DEPARTMENT OF THE INTERIOR

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Annotated Bibliography of Tectonostratigraphic and Organic Geochemical Characteristics of Upper Precambrian Rocks Related to Their Petroleum Potential

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ANNOTATED BIBLIOGRAPHY OF TECTONOSTRATIGRAPHIC AND ORGANIC GEOCHEMICAL CHARACTERISTICS OF UPPER PRECAMBRIAN ROCKS RELATED TO THEIR PETROLEUM POTENTIAL

By Gregory F. Ulmishek

Scope of the Bibliography

This report is a bibliography of tectonics, stratigraphy, and organic geochemistry of upper Precambrian (principally Upper Proterozoic but also some Middle Proterozoic) rocks of the world. Only those publications that are related to the problem of petroleum potential of Precambrian rocks are included. The majority of listed publications discuss various aspects of petroleum geology or contain general geologic descriptions of Precambrian basins composed of unmetamorphosed sedimentary rocks. Some of these basins may possess a certain potential for petroleum exploration. Other basins have no potential; however, they are well exposed and may provide important data for comparative analysis of factors that controlled formation and destruction of oil and gas accumulations. Publications on these exposed basins are included because of general scarcity of drilling data in most buried sedimentary basins of Precambrian age.

The bibliography includes also a number of principal publications on deformed and inverted Late Proterozoic rifts. These rifts represent the final stage of destruction of previously petroliferous basins. Commonly, these deformed rifts (now foldbelts) are associated with undeformed sedimentary basins which were marginal parts of sags overlying the rifts before the deformation.

The bibliography is arranged on a regional basis. Each reference contains a short annotation that indicates the principal content of the publication.

General Problems

Borukayev, Ch.B., 1985, Struktura dokembriya i tectonika plit (Structure of the Precambrian and the plate tectonics): Institut Geologii i Geofiziki Sibirskogo Otdeleniya Akademii Nauk SSSR, Trudy, v. 604, Nauka, Novosibirsk, USSR, 190 p. (in Russian).
The monograph analyzes the structure of Precambrian rocks worldwide and provides for a geodynamic interpretation of various structures from the plate tectonic point of view.

Brasier, M.D., 1985, Evolutionary and geological events across the Precambrian-Cambrian boundary: Geology Today, v. 1, no. 5, p. 141-146.
Evolution of the first skeletal fauna in the English Midlands is discussed in comparison with volcanic, tectonic, and oceanographic events.

Fedonkin, M.A., 1979, Paleoichnology of the Precambrian and Early Cambrian, in Sokolov, B.S., ed., Paleontologiya dokembriya i rannego kembriya (Paleontology of the Precambrian and Early Cambrian): Nauka, Leningrad, p. 183-192 (in Russian).
The diversity and abundance of burrowing infauna and consumption of organic matter in the bottom layer of sediments abruptly increased at boundary between the Precambrian and the Early Cambrian.

Garetskiy, R.G., Konishchev, V.S., and Sinichka, A.M., 1985, Petroleum potential of aulacogens of the ancient cratons, in Khain, V.E., Chepikov, K.R., and Mkrtchyan, O.N., eds., Globalnye tektonicheskiye zakonomernosti neftegazonakopleniya (Global tectonic regularities of oil and gas accumulation): Nauka, Moscow, p. 65-74 (in Russian).
Discussion on the petroleum potential of old (Upper Proterozoic) and younger (Paleozoic) aulacogens.

Guseva, A.N., Leyfman, I.E., and Sokolov, B.A., 1981, Geochemical prerequisites of oil generation in Precambrian rocks, in Sidorenko, A.V., and Yeremenko, N.A., eds., Organicheskaya geokhimiya neftey, gazov i organicheskogo veshchestva dokembriya (Organic geochemistry of oils, gases, and Precambrian organic matter): Nauka, Moscow, p. 221-226 (in Russian).
The chemical composition of the Precambrian biomass and specific geochemical environments of sedimentation resulted in the characteristic composition of Precambrian oils.

Hoering, T.C., 1987, A search for molecular fossils in the kerogen of Precambrian sedimentary rocks: Precambrian Research, v. 34, p. 247-267.
Hydrous pyrolysis of kerogen in Precambrian rocks shows decreasing yield of biomarkers with increasing age. Samples older than 1.6 Ga yield no detectable hydrocarbons supposedly because of spontaneous dehydrogenation of kerogen.

Hurley, P.M., 1974, Pangeaic orogenic system: Geology, v. 2, no. 8, p. 373-376.
The Pangeaic system includes orogens originated during the time span between 650 and 250 Ma. The author suggests that plate tectonics is responsible for orogenies in North America, Europe, and Asia, whereas ensialic model is more appropriate for orogens in Gondwana.

Ivanovskaya, A.V., Kazanskiy, Yu.P., and Timofeyev, B.V., 1979, Distribution of phytoplankton and sedimentary environments in the Riphean, in Sokolov, B.S., ed., Paleontologiya dokembriya i rannego kembriya (Paleontology of the Precambrian and Early Cambrian): Nauka, Leningrad, p. 173-182 (in Russian).
Sedimentary areas with different salinity of marine water (defined by the boron content) are characterized by different associations of microfossils (on the Siberian craton). The differentiation of phytoplankton depending upon sedimentary environments existed already in the Riphean.

Kasting, J.F., 1987, Theoretical constraints on oxygen and carbon dioxide concentrations in the Precambrian atmosphere: Precambrian Research, v. 34, p. 205-229.
The atmosphere became oxidizing not later than 2.4 Ga ago, but the deep ocean remained reducing until 1.7 Ga ago. After this, the rise of oxygen concentration in the atmosphere began.

Keller, B.M., 1973, Tektonicheskaya istoriya i formatsii verkhnego dokembriya (Tectonic history and formations of the upper Precambrian): Itogi Nauki i Tekhniki, Obshchaya Geologiya, v. 5, VINITI, Moscow, 119 p.
Stratigraphy, depositional conditions, and tectonics of the Upper Proterozoic are discussed. Stages of Proterozoic tectonic deformations are considered mainly for various areas of the USSR but also for some other regions of Europe and Asia.

Korotayev, M.Yu., and Nikishin, A.M., 1986, The multistage nature of magmatism, metamorphism, and metallogeny in continental rift belts. Part 1. Theoretical basis: International Geology Review, v. 33, p. 1213-1224.
A model of rifting that includes six phases is proposed. Applications of the model are considered in the next article.

Korotayev, M.Yu., and Nikishin, A.M., 1986, The multistage nature of magmatism, metamorphism, and metallogeny in continental rift belts. Part 2. Features of evolution of rift belts of different ages: International Geology Review, v. 33, p. 1225-1233.
Evolution of various rifts is considered on the basis of a model proposed in the previous article. The Upper Proterozoic Damara rift belt (South Africa) is considered among other rifts.

Leventhal, J.S., Suess, S.E., and Cloud, P., 1975, Nonprevalence of biochemical fossils in kerogen from pre-Phanerozoic sediments: Proceedings of the National Academy of Sciences of the USA, v. 72, p. 4706-4710.
Thirty pyrolyzed pre-Phanerozoic kerogens did not produce biochemical fossils.

Lopatin, N.V., 1986, Evolution of hydrocarbon generation in connection with evolution of the biosphere and geologic processes, in Yeremenko, N.A., Neruchev, S.G., Sokolov, B.A., and Bazhenova, O.K., eds., Evolutsiya neftegazoobrazovaniya v istorii Zemli (Evolution of oil and gas generation in the Earth history): Nauka, Moscow, p. 17-21 (in Russian).
Stages of biologic evolution beginning from the middle Proterozoic are reflected in oil types characteristic of rocks of different ages.

Lopatin, N.V., 1983, Obrazovaniye goryuchikh iskopaemykh (Formation of fossil fuels), Nedra, Moscow, 191 p. (in Russian).
Along with other problems, the monograph discusses the evolution of biosphere and conditions of source rock deposition in the Precambrian.

McKirdy, D.M., and Hahn, J.H., 1982, The composition of kerogen and hydrocarbons in Precambrian rocks, in Holland, H.D., and Schidlowski, M., eds., Mineral deposits and the evolution of the biosphere: New York, Springer-Verlag, p. 123-154.
The article is an extensive review of organic geochemical studies of Precambrian rocks.

Milanovskiy, E.E., 1983, Riftogenez v istorii Zemli (riftogenez na drevnikh platformakh) [Rifting in the history of the Earth {Rifting on ancient cratons}]: Nedra, Moscow, 279 p. (in Russian).
The monograph reviews rifts (mainly of Late Proterozoic age) on all cratons. Formation of rifts is interpreted from the concept of pulsations and expansion of the Earth.

Murray, G.E., Kaczor, M.J., and McArthur, R.E., 1980, Indigenous Precambrian petroleum revisited: American Association of Petroleum Geologists Bulletin, v. 64, no. 10, p. 1681-1700.
A review of the biological evolution in the Precambrian and petroleum occurrences generated by rocks of this age.

Murray, G.E., 1965, Indigenous Precambrian petroleum: American Association of Petroleum Geologists Bulletin, v. 49, no. 1, p. 3-21.
Discussion of factors (biologic, lithologic) that are favorable for generation of petroleum from Precambrian rocks.

Neruchev, S.G., 1979, Correlation between outbreaks of phytoplankton productivity, stages of uranium accumulation, and sudden changes in evolution during the Precambrian and early Paleozoic, in Sokolov, B.S., eds., Paleontologiya dokembriya i rannego kembriya (Paleontology of the Precambrian and Early Cambrian): Nauka, Leningrad, p. 237-242 (in Russian).
A concept of periodic contamination of marine water by uranium is proposed. This contamination led to widespread deposition of uranium by its biochemical concentration, suppression of heterotrophic organisms and resulting intense deposition of organic matter, and increasing rate of radiogenic mutagenesis and biological evolution.

