. In the southeast termination this structure is divided into several segments by shear faults. It extends longitudinally, closing as the horst between Ust' Lena and Omoloi grabens north of Buor-Khaya Bay. The total length of the Minin Swell is about 500 km with a width of 20-25 km. Everywhere the structure is bounded by normal faults with a maximum amplitude of 500 m and usually recognized in the section on all horizons, exclud-

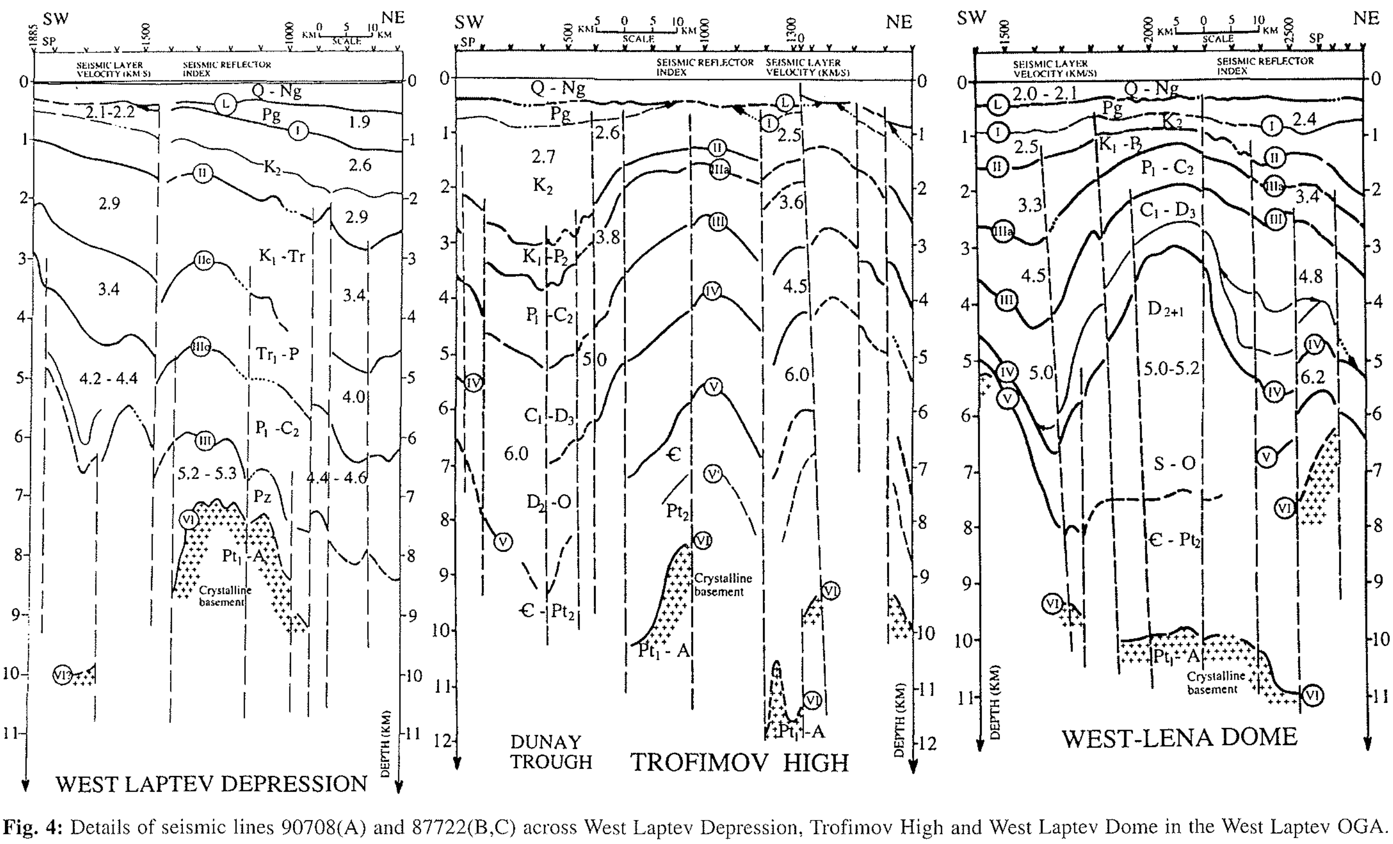

Fig. 4: Details of seismic lines 90708(A) and 87722(B,C) across West Laptev Depression, Trofimov High and West Laptev Dome in the West Laptev OGA. Geoseismic depth sections. SP = shot points and their numbers. Vertical depth scale is given in kilometers.

ing the base of Neogene - Quaternary deposits. Its structural expression increases down the section from 300-500 m on the base of the plate complex to 1-1.5 km on the top of the Karelian crystalline basement at a depth of 5-6 km.