Philp, R.P., 1983, Characterization of Precambrian kerogens by analytical pyrolysis: Precambrian Research, v. 20, p. 3-16.
Analyzed kerogens (including that from Nonesuch Shale) fall into two distinct chemical groups. The Curie-point pyrolysis was employed for the analyses.

Plumb, K.A., 1986, Subdivision of Precambrian time: recommendations and suggestions by the Subcommission on Precambrian stratigraphy: Precambrian Research, v. 32, p. 65-92.
Stratigraphic correlation of major Precambrian sequences of the world is suggested.

Radhakrishna, B.P., 1984, Petroleum prospects in Precambrian: Current Science, v. 53, no. 13, p. 671-674.
General discussion on petroleum potential of Precambrian rocks. The potential for inorganic methane is emphasized.

Schopf, J.W., ed., 1983, Earth's earliest biosphere, its origin and evolution: Princeton University Press, Princeton, New Jersey, 543 p.
The monograph contains four chapters on the Precambrian organic geochemistry and the development of the Earth's atmosphere in addition to discussions on the Precambrian paleontology, and the early origin and development of life.

Sochava, A.V., 1979, Change in the composition of the Earth atmosphere and the appearance of multicellular animals, in Sokolov, B.S., ed., Paleontologiya dokembriya i rannego kembriya (Paleontology of the Precambrian and Early Cambrian): Nauka, Leningrad, p. 255-265 (in Russian).
The author proposes a model that describes a mechanism of regulation of the CO_2 and O_2 contents in the atmosphere and cyclic changes in amounts of these gases. It is supposed that a high content of O_2 existed already since the Middle Proterozoic and maybe earlier.

Sokolov, B.S., 1979, Paleontology of the Precambrian, in Sokolov, B.S., eds., Paleontologiya dokembriya i rannego kembriya (Paleontology of the Precambrian and Early Cambrian): Nauka, Leningrad, p. 5-16 (in Russian).
A review of achievements and remaining problems in stratigraphy and paleontology of the Upper Precambrian (Riphean and Vendian).

Sozinov, N.A., 1979, Trace elements in the carbon-rich slate formations of the Precambrian and Phanerozoic, in Sokolov, B.S., ed., Paleontologiya dokembriya i rannego kembriya (Paleontology of the Precambrian and Early Cambrian): Nauka, Leningrad, p. 250-255 (in Russian).
Black shales and slates are geochemical accumulators of many elements: Ni, Co, Cr, Mo, Cu, U, V, rare earth, and others. The enrichment in these elements is surprisingly uniform for organic carbon-rich rocks from the Precambrian to the Tertiary. This suggests mainly biochemical mechanism of accumulation of the elements and early biochemical evolution.

Vassoevich, N.B., Korchagina, Yu.I., and Sokolov, B.A., 1979, Some peculiarities of organic matter in ancient rocks, in Sokolov, B.S., ed., Paleontologiya dokembriya i rannego kembriya (Paleontology of the Precambrian and Early Cambrian): Nauka, Leningrad, p. 205-209 (in Russian).
Organic matter of Upper Proterozoic rocks is rich in hydrogen and relatively poor in aromatic compounds. Petroleum potential is higher in rocks that experienced maturation in more recent time.

Yakobson, K.E., 1987, Boundary between the Cryptozoic and Phanerozoic: Sovetskaya Geologiya, no. 4, p. 57-63 (in Russian).
Stratigraphy of the upper part of the Proterozoic in Europe and Asia is considered. The stratigraphic marker is glacial rocks of the last Proterozoic glaciation. Overlying transgressive marine deposits are proposed to constitute the lower system of the Phanerozoic (below the Cambrian).

NORTH AMERICA

Catacosinos, P.A., 1981, Origin and stratigraphic assessment of pre-Mt. Simon clastics (Precambrian) of Michigan basin: American Association of Petroleum Geologists Bulletin, v. 65, no. 9, p. 1617-1620.
Stratigraphic correlation of Precambrian rocks drilled in the subsurface with the surface stratigraphy of the Keweenawan sequence of the Midcontinent rift.

Chandler, V.W., McSwiggen, P.L., Morey, G.B., Hinze, W.J., and Anderson, R.R., 1989, Interpretation of seismic reflection, gravity, and magnetic data across Middle Proterozoic Mid-Continent rift system, northern Wisconsin, eastern Minnesota, and central Iowa; American Association of Petroleum Geologists Bulletin, v. 73, no. 3, p. 261-275.
Geologic models of the rift system along transverse profiles are developed based on the interpretation of geophysical data.

Daniels, P.A., 1982, Upper Precambrian sedimentary rocks, Oronto Group, Michigan-Wisconsin, in Geology and tectonics of the Lake Superior basin: Geological Society of America Memoir 156, p. 107-133.
The stratigraphy, lithology, and regional correlation of the Oronto Group in part of the Midcontinent rift are described.

Desborough, G.A., Poole, F.G., Daws, T.A., and Scarborough, R., 1984, Hydrocarbon source rock evaluation of the Middle Proterozoic Apache Group, Gila County, Arizona, in Woodward, J., Meissner, F.F., and Clayton, J.L., eds., Hydrocarbon source rocks of the Greater Rocky Mountain region: Rocky Mountain Association of Geologists, Denver, Colorado, p. 51-55.
Black siltstone of the Dripping Spring Quartzite contains 3.4% of organic carbon. Geochemical characteristics indicate a low potential for hydrocarbon generation.

Dickas, A.B., 1986, Comparative Precambrian stratigraphy and structure along the Mid-Continent rift: American Association of Petroleum Geologists Bulletin, v. 70, no. 3, p. 225-238.
A stratigraphic and lithologic description of rift-filling sequences and their correlation from Kansas through Michigan are discussed.

Dickas, A.B., 1984, Midcontinent rift system: Precambrian hydrocarbon target: Oil and Gas Journal, v. 82, no. 42, p. 151-159.
Petroleum prospects in Precambrian rocks of the Midcontinent rift are discussed.

Eglinton, G.P., Scott, P.M., Belsky, T., Burlingame, A.L., and Calvin, M., 1964, Hydrocarbons of biological origin from a one-billion-year-old sediment: Science, v. 145, p. 263-264.
Oil shows from the Nonesuch Shale are described.

Elston, D.P., 1989, Middle and Late Proterozoic Grand Canyon Supergroup, Arizona, in Elston, D.P., Billingsley, G.H., and Young, R.A., eds., Geology of Grand Canyon, northern Arizona (with Colorado River guides): American Geophysical Union, Washington, D.C., p. 94-105.
The exposed geologic sections of the Grand Canyon Supergroup are described.

Ford, T.D., and Breed, W.J., 1973, Late Precambrian Chuar Group, Grand Canyon, Arizona: Geological Society of American Bulletin, v. 84, p. 1243-1260.
The exposed Chuar Group is subdivided into three formations and seven members. The stratigraphic units are described.

Fowler, J.H., and Kuenzi, W.D., 1978, Keweenawan turbidites in Michigan (deep borehole red beds): a foundered basin sequence developed during evolution of a protoceanic rift system: Journal of Geophysical Research, v. 83, p. 5833-5843.
Fining-upward cyclicity in Precambrian arkosic clastics indicate deep-water marine conditions of sedimentation of these clastics below the Mount Simon.

Hatch, J.R., and Morey, G.B., 1985, Hydrocarbon source rock evaluation of Middle Proterozoic Solor Church Formation, North American Mid-Continent rift system, Rice county, Minnesota: American Association of Petroleum Geologists Bulletin, v. 69, no. 8, p. 1208-1216.
Studied organic matter is overmature and its concentrations are low (less than 0.8%) indicating little petroleum potential.

Hatch, J.R., and Morey, G.B., 1984, Hydrocarbon source rock evaluation--Solor Church Formation (Middle Proterozoic, Keweenawan Supergroup), southeastern Minnesota: U.S. Geological Survey Open-File Report 84-554, 17 p.
Only gas-source rocks of poor quality are present in the Solor Church Formation.

Hoering, T.C., 1967, The organic geochemistry of Precambrian rocks, in Abelson, P.H., ed., Researches in geochemistry: John Wiley and Sons, New York, London, Sydney, p. 87-111.
Analytical results on the organic geochemistry of the Nonesuch and Fig Tree Shales are discussed.

Horodyski, R.J., 1983, Sedimentary geology and stromatolites of the Middle Proterozoic Belt Supergroup, Glacier National Park, Montana: Precambrian Research, v. 20, p. 391-425.
The Belt Supergroup sequence 2,900-m thick is described.

Howe, J.R., and Thompson, T.L., 1984, Tectonics, sedimentation, and hydrocarbon potential of the Reelfoot rift: Oil and Gas Journal, v. 82, no. 46, p. 179, 181-182, 185-190.
The article describes stages of tectonic development of the Reelfoot rift that contains a sedimentary section greater than 30,000-ft thick. Potential source rocks, reservoir rocks, and drillable prospects are discussed.

Imbus, S.W., Engel, M.H., Elmore, R.D., and Zumberge, J.E., 1988, The origin, distribution and hydrocarbon generation potential of organic-rich facies in the Nonesuch Formation, Central North American Rift System: A regional study: Organic Geochemistry, v. 13, nos. 1-3, p. 207-219.
TOC values in samples of the Nonesuch Formation vary from 0 to 2.5%. Two petrographic groups of kerogen are identified which reflect differences in source for the organic matter and in maturity.

Kalliokoski, J., 1982, Jacobsville Sandstone, in Geology and tectonics of the Lake Superior basin: Geological Society of America Memoir 156, p. 147-155.
Stratigraphy and lithology of the Proterozoic Jacobsville Sandstone are described. Correlation of the sandstone with the Fond du Lac Formation of Minnesota is proposed.

Khabarov, E.M., 1987, Geologic framework and depositional conditions of some craton-margin reefal formations of the Precambrian: Geologiya i Geofizika, no. 8, p. 27-35 (in Russian).
The article describes reefal and associated sedimentary sequences of three Precambrian formations: the Chenchin Formation of the Siberian craton and the Rocknest and the Denault Formations of the North American craton. Types of Precambrian reefal rocks are discussed.