West-Lena Dome lies in the southeastern part of South Laptev Depression and is characterized by approximately isometric configuration (Fig. 1). It has the appearance of a large compressive anticline formed in the lower complex of the sedimentary section due to compression within Ordovician to Middle Devonian carbonate succession (Figs. 3, 4c). The extent of this dome-shaped structure is about 90 km. Its cross-sectional size on the top of Ordovician to Middle Devonian succession varies from 30 km at the foot to 10-15 km in axial part of the dome. Probably, the core of West-Lena Dome consists of Early to Middle Devonian evaporites with the increased thickness. The following factors favour of the above suggestion. The core of this structure is associated on its perimeter with synforms on the top of the Ordovician to Middle Devonian succession, marked in covering deposits by troughs of compensation. These troughs become gradually more gentle up the section. This geometry is a characteristic of salt domes. The regional minimum in the gravity field over large anticline structure marks a decompaction of the section, probably, in the core of the dome. The top of the Upper Proterozoic to Cambrian succession and top of the Karelian crystalline basement are identified beneath salt-bearing deposits and look like almost horizontal surfaces. Tectonic development of the West-Lena Dome occurred, mainly, in Late Devonian to Early Carboniferous time as shown by the corresponding sediment succession on its periphery (Figs. 3, 4c). Upwards, the anticline structure is well expressed in the section at Late Paleozoic, Mesozoic and Cenozoic horizons, excluding the base of Neogene to Quaternary deposits. Its structural significance increases down the section from 200-300 m on the base of Paleogene succession to 2.5-3.5 km on the top of Ordovician to Middle Devonian deposits. The total thickness of all successions, overlying the core of the structure, changes from 5-6 km on peripheries to 3 km in the axial part of the dome. The depth of the top of the Karelian crystalline basement is about 10 km. Configuration of the outlined area of the supposed development of Devonian evaporites is defined by the position of the regional minimum in the gravity field, which in addition to the shelf occupies the northwestern coast of Lena river delta.

The above anticlines developed syndepositionally, at least from the Late Paleozoic to the Paleogene. They are associated with the extensive probable oil and gas-bearing area, but the thickness of the sedimentary cover in their crests is not less than 5-8 km. Additionally the West Lena Dome, as well as the south-eastern parts of the Trofimov High and the Minin Swell, are situated within a shallow shelf with water depths of 10-20 m and near the shore of Lena river delta. Herewith Trofimov High and West-Lena Dome extend into the coast zone of the delta (Fig. 1).

South Taimyr and North Taimyr areas

South Taimyr and North Taimyr OGA occupy a small area in the northwestern part of the Laptev shelf and correspond tectonically to the offshore extension of Taimyr fold belts (Fig. 1). They are low prospective OGA in the West Laptev shelf OGB. On most of their area the thickness of Jurassic-Cenozoic sedimentary cover does not exceed 1-1.5 km. In the offshore strip from the south to 40-50 km to the north the sedimentary cover is almost completely absent. Only eastern and northeastern peripheral parts of the South Taimyr OGA can be considered a prospective zone: the total thickness of Mesozoic to Cenozoic sandy-clayey deposits, overlying Early Cimmerian folded basement with an age of 175-215 m.y., is about 2.5-3 km (Fig. 6, offshore extension of South Taimyr fold belt).