Lee, C.K., and Kerr, S.D., 1984, Midcontinent rift--a frontier oil province: Oil and Gas Journal, v. 82, no. 33, p. 144-150.
Sedimentary basins connected with the Midcontinent rift are described and their petroleum potential is discussed.

Morey, G.B., 1974, Cyclic sedimentation of the Solor Church Formation (upper Precambrian, Keweenawan), southeastern Minnesota: Journal of Sedimentary Petrology, v. 44, p. 872-884.
An alluvial plain to lacustrine environment of deposition of the formation is suggested based on its cyclicity.

Morton, J.P., and Long, L.E., 1982, Pb-Sr ages of Precambrian sedimentary rocks in the U.S.A.: Precambrian Research, v. 18, p. 133-138.
Ages of the Nonesuch Shale, Uinta Mountain Group, Belt Supergroup, and of rocks in the Grand Canyon are evaluated.

Ojakangas, R.W., and Morey, G.B., 1982, Keweenawan sedimentary rocks of the Lake Superior region: a summary, in Geology and tectonics of the Lake Superior basin: Geological Society of America Memoir 156, p. 157-164.
A general description of upper Precambrian rocks is provided.

Pratt, W.P., and Sims, P.K., 1987, The U.S. Midcontinent: a new frontier for mineral exploration: Episodes, v. 10, no. 4, p. 303-307.
Eight major terranes are distinguished in Precambrian rocks. Their mineral potential is indicated. The Midcontinent rift is a potential exploration target for oil/gas and metals (Cu, Ni, platinum-group metals).

Reed, J.C., 1987, Precambrian geology of the USA: Episodes, v. 10, no. 4, p. 243-247.
The paper reviews the geologic development of the Archean craton, orogenic belts, and the Midcontinent rift system of North America.

Summons, R.E., Brassell, S.C., Eglinton, G., Evans, E., Horodyski, R.J., Robinson, N., and Ward, D.M., 1988, Distinctive hydrocarbon biomarkers from fossiliferous sediment of the Late Proterozoic Walcott Member, Chuar Group, Grand Canyon, Arizona: Geochimica et Cosmochimica Acta, v. 52, p. 2625-2637.
Identified biomarkers suggest eukaryotic source of organic matter and hypersaline environments of deposition.

Van Schmus, W.R., and Hinze, W.J., 1985, The Midcontinent rift system: Annual Review of Earth and Planetary Science, v. 13, p. 345-383.
The geophysical expression, petrology of rocks, stratigraphy, tectonics, and evolution of the Midcontinent rift are discussed.

Vidal, G., and Ford, T.D., 1985, Microbiotas from the Late Proterozoic Chuar Group (northern Arizona) and Uinta Mountain Group (Utah) and their chronostratigraphic implications: Precambrian Research, v. 28, p. 349-389.
Stratigraphy of the Chuar and Uinta Mountain Groups is described and the correlation with the Russian craton, Svalbard, and Greenland is proposed.

White, W.S., 1966, Tectonics of the Keweenawan basin, western Lake Superior region: U.S. Geological Survey Professional Paper 524-E, p. E-1 to E-23.

Young, G.M., 1984, Proterozoic plate tectonics in Canada with emphasis on evidence for a Late Proterozoic rifting event: Precambrian Research, v. 25, p. 233-256.
Rifting in the North American craton during Late Proterozoic time is discussed.

SOUTH AMERICA

Almeida, F.F.M., Hawui, Y., and Brito Neves, B.B., 1976, The upper Precambrian of South America: Boletim IG, Instituto de Geociencias, Universidade de Sao Paulo, v. 7, p. 45-80.
The paper reviews the tectonic evolution of South America during late Precambrian time.

Bernasconi, A., 1987, The major Precambrian terranes of eastern South America: a study of their regional and chronological evolution: Precambrian Research, v. 37, p. 107-124.
The Precambrian tectono-thermal events are distinguished. Correlation with analogous events recognized in Africa is provided. Major mobil zones were formed on the sialic crust.

Bonhomme, M.G., Cordani, U.G., Kawashita, K., Macedo, M.F., and Filno, A.T., 1982, Radiochronological age and correlation of Proterozoic sediments in Brazil: Precambrian Research, v. 18, p. 103-118.
Proterozoic sedimentary sequences, including the sequence of the Sao Francisco basin, are described and correlated.

Gordani, U.G., Amaral, G., and Kawashita, K., 1973, The Precambrian evolution of South America: Geologische Rundschau, v. 62, p. 309-317.
A general synthesis of the Precambrian evolution of South America.

Jazek, P., Willner, A.P., Acenolaza, F.G., and Miller, H., 1985, The Puncoviscana trough--a large basin of Late Precambrian to Early Cambrian age on the Pacific edge of the Brazilian shield: Geologische Rundschau, v. 74, no. 3, p. 573-584.
The paleogeography, lithology, and paleontology of the basin that was later deformed and partly metamorphosed by Paleozoic tectonism are discussed.

Ramos, V.A., 1988, Late Proterozoic-early Paleozoic of South America--a collisional history: Episodes, v. 11, no. 3, p. 168-174.
The Precambrian tectonic history of South America is interpreted in terms of a series of collisional events.

CHINA AND INDIA

Baspalov, V.F., 1965, Riphean and Cambrian of central Asia: International Geological Review, v. 7, no. 7, p. 1237-1250.
A number of sections of Riphean and Cambrian age in China and adjacent regions are described and correlated.

Chen Jinbiao, Zhang Huimin, Xing Yusheng, and Ma Guogan, 1981, On the upper Precambrian (Sinian Suberathem) in China: Precambrian Research, v. 15, p. 207-228.
A review of the distribution and stratigraphy of the Sinian Suberathem (1950-615 Ma) in China.

Hao Shisheng and Zhang Changgen, 1988, Primary hydrocarbon characteristics of the Middle and Upper Proterozoic rocks of North China, in Wagner, H.C., Wagner, L.C., Wang, F.F.H., and Wong, F.L., eds., Petroleum resources of China and related subjects: Circum-Pacific Council for Energy and Mineral Resources, Earth Science Series, v. 10, p. 135-154.
Geology and geochemistry of Proterozoic rocks and oil and gas shows are described. The generative hydrocarbon potential is assessed for three tectono-stratigraphic provinces.

Lee, K.Y., 1984, Geology of the Dian-Qian-Gui foldbelt, Southwest China: U.S. Geological Survey Open-File Report 84-357.
Stratigraphy, lithology, and depositional conditions of Sinian rocks of the Yunnan and Guizhou provinces are described.

Liu Hung-Yun, Sha Ching-An, and Hu Shin-Ling, 1973, The Sinian System in southern China: Scientia Sinica, v. 16, no. 2, p. 266-278.
Stratigraphy, correlation, and depositional conditions of Sinian rock in southern China are described.

Mathur, S.M., 1982, Precambrian sedimentary sequences of India: their geochronology and correlation: Precambrian Research, v. 18, p. 139-144.
Unmetamorphosed sedimentary rocks of late Precambrian age are described and correlated.

Meijerink, A.M.J., Rao, D.P., and Rupke, J., 1984, Stratigraphic and structural development of the Precambrian Cuddapah basin, S.E. India: Precambrian Research, v. 26, p. 57-104.
An extensive description of the geology of the Cuddapah basin is provided.

Pankina, R.G., Faingersh, L.A., and Afonskiy, M.N., 1989, Peculiarities of petroleum productivity of sedimentary basins in China: Geologiya Nefti i Gaza, no. 4, p. 51-54 (in Russian).
The article includes a description of oil shows from Sinian rocks of the Yanshan belt and compositional characteristics of gases generated from Sinian rocks of the Sichuan basin.

Sun Dazhong and Lu Songnian, 1985, A subdivision of the Precambrian in China: Precambrian Research, v. 28, p. 137-162.
The Precambrian stratigraphic successions in four regions of China are described.

Tang Zeyao and Zhen Shenyu, 1988, Origin of Sinian (Upper Proterozoic) gas pools in the Sichuan basin, China, _in_ Wagner, H.C., Wagner, L.C., Wang, F.F.H., and Wong, F.L., eds., Petroleum resources of China and related subjects: Circum-Pacific Council for Energy and Mineral Resources, Earth Science Series, v. 10, p. 359-370.
Geologic and geochemical data indicate the indigenous origin of gas pools found in Sinian rocks of the Sichuan basin.

Tang Zeyao and Zhan Shenyu, 1984, Forming conditions of Sinian gas pool in Sichuan basin: Beijing Petroleum Geology Symposium, China, September 1984, Reprint, 21 p.
Geology, geochemistry, and structure of Sinian rocks of the Sichuan basin, and specifically of the Weiyuan gas field are described.

Zou Yuqi, 1987, Significance of discovery of oil- and gas-bearing combination of upper Sinian and Lower Cambrian in lower Yangzi region: Natural Gas Industry, v. 7, no. 3, p. 17-22.
Sinian source rocks generated gas that is capped by the Lower Cambrian regional seal.

AUSTRALIA

Brakel, A.T., and Mahling, P.C., 1976, Stratigraphy, sedimentation, and structure in the western and center part of the Bangemall basin, western Australia: Geological Survey of Western Australia Annual Report for the year 1975, p. 70-79.

The geology of deeper central and western parts of the Bangemall basin is described. The correlation with marginal eastern facies is provided.

Crick, I.H., Boreham, C.J., Cook, A.C., and Powell, T.G., 1988, Petroleum geology and geochemistry of Middle Proterozoic McArthur basin, northern Australia II: assessment of source rock potential: American Association of Petroleum Geologists Bulletin, v. 72, no. 12, p. 1495-1514.

Geochemical study shows five potential source rock intervals in the basin. The Velkerri Formation (Roper Group) is not overmature and contains the best source rocks of the basin.

Donnelly, T.H., and Crick, I.H., 1988, Depositional environment of the Middle Proterozoic Velkerri Formation in northern Australia: geochemical evidence: Precambrian Research, v. 42, p. 165-172.