LAPTEV – EAST SIBERIAN BASIN

Laptev - East Siberian shelf OGB occupies the east part of the Laptev Sea shelf and the whole shelf of the East Siberian Sea (Fig. 1). This OGB is related tectonically to the offshore extension of Late Cimmerian fold belts of the northeastern Russia, including isolated deformed blocks of fractured paleoplatforms. Three OGA are outlined in the Laptev – East Siberian OGB: East Laptev, Kotel'nyi and East-Siberian. The East Siberian OGA is geographically situated in the East Siberian Sea and is not considered in this article.

East Laptev area

East Laptev OGA corresponds tectonically to the offshore extension of Late Cimmerian fold belts of the northeastern Russia in the eastern part of the Laptev shelf (Fig. 1). Its potential for oil and gas is unequal within different structural zones. The complex of Upper Cretaceous to Cenozoic deposits overlies Late Cimmerian folded basement with an age of 125-150 m.y. and it is a single structural complex of the sedimentary cover. Generally these deposits are considered to be prospective within the Laptev Sea. On the most of the East Laptev OGA they are effectively not prospective, because their total thickness does not exceed 1-1.5 km. However, within Belkovsky-Svyatonossky and Ust-Yana grabens, as well as in the eastern side part of Omoloi Graben the Upper Cretaceous-Cenozoic sediments are 3-5 km thick and they can be considered as potential oil and gas-bearing deposits. Prevalent deltaic facies, clinoforms and rifting, revealed on the basis of the seismic stratigraphic analysis, are very important indicators for high petroleum potential.

Kotel'nyi area

Kotel'nyi OGA, most likely, tectonically corresponds to the offshore part of an isolated platform block, which is framed in Late Cimmerian fold belts of northeastern Russia and partially exposed as Kotel'nyi Island (Fig. 1). Probably, the stratigraphic volume, lithologic composition, thickness and structure of the sedimentary cover within Kotel'nyi OGA are comparable with those described in the West Laptev OGA. Northwest from Kotel'nyi Island, within the Anisinskiy rift depression, a sedi-