The Velkerri Formation of the McArthur basin is organic matter-rich (TOC reaches 7.1%). It was deposited in a lake or in a barred bay under anoxic conditions.

Goode, A.D.T., and Hall, W.D.M., 1981, The Middle Proterozoic eastern Bangemall basin, western Australia: Precambrian Research, v. 16, p. 11-29.

A general geologic description of the Bangemall basin is provided.

Kralick, M., 1982, Pb-Sb age determinations on Precambrian carbonate rocks of the Carpentarian McArthur basin, Northern Territories, Australia: Precambrian Research, v. 18, p. 157-170.

The McArthur basin sections are described and their age is evaluated.

Lambeck, K., 1983, Structure and evolution of the intracratonic basins of central Australia: Geophysical Journal of the Royal Astronomical Society, v. 74, p. 843-886.

A new crustal model of formation of the east-west chain of basins (Officer, Amadeus, Ngalia) is proposed. The model is based on the supposition of basin formation under the compressive stress affecting the viscoelastic lithospheric plate.

Lemon, N.M., 1985, Physical modeling of sedimentation adjacent to diapirs and comparison with late Precambrian Oratunga Breccia body in central Flinders Ranges, South Australia: American Association of Petroleum Geologists Bulletin, v. 69, no. 9, p. 1327-1338.

Comparison of laboratory models and field studies of the breccia suggest that a thick evaporite sequence was once present at the base of the Adelaide geosyncline sequence.

Lindsay, J.F., 1987, Sequence stratigraphy and depositional controls in Late Proterozoic-Early Cambrian sediments of Amadeus basin, central Australia: American Association of Petroleum Geologists Bulletin, v. 71, no. 11, p. 1387-1403.
A depositional model of the Arumbera Sandstone is developed based on facies analysis and seismic data.

McKirdy, d.M., and Kantsler, A.J., 1980, Oil geochemistry and potential source rocks of the Officer basin, South Australia: Australian Petroleum Exploration Association Journal, v. 20, p. 68-86.
Organic geochemistry of Precambrian rocks composing the Officer basin is described. The Observatory Hill Beds are rich in type I kerogen.

Murray, W.J., 1975, McArthur River H.Y.C. lead-zinc and related deposits, N.T., in Knight, C.L., ed., Economic geology of Australia and Papua New Guinea, v. 1. Metals, Monograph Series no. 5: Australian Institute of Mining and Metallurgy, Parkville, Victoria, Australia, p. 329-339.
Regional and local geology of the ore body is described. The mineralization is connected with organic-rich black-shale facies on the edge of a rift filled with rocks of the Middle Proterozoic McArthur Group.

Peat, C.J., Muir, M.D., Plumb, K.A., McKirdy, D.M., and Norvick, M.S., 1978, Proterozoic microfossils from the Roper Group, Northern Territory, Australia: Bureau of Mineral Resources Journal of Australian Geology and Geophysics, v. 3, p. 1-17.
Black and green shale and sandstone in the upper Roper Group of the McArthur basin contain abundant microfossils. The rocks are 1,300-1,400 Ma old. Geochemical analysis indicate oil-prone organic matter and a low level of thermal maturity.

Plumb, K.A., 1985, Subdivision and correlation of late Precambrian sequences in Australia: Precambrian Research, v. 29, p. 303-329.
Correlation of Precambrian rocks of Australia with special emphasis on different correlation techniques.

Plumb, K.A., 1979, The tectonic evolution of Australia: Earth Science Reviews, v. 14, p. 205-249.
The tectonic evolution of the Australian continental block is presented. Eight tectonic maps show the development of Australia during the Precambrian and seven maps show the Phanerozoic geologic development. The block-type structure of Australia and New Guinea is emphasized.

Plumb, K.A., 1979, Structure and tectonic style of the Precambrian shields and platforms of northern Australia: Tectonophysics, v. 58, p. 291-325.
A review of the tectonics of northern Australia including the Amadeus, Ngalia, McArthur, and Victoria River Proterozoic basins.

Plumb, K.A., Derrick, G.M., and Wilson, I.H., 1979, Precambrian geology of the McArthur River-Mount Isa region, northern Australia, in Henderson, R.A., and Stephenson, P.J., eds., The geology and geophysics of northeastern Australia: Geological Society of Australia, Queensland Division, Brisbane, Australia, p. 71-88.
Summary of the tectonic evolution and paleogeography of the Mount Isa orogen (craton margin), the McArthur intracontinental basin, the Batten and Leichhard troughs (rifts), and the intervening platforms.

Plumb, K.A., and Derrick, G.M., 1975, Geology of the Proterozoic rocks of the Kimberley to Mount Isa region, in Knight, C.L., ed., Economic geology of Australia and Papua New Guinea, v. 1, Metals, Monograph Series no. 5: Australian Institute of Mining and Metallurgy, Parkville, Victoria, Australia, p. 217-252.
The regional geology and tectonics of the region are described. The region includes the Victoria River, McArthur, and Arafura basin, the Hills Creek mobil zone, the Batten trough (rift), and the Mount Isa orogen (inverted and folded rift).

Plumb, K.A., and Brown, M.C., 1973, Revised correlations and stratigraphic nomenclature in the Proterozoic carbonate complex of the McArthur Group, Northern Territory: Bureau of Mineral Resources, Geology and Geophysics Bulletin 139, Canberra, p. 103-115.
Revised stratigraphic correlation of rocks of the McArthur Group. The paleogeographic interpretation suggests a deep-water basin in the Bulbarra depression (McArthur River region).

Plummer, P.S., and Gostin, V.A., 1976, Faulting contemporaneous with Umberatana Group sedimentation (late Precambrian), southern Flinders Ranges, South Australia: Transactions of the Royal Society of South Australia, v. 100, part 1, p. 29-37.
Detailed stratigraphy and depositional environments of the Umberatana Group (Adelaidean) affected by syndepositional faulting.

Preiss, W.V., Coats, R.P., and Forbes, B.G., 1987, The Adelaide geosyncline, Late Proterozoic stratigraphy, sedimentation, paleontology, and tectonics: Geological Society of Australia Bulletin 53, 438 p.
The monograph provides a complete geologic description of the Adelaidean System in southern Australia.

Rowlands, N.J., Blight, P.G., Jarvis, D.M., and von der Borch, C.C., 1980, Sabkha and playa environments in Late Proterozoic grabens, Willouran Ranges, South Australia: Journal of the Geological Society of Australia, v. 27, nos. 1 and 2, p. 55-68.
Sedimentology of the Callanna Beds of the Late Proterozoic Adelaidean System. The sedimentation occurred in a series of half grabens at an early stage of development of the Adelaidean rift system.

Schopf, J.W., and Packer, B.M., 1987, Early Archean (3.3-billion to 3.5-billion-year-old) microfossils from Warrawoona Group, Australia: Science, v. 237, no. 7, p. 70-73.
Discovery of the earliest photosynthetic cyanobacteria fossils.

Schroder, R.J., and Gorter, J.D., 1984, A review of the recent exploration and hydrocarbon potential of the Amadeus basin, Northern Territory: Australian Petroleum Exploration Association Journal, v. 24, part 1, p. 19-50.
Eight exploration wells were drilled and two gas discoveries were made. Numerous oil and gas shows were recorded. Upper Proterozoic rocks have generated large volumes of oil and gas.

Summons, R.E., Powell, T.G., and Boreham, C.J., 1988, Petroleum geology and geochemistry of the Middle Proterozoic McArthur basin, northern Australia: III Composition of extractable hydrocarbons: Geochimica et Cosmochimica Acta, v. 52, p. 1747-1763.
The Middle Proterozoic rocks contain abundant hydrocarbons. Identified biomarkers suggest that the organic matter was derived both from prokaryotes and eukaryotes.

Sweet, I.P., 1977, The Precambrian geology of the Victoria River region, Northern Territory: Bureau of Mineral Resources, Geology and Geophysics of Australia Bulletin 168, Canberra, Australia, 73 p.
The region described includes the Carpentarian (Middle Proterozoic) Birrindudu basin and the Carpentarian to Adelaidean (Late Proterozoic) Victoria River basin.

Thompson, B.P., 1969, Precambrian basement cover, the Adelaide System, in Parkin, L.W., ed., Handbook of South Australian geology: Geological Survey of South Australia, Adelaide, Australia, p. 49-83.
A chapter describing stratigraphy of the Upper Proterozoic Adelaidean System.

Thompson, B.P., Dailly, B., Coats, R.P., and Forbes, G.B., 1976, Late Precambrian and Cambrian geology of the Adelaide "geosyncline" and Stuart shelf, South Australia: 25th International Geological Congress, Excursion Guide no. 33A, 53 p.
Stratigraphy and structure of Adelaidean rocks both in the deformed rift sequences of the "geosyncline" and on the adjacent stable platform are described.

Uppill, R.K., 1979, Stratigraphy and depositional environments of the Mundallio Subgroup (new name) in the late Precambrian Burra Group of the Mt. Fofty and Flinders Ranges: Transactions of the Royal Society of South Australia, v. 103, part 1, p. 25-43.
Stratigraphic subdivision of the dolomite-dominated part of the Burra Group (Adelaidean) is proposed. Facies composition and depositional environments are analyzed.

von der Borch, C.C., 1980, Evolution of Late Proterozoic to early Paleozoic Adelaide fold belt, Australia: comparisons with post-Permian rifts and passive margins: Tectonophysics, v. 70, p. 115-134.
The rift origin of the Adelaide foldbelt is substantiated by tectonic and sedimentary facies analysis.

Walker, R.N., Logan, R.G., and Binnekamp, J.G., 1977, Recent geological advances concerning the H.Y.C. and associated deposits, McArthur River, N.T.: Journal of the Geological Society of Australia, v. 24, no. 8, p. 365-380.
Description of local geology of the H.Y.C. and Ridge II lead-zinc deposits that are connected with organic matter-rich pyritic shale of the McArthur Group in the McArthur River district.

Walter, M.R., and Bauld, J., 1983, The association of sulphate evaporites, stromatolitic carbonates and glacial sediments: examples from the Proterozoic of Australia and the Cainozoic of Antarctica: Precambrian Research, v. 21, p. 129-142.
Late Proterozoic glacial sequences of the Amadeus and Ngalia basins contain stromatolitic carbonates that were supposedly deposited in cold lakes.

Wells, A.T., and Moss, F.J., 1983, The Ngalia basin, Northern Territory, stratigraphy and structure: Bureau of Mineral Resources of Australia, Bulletin 212.
General geology and evolution of the Ngalia basin are discussed.

Williams, I.R., Brakel, A.T., Chin, R.J., and Williams, S.F., 1975, The stratigraphy of the eastern Bangemall basin and the Paterson province: Geological Survey of Western Australia Annual Report for the Year 1975, p. 79-83.
A stratigraphic description and correlation of the Yeneena Group and the Bangemall Group (Middle Proterozoic) is provided. The latter fills the Bangemall basin whereas the former covers the Paterson province and underlies the Bangemall group in the basin.

Youngs, B.C., 1978, Stratigraphic drilling in the eastern Arrowie basin, 1975-1976: South Australia Geological Survey Quarterly Geological Notes, no. 66, p. 16-20.
The drilling of two wells showed the existence of a shallow basement ridge beneath Mesozoic sediments. The basin is east of the Late Proterozoic-Cambrian structures of the Flinders Ranges.

AFRICA AND ARABIA

Alsharhan, A.S., and Kendall, C.G., 1986, Precambrian to Jurassic rocks of Arabian Gulf and adjacent areas: their facies, depositional setting, and hydrocarbon habitat: American Association of Petroleum Geologists Bulletin, v. 70, no. 8, p. 977-1002.
A general stratigraphic description of Upper Proterozoic rocks in Iran and Oman is provided.

Bozhko, N.A., 1970, Mozambique belt and some features of the late Precambrian "activated" zones of Africa: Geotektonika, no. 6, p. 13-22 (in Russian).
The author discusses youngest rocks known in the Mozambique belt and suggests that this belt was an intracratonic orogen in Late Proterozoic time.

Button, A., 1977, Stratigraphic history of the Middle Proterozoic Umkondo basin in the Chipinga area, southeastern Rhodesia: Economic Geology Research Unit, University of the Witwatersrand, Johannesburg, Information Circular no. 108, 31 p.
The stratigraphy and depositional environments of the Umkondo System are described. The rocks are strongly deformed. Stratiform deposits of copper were formed in the lower sabkha unit of the system.

Clauer, N., Caby, R., Jeannette, D., and Trompette, R., 1982, Geochronology of sedimentary and metasedimentary Precambrian rocks of the West African craton: Precambrian Research, v. 18, p. 53-71.
Sedimentary rocks of the craton are described and correlated.

Crockett, R.N., and Jones, M.T., 1976, Some aspects of the geology of the Waterberg System in eastern Botswana: Transactions of the Geological Society of South Africa, v. 78, p. 1-10.
Exposures of the Waterberg System in three areas of eastern Botswana are correlated with type sections of South Africa. Rocks in Botswana were formed in subaqueous conditions (lakes or shallow sea). Supposedly, the sedimentation was controlled by a series of grabens (rifts). Outside the grabens, the system is thin.

Fritz, M., 1989, An old source surfaces in Oman: AAPG Explorer, vol. 10, no. 9, p. 1, 14-15.
Oils in fields of the South Oman and, probably, central Oman areas were generated by Upper Proterozoic source rocks of the Ara Formation.

Germs, G.J.B., 1974, The Nama Group in South West Africa and its relationship to the Pan-African geosyncline: The Journal of Geology, v. 82, p. 301-317.
Stratigraphy, paleontology, and depositional history of the Nama Group (Upper Proterozoic) are described.

Germs, G.J.B., 1972, The stratigraphy and paleontology of the lower Nama Group, SW Africa: Precambrian Research Unit, University of Cape Town, Bulletin 12.
Stratigraphy and depositional conditions of the lower Nama Group (upper Precambrian) are discussed.

Gorin, G.E., Racz, L.G., and Walter, M.R., 1982, Late Precambrian-Cambrian sediments of Huqf Group, Sultanate of Oman: American Association of Petroleum Geologists Bulletin, v. 66, no. 12, p. 2609-2627.
The article describes the stratigraphy, lithology, and paleogeography of clastic, carbonate, and evaporite rocks of the Huqf Group. Regional paleogeographic reconstructions are proposed.

Grantham, P.J., Lijmbach, G.W.M., Posthuma, J., Hughes Clarke, M.W., and Willink, R.J., 1987, Origin of crude oils in Oman: Journal of Petroleum Geology, v. 11, no. 1, p. 61-80.
Five types of oils in Oman, one of which was certainly, and another was probably, originated from source rocks of the Precambrian Huqf Group, are described. Data on oil/source rock correlation are provided.

Guj, P., 1970, The Damara mobil belt in the SW Koakoveld, SW Africa, Precambrian Research Unit, University of Cape Town, Bulletin 8, 132 p.
The stratigraphy and structure of the central part of the Damara paleotrough are described.

Hedberg, R.M., 1979, Stratigraphy of the Ovamboland basin, SW Africa: Precambrian Research Unit, University of Cape Town, Bulletin 24.
Stratigraphy and depositional conditions of the upper (shelfal) stratigraphic unit of the Damara System are described.

Husseini, M.I., 1989, Tectonic and depositional model of late Precambrian-Cambrian Arabian and adjoining plates: American Association of Petroleum Geologists Bulletin, v. 73, no. 9, p. 1117-1131.
The stratigraphy and correlation of Infracambrian and Cambrian sequences of the Turkish, Arabian, and Lut plates are interpreted in terms of tectonic development of the northern Tethyan margin.

Jansen, H., 1976, The Soutpansberg trough (northern Transvaal)--an aulacogen: Transactions of the Geological Society of South Africa, v. 78, p. 129-136.
The aulacogen (rift) was developed on the older Limpopo mobile belt at some time between 2000 and 1300 Ma. The structure of the aulacogen and the correlation between the Soutpansberg, the Waterberg, and the Umkondo Systems are discussed.

Jansen, H., 1976, Precambrian basins on the Transvaal craton and their sedimentological and structural features: Transactions of the Geological Society of South Africa, v. 78, p. 25-33.
Tectonic conditions of deposition of the lower and upper Waterberg System (~2000-1350 Ma) are described. Seemingly, sedimentation occurred in rifts and on the surrounding platform. Two rift systems of early and late Waterberg age are probably present and they have different strikes. The sedimentation was not followed by orogeny.

Klomp, U.C., 1986, The chemical structure of a pronounced series of iso-alkanes in South Oman crudes: Organic Geochemistry, v. 10, p. 807-814.
A number of monomethylalkanes in the oils may suggest Precambrian age of the source rock.

Kröner, A., 1971, Late Precambrian correlation and the relationship between the Damara and Nama Systems of South West Africa: Geologische Rundschau, v. 60, p. 1513-1523.
Stratigraphic correlation shows that the Damara and Nama Systems are completely or partly coeval. Same is true for the underlying Gariep and Nosib Groups that were deformed before the Damara tectonic event.

Lawrence, S.R., 1989, Prospects for petroleum in Late Proterozoic/early Paleozoic basins of southern-central Africa: Journal of Petroleum Geology, v. 12, no. 2, p. 231-242.
The stratigraphy, structure, and petroleum potential of foreland Late Proterozoic basins south of the Damara orogenic belt are described.

Martin, H., and Porada, H., 1977, The intracratonic branch of the Damara orogen in South West Africa. I. Discussion of relationships with the Pan-African mobil belt system: Precambrian Research, v. 5, p. 339-357.
Geodynamic interpretation of the Damara, Zambezi, and Mozambique belts is discussed.

Meinster, B., and Tickell, S.J., 1976, Precambrian aeolian deposits in the Waterberg Supergroup: Transactions of the Geological Society of South Africa, v. 78, p. 191-199.
The aeolian origin of sandstones of the Makgabeng Formation (Waterberg Supergroup) in northern Transvaal (South Africa) is substantiated.

Porada, H., 1985, Stratigraphy and facies of the Upper Proterozoic Damara orogen, Namibia, based on a geodynamic model: Precambrian Research, v. 29, p. 235-264.
The rift origin of the Damara orogen is indicated and the rifting history is described.

Schalk, K.E.L., 1970, Some late Precambrian formations in central South West Africa: Annals of the Geological Survey of South Africa, v. 8, p. 29-41.
Stratigraphic description and correlation of Upper Proterozoic formations. Five formations of sedimentary and volcanic origin are distinguished. The area is a part of the Damara geosyncline.

Tickell, S.J., 1976, Braided river deposits in the Waterberg Supergroup: Transactions of the Geological Society of South Africa, v. 78, p. 83-88.
Sedimentology of the Mogalakwena Formation (Waterberg Supergroup) is described. Thick coarse clastics were deposited by a braided river system with a provenance area in mountains of the Limpopo belt.

Villeneuve, M., and Dallmeyer, R.D., 1987, Geodynamic evolution of the Mauritanide, Bassaride, and Rokelide orogens (West Africa): Precambrian Research, v. 37, p. 19-28.
The orogens occur along the western edge of the West African craton. The geodynamic interpretation of three main orogenic events (two in the Late Proterozoic and one in the Hercynian stage) is considered.

Watters, B.R., 1977, The Sinclair Group: definition and regional correlation: Transactions of the Geological Society of South Africa, v. 80, no. 1, p. 9-16.
Subdivision, stratigraphy, and regional correlation of rocks of the upper Precambrian (1400-950 Ma) Sinclair Group, which was deposited and deformed in pre-Damara time, are described.