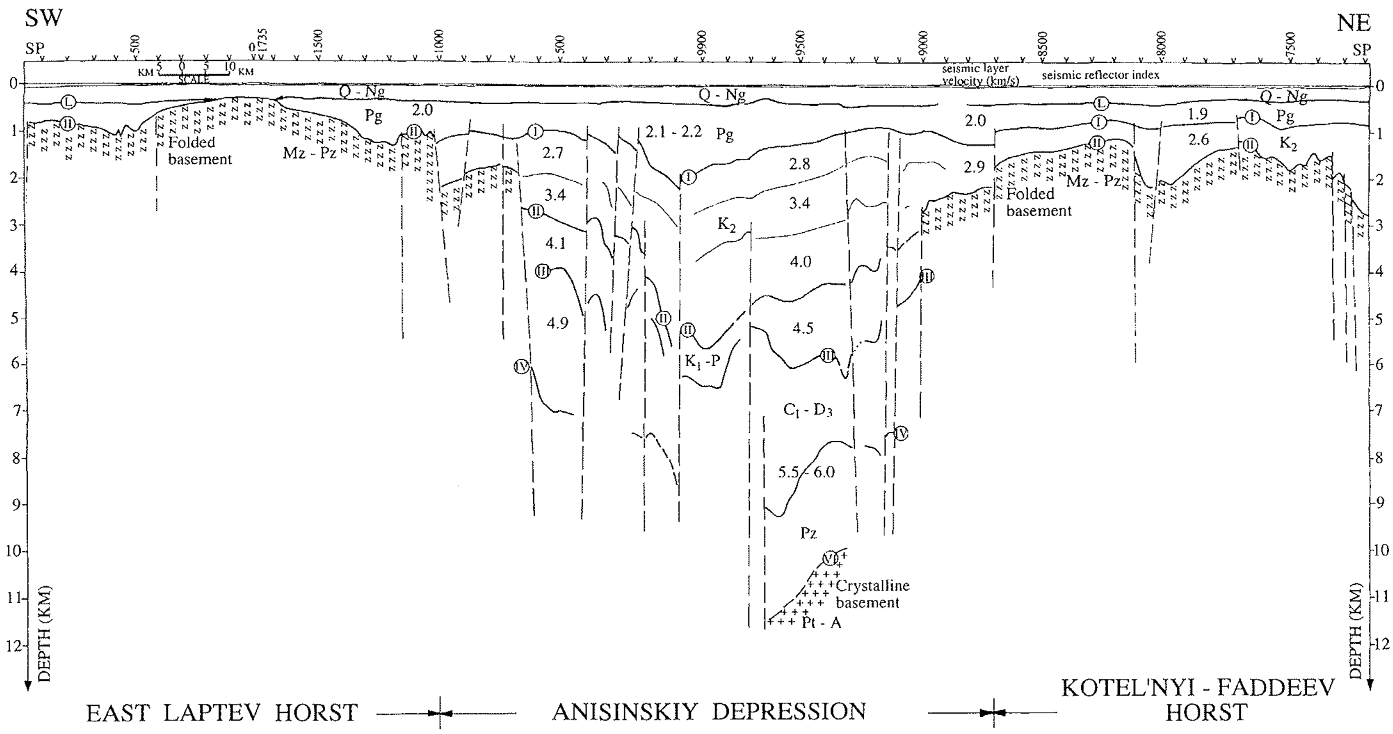

Fig. 5: Part of seismic line 90800 across Anisinskiy Depression in the Kotel'nyi OGA. Geoseismic depth section. SP = shot points and their numbers. Vertical depth scale is given in kilometers. See also Figure 1 for location (thick line F5).

mentary cover with a thickness up to 11 km is observed (Fig. 5). Two structural complexes are distinguished upward the sedimentary section: lower Paleozoic to Lower Cretaceous and upper Upper Cretaceous to Cenozoic. The thickness of the lower complex is not less than 4-6 km. Probably, it is prospective by analogy with Paleozoic and Mesozoic deposits of the Kotel'nyi Island. There are the bitumen manifestations in Lower to Middle Devonian and Triassic potential source rocks. The presence of traps associate with regional seals in stratigraphic successions of Upper Devonian to Upper Paleozoic and Mesozoic on Kotel'nyi Island points to the possibility of a finding of oilfields, where these positive factors coincide (Ivanov & Nepomiluev 1975).

The Upper Cretaceous to Cenozoic sediment complex, forming the upper cover within Kotel'nyi OGA, is characterized by a thickness of 2.5-5.5 km in the Anisinsky Depression (Fig. 5). It may be considered as an independent potentially oil and gas-bearing zone. The presence of faults, terminating within Lower Cenozoic, defines a possibility for migration of hydrocarbons from the lower complex and accumulation in the upper part of the sedimentary cover.

LAPTEV DEEP MARGIN BASIN

The Laptev deep margin OGB coincides tectonically with the continental slope of the Laptev Sea (Fig. 1). The total thickness of the sedimentary cover on the continental slope changes in a broad range from 1.5 to 8 km. Two structural sequences are distinguished up the sedimentary section: Upper Cretaceous to Lower Paleocene synrift and Cenozoic synoceanic (Fig. 6).

Hydrocarbon prospects may be related to Upper Cretaceous to Lower Paleocene synrift deposits, which are represented generally by sandy-clayey formations of subcontinental genesis and fill interblock grabens in the continental basement. High oil and gas potential of the synrift sediment sequence within passive deep margins is well-known.

The Cenozoic synoceanic sequence is formed by differently orientated submarine fans. It is characterized by variable thickness of 1.5-6 km. Sedimentary section of submarine fans is distinguished, as a rule, by laterally migrating sedimentation. It is characterized by the channel development with incision of underlying deposits, which may be the source rocks. By seismic stratigraphic analysis the prevalence of deep marine turbidite sediments in the synoceanic cover are identified with reasonable certainty. The thick Cenozoic sedimentary sequence with rhythmical alternation of sandstones, siltstones and clays, probably, enriched by the organic material, may be considered as potentially oil and gas-bearing.

Active Cenozoic subsidence probably promoted rapid maturation in thick cover of turbidite deposits and created favourable conditions for hydrocarbon migration and accumulation within the Laptev deep margin OGB. It is very likely that combined structural and stratigraphic traps exist in the thick terrigenous section (Fig. 6).