RUSSIAN CRATON

Bekker, Yu.R., 1987, Geologic map of the basement, pre-Vendian sedimentary cover, and folded margins of the Russian craton: Sovetskaya Geologiya, no. 8, p. 63-71 (in Russian).
A new geologic map with removed Vendian and younger rocks is described. The map shows a system of Riphean aulacogens (rifts) and marginal depressions of the craton. Isopachs of Riphean rocks are shown.

Frolovich, G.M., Litvinova, N.A., and Kalabin, C.N., 1989, Petroleum potential of Riphean-Vendian rocks in junction area of the Kama uplift and the Chelva trough: Geologiya Nefti i Gaza, no. 5, p. 12-15 (in Russian).
The seismostratigraphic analysis of Precambrian sedimentary rocks provide understanding of the regional structural conditions and suggests the potential exploration plays in the area which is located in the Volga-Ural province.

Garetskiy, R.G., and Suveyzdis, P.I., eds., 1987, Tektonika, fatsii, i formatsii zapada Vostochno-Yevropeyskoy platformy (Tectonics, facies, and formations of the western East-European craton): Nauka i Tekhnika, Minsk, USSR, 214 p. (in Russian).
Two chapters of the monograph describe Upper Proterozoic sedimentary rocks of the western Russian craton.

Kabankov, V.Ya., and Sobolevskaya, R.F., 1981, Late Precambrian-early Paleozoic stage of geologic development of the Taimyr-Severnaya Zemlya folded region, in Bogolepov, K.V., and Basharin, A.K., eds., Tektonika baikalskogo (rifeyskogo) megakompleksa Sibiri [Tectonics of the Baikalian (Riphean) megacomplex of Siberia]: Institut Geologii i Geofiziki, Novosibirsk, USSR, p. 55-63 (in Russian).
Stratigraphic studies indicate the absence of significant Baikalian (pre-Paleozoic) tectonic event in the region.

Kapustin, I.N., Kiryukhin, L.G., Klevtsova, A.A., Kuznetsov, A.G., and Kucheruk, E.V., 1987, Petroleum potential of Upper Proterozoic rocks of the East European craton: Sovetskaya Geologiya, no. 12, p. 26-35 (in Russian).
Comparative analysis of petroleum potential of the East European (Russian) and Siberian cratons.

Khachatryan, R.O., 1979, Tektonicheskoye razvitiye i neftegazonosnost Volzhsko-Kamskoy anteklizy (Tectonic development and petroleum potential of the Volga-Kama anteclise): Nauka, Moscow, 171 p. (in Russian).
The monograph includes information on the stratigraphy, tectonics, and petroleum potential of Upper Proterozoic rocks of the eastern Russian craton.

Klevtsova, A.A., 1984, Paleotectonic conditions of Riphean and Vendian sedimentation on the East-European craton, in Kiryukhin, L.G., ed., Geologiya i neftegazonosnost Vostochno-Yevropeyskoy platformy (Geology and petroleum potential of the East European craton): Izdaniye VNIGNI, Moscow, p. 91-98 (in Russian).
Paleogeographic conditions of sedimentation during Riphean-Vendian (Middle-Late Proterozoic) time are discussed.

Klevtsova, A.A., Frolovich, G.M., Shvarev, V.N., Melnichenko, E.M., and Tiunova, T.M., 1981, Potential exploration plays for oil fields in pre-Devonian rocks of Kama area of the Perm Region: Geologiya Nefti i Gaza, no. 9, p. 11-16 (in Russian).
The structure and stratigraphy of Riphean and Vendian rocks of the Kama area are described. Petroleum potential is connected with the weathered top of Riphean carbonates and with three sandstones in the clastic Vendian sequence in large structural traps.

Korchagina, Yu.I., Fadeeva, N.P., and Naydenova, O.A., 1986, Oil-generative potential of ancient rocks, in Trofimuk, A.A., Kontorovich, A.E., and Marasanova, N.V., eds., Sovremennye geokhimicheskiye metody diagnostiki neftematerinskikh otlozheniy (Modern geochemical methods of identification of oil-source rocks): Nauka, Moscow, p. 77-87 (in Russian).
Paleobiologic and geochemical characteristics and oil-source potential of Upper Proterozoic-Cambrian rocks of parts of the Russian and Siberian cratons are discussed.

Korchagina, Yu,O., Fadeeva, N.P., Artamonova, G.F., Danilova, I.N., Levchenko, V.A., and Mityushin, N.V., 1979, Old oil-source formations, in Vassoevich, N.B., and Timofeyev, P.P., eds., Neftematerinskiye svity i printsipy ikh diagnostiki (Oil-source formations and principles of their identification), Nauka, Moscow, p. 102-116 (in Russian).
The article contains geochemical characterization of Upper Proterozoic and Cambrian formations of the Russian and Siberian cratons.

Kutukov, A.V., 1981, Conditions of oil and gas generation in Vendian, Devonian, and Visean clastic rocks in the Kama area of the Perm Region: Geologiya Nefti i Gaza, no. 2, p. 35-39 (in Russian).
The content of organic carbon in Vendian rocks reaches 2.5%. Time of petroleum generation by these rocks vary from end of the Vendian on the western Urals to the Carboniferous west of them.

Kutukov, A.V., Vinnikovskiy, S.A., and Shershnev, K.S., 1977, Petroleum potential of Vendian rocks of the Kama area in the Perm Region: Geologiya Nefti i Gaza, no. 11, p. 37-42 (in Russian).
Depositional conditions of Vendian rocks, character of organic matter, oil shows and noncommercial pools suggest a significant petroleum potential. Evaluation of conditions of preservation of oil fields is critical for exploration success. A proposed exploration program is discussed.

Lagutenkova, N.S., and Chepikova, I.K., 1982, Verkhnedokembriyskiye otlozheniya Volgo-Uralskoy oblasti i perspektivy ikh neftegazonosnosti (Upper Precambrian rocks of the Volga-Ural region and their petroleum potential): Nauka, Moscow, 110 p. (in Russian).
A monograph describing stratigraphy, lithology, paleontology, known oil and bitumen shows, and petroleum potential of Upper Proterozoic rocks of the Volga-Ural region (Russian craton).

Makarevich, V.N., 1985, Zakonomrnosti stroyeniya i evolutsii avlakogenov i ikh neftegazonosnost (Geologic framework and evolution of aulacogens and their petroleum potential): Obzornaya Informatsiya, Seriya Neftegazovaya Geologiya i Geofizika, VNIIOENG, Moscow, 38 p. (in Russian).
Comparative analysis of Late Proterozoic, Paleozoic, and younger rifts, especially those of the Russian craton.

Makarevich, V.N., 1980, Structure of the earth crust in rifts and aulacogens and their origin: Byulleten Moskovskogo obshchestva Ispytateley Prirody, Otd. Geol., v. 55, no. 1, p. 28-31 (in Russian).
A number of young rifts and ancient aulacogens are discussed including the Late Proterozoic Kama-Belaya, Sergiev-Abdulin, and Vyatka aulacogens of the Russian craton.

Maksimov, S.P., Pankina, R.G., and Shkutnik, Ye.N., 1980, Distribution of sulphur, carbon, and hydrogen isotopes in Proterozoic oil of old platforms in the Soviet Union: Doklady Akademii Nauk SSSR, Earth Science Sections, v. 251, March-April, p. 142-143.
Analyzed Vendian oils and organic matter are rich in heavy isotope of sulphur and highly enriched in light isotopes of C and H. This reflects the specificity of Precambrian biota and low salinity of ancient ocean water.

Maslov, A.V., 1989, Riphean sedimentary basins of the western slope of the southern Urals, _in_ Timofeyev, P.P., ed., Osadochnaya obolochka Zemli v prostranstve i vremeni (Sedimentary cover of the Earth in space and time): Nauka, Moscow, p. 227-234.
Depositional environments reflect the tectonic development of the sedimentary basins. A wide spectrum of sediments, from continental to deep-water, is present in the sequence.

Maslov, A.V., 1988, Litologiya verkhnerifeyskikh otlozheniy Bashkirskogo megantiklinoriya (Lithology of upper Riphean rocks of the Bashkir anticlinorium, Trudy Geologicheskogo Instituta Akademii Nauk SSSR, v. 426: Nauka, Moscow, 133 p. (in Russian).
The monograph describes the lithology, stratigraphy, and paleogeography of the Karatau Series exposed on the anticlinorium in the western Urals.

Mirchink, M.F., ed., 1977, Geologiya i neftegazonosnost rifeyskikh i vendskikh otlozheniy Volgo-Uralskoy provintsii (Geology and petroleum potential of Riphean and Vendian rocks of the Volga-Ural province): Nedra, Moscow, 156 p. (in Russian).
The monograph describes the stratigraphy, lithology, depositional conditions, and tectonic development of Middle-Upper Proterozoic (Riphean and Vendian) rocks of the Volga-Ural region (Russian craton).

Mladshikh, S.V., Klyuzhina, M.L., and Ablizin, B.D., 1978, Correlation of Vendomian clastic rocks of the western slope of the southern and central Urals, in Dokembriy i nizhniy paleozoy Urala (The Precambrian and lower Paleozoic of the Urals): Institut Geologii i Geofiziki, Uralskiy Nauchnyi Tsentr AN SSSR, Trudy, v. 135, p. 13-29 (in Russian).
Description and stratigraphic correlation of Vendomean (upper Riphean plus Vendian) rocks.

Petrov, A.A., Vorobyeva, N.S., and Semskova, Z.K., 1981, Peculiarities of composition of relict hydrocarbons in Proterozoic oils of the Sivin field, in Sidorenko, A.V., and Yeremenko, N.A., eds., Organicheskaya geokhimiya neftey, gazov i organichoskogo veshchestva dokembriya (Organic geochemistry of oils, gases, and Precambrian organic matter): Nauka, Moscow, p. 237-244 (in Russian).
Detailed chemical composition of naphthenes in Riphean oil of this field in the Volga-Ural province (eastern Russian craton) is described.

Postnikova, I.I., 1977, Verkhniy dokembriy Russkoy plity i yego neftenosnost (Upper Precambrian rocks of the Russian plate and their petroleum potential): Nedra, Moscow, 222 p. (in Russian).
The monograph describes the stratigraphy, lithology, and tectonic history of upper Precambrian rocks of the Russian craton. The geology of Vendian rocks and their oil potential are discussed on the basis of the comparative analysis of these rocks on the Russian and Siberian cratons.

Revenko, E.A., 1979, Microphytoliths--a possible source of organic matter accumulation in Riphean rocks of the Volga-Ural region, in Sokolov, B.S., ed., Paleontologiya dokembriya i rannego kembriya (Paleontology of the Precambrian and Early Cambrian): Nauka, Leningrad, p. 220-222 (in Russian).
The Kaltasy Formation is composed of thick carbonate rocks and reefal buildups formed by blue-green algae. The formation is oil-source rock. Significant oil shows are known from the carbonates and overlying sandstones of the Gozhan Formation.

Rundkvist, D.V., and Mitrofanov, F.P., eds., 1988, Dokembriyskaya geologiya SSSR (Precambrian geology of the USSR): Nauka, Leningrad, 441 p. (in Russian).
The main parts of the monograph describe Precambrian rocks of the Russian and Siberian cratons, both metamorphosed rocks composing the basements and unmetamorphosed rocks of the sedimentary cover.

Solontsov, L.F., Aksenov, E.M., Ignatyev, S.V., and Kuznetsov, O.B., 1979, Proterozoic formations of the East European craton: Izvestiya Akademii Nauk SSSR, ser. geol., no. 8, p. 12-25 (in Russian).
Analysis of the tectonic conditions of deposition of Proterozoic formations including Upper Proterozoic unmetamorphosed rocks.

Tucker, M.E., 1983, Sedimentation of organic-rich limestones in the late Precambrian of southern Norway: Precambrian Research, v. 22, p. 295-315.
The late Precambrian Biri Formation in the Sparagmite basin contains up to 3% of organic matter in limestone beds. Depositional conditions of the limestones are discussed.

Valeyev, R.N., 1978, Avlakogeny Vostochno-Yevropeyskoy platformy (The aulacogens of the East European craton): Nedra, Moscow, 153 p. (in Russian).
History of formation, composition, and tectonic evolution of aulacogens (rifts) of the East European (Russian) craton are described in the monograph. The petroleum potential of the aulacogens is evaluated. Most of the aulacogens are of Late Proterozoic age.

Zagulova, O.P., and Khramova, E.V., 1978, Specificity of catagenetic transformation of organic matter in Upper Proterozoic rocks of the Russian craton, in Kalinko, M.K., and Chetverikova, O.P., eds., Metody opredeleniya masshtabov generatsii i emigratsii uglevodorodov i kharakteristiki neftey po geokhimicheskim dannym (Methods of calculating the amounts of generated and migrated hydrocarbons and characterization of oils on geochemical data): Trudy VNIGNI, v. 205, p. 54-62 (in Russian).
Geochemical characteristics and thermal histories of Upper Proterozoic rocks suggest their significant generative potential.

Zufarova, N.A., 1976, Organicheskoye veshchestvo i neftegazonosnost verkhneproterozoyskikh obrazovaniy Bashkirii (Organic matter in and petroleum potential of Upper Proterozoic rocks of Bashkiria): Nauka, Moscow, 107 p. (in Russian).
The monograph describes lithology, geochemistry of organic matter and bitumens, and maturation of organic matter in Upper Proterozoic rocks of Bashkiria (the Volga-Ural province of the Russian craton).

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Bakhturov, S.F., 1985, Bituminoznye karbonatno-slantsevye formatsii Vostochnoy Sibiri (Bituminous carbonate and shale formations of East Siberia): Trudy InstitutaGeologii i Geofiziki Sibirskogo Otdeleniya Akademii Nauk SSSR, v. 617, Nauka, Novosibirsak, USSR, 125 p. (in Russian).
The monograph describes organic matter-rich Upper Proterozoic and Cambrian formations of the Siberian craton and surrounding areas. These formations are possible sources for oil and gas found in Proterozoic rocks of the craton.

Basharin, A.K., 1981, Formations and tectonic complexes of the Riphean of Siberia, in Bogolepov, K.V., and Basharin, A.K., eds., Tektonika baikalskogo (rifeyskogo) megakompleksa Sibiri [Tectonics of the Baikalian (Riphean) megacomplex of Siberia]: Institut Geologii i Geofiziki, Novosibirsk, USSR, p. 97-107 (in Russian).
A review of Riphean formations of the Siberian craton and surrounding folded regions.

Bazhenova, T.K., Ipatov, Yu.I., and Shumenkova, Yu.M., 1983, Stages in megabasin development of the Siberian craton and ontogenetic evolution of naphthids, in Khain, V.E., Sokolov, B.A., and Nazarevich, I.A., eds., Uspekhi v razvitii osadochno-migratsionnoy teorii neftegazoobrazovaniya (Achievements in development of the sedimentary-migrational theory of oil and gas formation): Nauka, Moscow, p. 132-137 (in Russian).
Tectonic stages in formation of the sedimentary cover and conditions of petroleum generation from source rocks deposited during these stages are considered.

Bazhenova, T.K., Belyaeva, L.S., Bikkenina, D.A., Ipatov, Yu.I., and Shumenkova, Yu.M., 1982, Paleozoic and late Precambrian biocenoses of the Siberian craton and oil-source potential, in Vassoevich, N.B., Polster, L.A., and Bazhenova, O.K., eds., Metody otsenki nefte- i gazomaterinskogo potentsiala sedimentitov (Methods of evaluation of oil- and gas-generative potential of sedimentary rocks): Nauka, Moscow, p. 142-147 (in Russian).
Evolution of biocenoses on the Siberian craton from Late Proterozoic to middle Paleozoic time resulted in changes in the composition of organic matter and its generative potential.

Bazhenova, T.K., Belyaeva, L.S., Bikkenina, D.A., Ipatov, Yu.I., Makarov, K.K., Neruchev, S.G., Parparova, G.M., and Shumenkova, Yu.M., 1981, Dispersed organic matter in upper Precambrian rocks of old cratons and its transformation in lithogenesis, in Sidorenko, A.V., and Yeremenko, N.A., eds., Organicheskaya geokhimiya neftey, gazov i organicheskogo veshchestva dokembriya (Organic geochemistry of oils, gases, and Precambrian organic matter): Nauka, Moscow, p. 253-260 (in Russian).
Riphean rocks are richest in organic matter on the Siberian craton. The biological and environmental conditions of deposition of this organic matter and its geochemical transformation during burial are discussed.

Bezzubtsev, V.V., 1981, Upper Precambrian structural complexes of Taimyr and peculiarities of their formation, in Bogolepov, K.V., and Basharin, A.K., eds., Tektonika baikalskogo (rifegskogo) megakompleksa Sibiri [Tectonics of the Baikalian (Riphean) megacomplex of Siberia]: Institut Geologii i Geofiziki, Novosibirsk, USSR, p. 48-55 (in Russian).
Two structural zones are distinguished in Riphean rocks. The southern zone is composed of thick sedimentary rocks including carbonates. The northern zone is primarily composed of volcanics and flysch.

Bgatova, G.F., 1982, Riphean rocks of the southern Tunguska syneclise on seismic data, in Neftepoiskovaya geofizika v usloviyakh shirokogo razvitiya trappovogo magmatizma (Geophysical exploration in conditions of wide development of basaltic (trappean) magmatism): SNIIGIMS, Novosibirsk, USSR, p. 31-36 (in Russian).
Riphean rocks in the southern part of the Tunguska basin were mapped. The region includes the Kamov arch and the Katanga saddle were the rocks proved to be oil productive.

Bikkenina, D.A., and Kozlova, L.E., 1977, Characteristics of organic matter in carbonate rocks drilled by the Markhin stratigraphic test borehole, in Kontorovich, A.E., and Uspenskiy, V.A., eds., Rasseyannoye organicheskoye veshchestvo gornykh porod i metody yego isucheniya (Dispersed organic matter in rocks and methods of its study): Trudy Instituta Geologii i Geofiziki Sibirskogo Otdeleniya Akademii Nauk SSSR, v. 334, p. 101-108 (in Russian).
The well on the northeastern Siberian craton drilled Riphean, Vendian, and Cambrian rocks. The Riphean Starorechensk Formation is organic matter-rich and has generated hydrocarbons judging from geochemical data.

Drobot, D.I., Zolotov, A.N., and Kontorovich, A.E., 1974, Geokhimicheskiye kriterii otsenki perspektiv neftegazonosnosti dokembriyskikh i nizhnekembriyskikh otlozheniy yuga Sibirskoy platformy (Geochemical criteria of the assessment of petroleum potential of Precambrian and Lower Cambrian rocks of the southern Siberian craton): Vsesoyuznyi nauchno-issledovatelskiy geologorazvedochnyi neftyanoy institut (VNIGNI), Trudy, v. 146, Nedra, Moscow, 158 p., (in Russian).
The monograph discusses facies and geochemical conditions of organic matter deposition and maturation. The petroleum potential is assessed by application of material balance method.

Fowler, M.G., and Douglas, A.G., 1987, Saturated hydrocarbon biomarkers in oils of Late Precambrian age from eastern Siberia: Organic Geochemistry, v. 11, no. 3, p. 201-213.
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Gorbachev, V.F., and Kornev, B.V., 1979, Rift structures on margins of the Siberian craton and their petroleum potential, in Chepikov, K.R., ed., Tektonika i perspektivy neftegazonosnosti vostochnoy Sibiri (Tectonics and petroleum potential of East Siberia): Nauka, Moscow, p. 83-95 (in Russian).
Stratigraphy and paleogeography of Riphean and Vendian rocks in marginal rifts of the Siberian craton (Baikal-Patom and Yenisey rifts). The Baikal-Patom rift is most potential (4.8×10^9 tons of hydrocarbons).