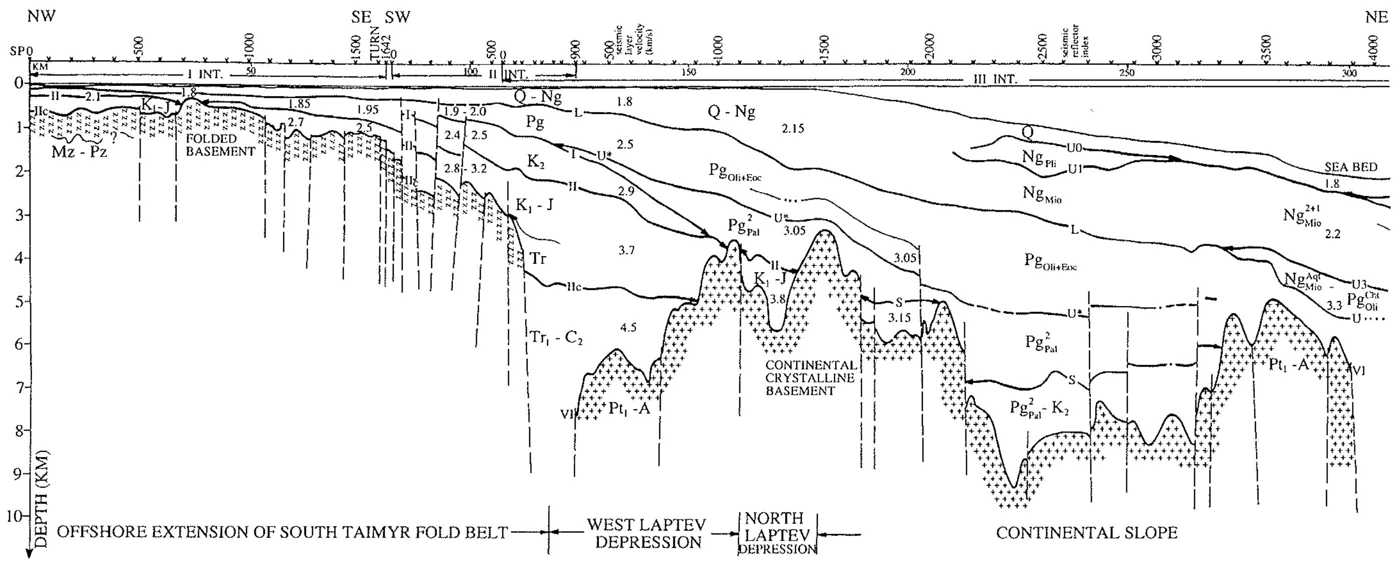

Fig. 6: Part of seismic line 90702 across South Taimyr OGA, West Laptev OGA and Laptev deep margin OGA. Geoseismic depth section. SP = shot points and their numbers. The horizontal km scale show the shooting direction and total length of the seismic line. I INT, II INT, III INT – portions of the whole seismic line with shot point sequences according to the data acquisition. Vertical depth scale is given in kilometers. Note: correlated on the Laptev shelf seismic reflectors "I" and "L" are named as "S" and "U" on the Laptev continental slope. See also Figure 1 for location (bold line F6).

CONCLUSION

Quantitative data on hydrocarbon resources within the Laptev Sea cannot be given due to the absence of wells and the regional stage of geological and geophysical studies. Also, complex natural-climatic, geographical and economic conditions must be considered in developing the region. As a positive factor it is possible to consider the shoal sea over Laptev shelf: water depth ranges generally within 10-50 m. On the basis of seismic data, the West Laptev shelf OGB is identified as the most prospective within the Laptev Sea. Besides, there is an attractive possibility for joint development of potential oil and gas fields within Enisei-Khatanga and Lena-Anabar OGA of the north of Siberia and potential offshore fields, situated within shallow shelf in the southwestern part of the Laptev Sea and seashore of the Lena river delta – West Lena Dome and Trofimov High (Fig. 1). The planning and undertaking of detailed 2D seismic survey, scientific and exploration drilling on the prospective areas of Enisei-Khatanga and Lena-Anabar OGA of Siberia, and also in the Lena river delta and shallow southwestern shelf of the Laptev Sea, are prospects for the not too distant future.

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