Izosimova, A.N., 1986, Formation of oil compositions of the Nepa-Botuoba petroleum region, in Neftegazonosnost verkhnedokembriyskikh i fanerozoyskikh otlozheniy vostochnoy chasti Sibirskoy platformy (Petroleum potential of upper Precambrian and Phanerozoic rocks of the eastern Siberian craton): Yakutskiy Filial Sibirskogo Otdeleniya Akademii Nauk SSSR, Yakutsk, USSR, p. 79-87 (in Russian).
Oils and condensates of Vendian-Lower Cambrian rocks are characterized by a common character of biomarkers. Composition of biomarkers indicates that oils were generated by source rocks deposited in strongly reducing environments. Condensates were formed by dissolution of oil fractions in gas.

Izosimova, A.N., and Chalaya, O.N., 1989, Reliktovye uglevodorody v organicheskom veshchestve i neftyakh Zapadnoy Yakutii (Relict hydrocarbons in organic matter and oils of West Yakutia): Nauka, Novosibirsk, USSR, 126 p. (in Russian).
Oil/source rock correlation indicates that the oil-source rocks for oils in Vendian and Lower Cambrian rocks of the eastern Siberian craton are in the Riphean sequence of the adjacent Patom region.

Kashirtsev, V.A., Arefyev, O.A., Bodoyev, N.V., Kamenyar, Ya.N., Bolotova, I.A., and Yushkova, L.S., 1986, Natural bitumens of the northeastern Siberian craton, in Neftegazonosnost verkhnedokembriyskikh i fanerozoyskikh otlozheniy vostochnoy chasti Sibirskoy platformy (Petroleum potential of Upper Precambrian and Phanerozoic rocks of the eastern Siberian craton): Yakutskiy filial Sibirskogo Otdeleniya Akademii Nauk SSSR, Yakutsk, USSR, p. 70-79 (in Russian).
Two groups of bitumens are identified. Inside each group, the difference in composition of bitumens is connected only with different degree of biodegradation. Two source rocks are suggested.

Kazanskiy, Yu.P., ed., 1973, Rifeyskiye otlozheniya Sibirskoy platformy i prilegayushchikh skladchatykh sooruzheniy (Riphean rocks of the Siberian craton and adjacent folded regions), Institut Geologii i Geofiziki Sibirskogo Otdeleniya Akademii Nauk SSSR, Trudy, v. 168, Nauka, Novosibirsk, USSR, 208 p. (in Russian).
The monograph describes stratigraphy, lithology, depositional environments, and paleontology of Riphean rocks of Siberia.

Khabarov, E.M., 1985, Sravnitelnaya kharakteristika pozdnedokembriyskikh rifogennykh formatsiy (Comparative characteristic of the late Precambrian reefal formations): Institut Geologii i Geofiziki Sibirskogo Otdeleniya Akademii Nauk SSSR, Trudy, v. 618, Nauka, Movosibirsk, USSR, 126 p. (in Russian).
The monograph describes the composition, depositional environments, and spatial distribution of the Upper Proterozoic reefal rocks in eastern Siberia in the southern Ural Mountains, and in the Timan region.

Klubov, B.A., 1983, Prirodnye bitumy severa (Natural bitumens of the north): Nauka, Moscow, 205 p. (in Russian).
The monograph describes deposits of natural bitumens in the arctic regions. The geology of some deposits in Upper Proterozoic rocks of the northern Siberian craton suggests the indigenous source for the bitumens.

Kolosov, P.N., 1977, Drevniye neftegazonosnye tolshchi yugo-vostoka Sibirskoy platformy (Old oil- and gas-bearing formations of the southeastern Siberian craton): Nauka, Novosibirsk, USSR, 90 p. (in Russian).
The monograph describes stratigraphy, paleontology, and correlation of the Upper Proterozoic-Cambrian sequences of the southeast of the Siberian craton.

Kontorovich, A.E., Surkov, V.S., and Trofimuk, A.A., eds., 1982, Geologiya nefti i gaza Sibirskoy platformy (Geology of oil and gas of the Siberian craton), Nedra, Moscow, 552 p. (in Russian).
A monograph describing stratigraphy, tectonics, geochemistry, hydrogeology, oil and gas fields, and petroleum potential of the Siberian craton.

Korchagina, Yu.I., and Fadeeva,N.P., 1982, Realization of the oil-source potential in ancient sedimentary rocks, in Vassoevich, N.B., Polster, L.A., and Bazhenova, O.K., eds., Metody otsenki nefti- i gazomaterinskogo potentsiala sedimentitov (Methods of evaluation of oil- and gas-generative potential of sedimentary rocks): Nauka, Moscow, p. 114-122 (in Russian).
Stratigraphy, geochemistry, and hydrocarbon-source potential of Vendian and Cambrian rocks of the Cis-Patom basin (Siberian craton) are discussed.

Kozlovskiy, E.A., 1986, Perspectives of integrated studies of the earth crust until the year 2000: Sovetskaya Geologiya, no. 12, p. 3-13 (in Russian).
The program of superdeep drilling in the USSR is discussed. Cross sections and a map reflect new data on the rifts of the Siberian craton that are filled with Upper Proterozoic sedimentary rocks.

Moskvitin, I.E., Sitnikov, V.S., and Shabalin, V.P., 1986, Tectonics and petroleum potential of the Nyuysk-Dzhebrin trough, in Neftegazonosnost verkhnedokembriyskikh i fanerozoyskikh otlozheniy vostochnoy chasti Sibirskoy platformy (Petroleum potential of upper Precambrian and Phanerozoic rocks of the eastern Siberian craton): Yakutskiy Filial Sibirskogo Otdeleniya Akademii Nauk SSSR, Yakutsk, USSR, p. 17-27 (in Russian).
The Nyuysk-Dzhebrin trough is located between the petroleum productive Nepa-Botuoba arch (Siberian craton) and the Baikal-Patom fold system. Riphean and Vendian rocks are overlain by the lower Paleozoic and are potential for gas.

Neruchev, S.G., Bazhenova, T.K., Ipatov, Yu.I., Makarov,K.K., Parparova, G.M., Shumenkova, Yu.M., Belyaeva, L.S., Bikkenina, D.A., Rudavskaya, V.A., and Fayzullina, E.M., 1979, Organic matter of the upper Precambrian and Lower Cambrian of the Siberian craton, in Sokolov, B.S., ed., Paleontologiya dokembriya i rannego kembriya (Paleontology of the Precambrian and Early Cambrian): Nauka, Leningrad, p. 210-217 (in Russian).
Original average amounts of organic matter in Precambrian-Lower Cambrian formations varied from 0.1 to 5-6%. Blue-green algae (cyanobacteria) were the main suppliers of the organic matter. Organic-rich formations are described.

Perevalov, O.V., Ivanov, A.I., and Lifshits, V.I., 1981, Boundaries and stratigraphy of the Baikalian megacomplex of the Patom region, in Bogolepov, K.V., and Basharin, A.K., eds., Tektonika baikalskogo (rifeyskogo) megakompleksa Sibiri [Tectonics of the Baikalian (Riphean) megacomplex of Siberia]: Institut Geologii i Geofiziki, Novosibirsk, USSR, p. 63-73 (in Russian).
Facies zones of the miogeosynclinal Patom trough and the marginal Bodayba trough are described and correlated.

Savinskiy, K.A., Volkhonin, V.S., Lopatin, S.S., Zolotov, A.N., and Yakovlev, I.A., 1983, Geologicheskoye stroyeniye neftegazonosnykh provintsiy Vostochnoy Sibiri po geofizicheskim dannym (Geologic framework of oil- and gas-bearing provinces of East Siberia on geophysical data): Nedra, Moscow, 183 p. (in Russian).
The main tectono-stratigraphic sequences (including the Upper Proterozoic) are described in the monograph.

Shpunt, B.R., 1981, Composition of the Baikalian megacomplex of the eastern Siberian craton and adjacent folded areas, in Bogolepov, K.V., and Basharin, A.K., eds., Tektonika baikalskogo (rifeyskogo) megakompleksa Sibiri [Tectonics of the Baikalian (Riphean) megacomplex of Siberia]: Institut Geologii i Geofiziki, Novosibirsk, USSR, p. 6-15 (in Russian).
Thick Riphean rocks are developed on the craton margins and in aulacogens (rifts). A structural unconformity is present at base of the middle Riphean.

Zamarayev, S.M., and Aleksandrov, V.K., 1981, Composition of the Baikalian megacomplex of the southern Siberian craton, in Bogolepov, K.V., and Basharin, A.K., eds., Tektonika baikalskogo (rifeyskogo) megakompleksa Sibiri [Tectonics of the Baikalian (Riphean) megacomplex of Siberia]: Institut Geologii i Geofiziki, Novosibirsk, USSR, p. 15-28 (in Russian).
Stratigraphy of Riphean rocks along the southern margin of the Siberian craton and in the adjacent Baikalian and Sayan folded regions is described.

Zorkin, L.M., Zorkina, V.A., Stadnik, E.V., and Yurin, G.A., 1987, Uglevodorody drevnikh tolshch (Hydrocarbons in ancient rocks): Obzornaya informatsiya; seriya geologiya, methody poiskov i razvedki mestorozhdeniy nefti i gaza, VIEMS, Moscow, 54 p. (in Russian),.
Oil and gas fields and shows in Upper Proterozoic and lower Paleozoic rocks are reviewed. Oils and gases in these rocks are specific in their composition. The petroleum potential of Upper Proterozoic rocks of the Siberian craton is evaluated.

Zorkin, L.M., Stadnik, E.V., and Yurin, G.A., 1979, Geochemistry of natural gases in ancient rocks, in Sokolov, B.S., ed., Paleontologiya dokembriya i rannego kembriya (Paleontology of the Precambrian and early Cambrian): Nauka, Leningrad, p. 265-268 (in Russian).
The composition of gas in hydrocarbon pools and in water solution on the Russian and Siberian cratons is described. Potential resources of dissolved gas are evaluated at $10 \times 10^{12} m^3$ for the Russian craton and at $75 \times 10^{12} m^3$ for the Siberian craton (for pre-Devonian rocks).