

posits of this large area. A comparison of the Precambrian of Sweden and parts of Finland has been made.

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GEOLOGY OF OFFSHORE AREAS OF CANADIAN ARCTIC ISLANDS BASED ON GEOPHYSICAL WORK

Surface geologic exposures in the Arctic Islands are excellent as is the case in most of the world's deserts. The sparse subsurface information from boreholes is limited to only a few islands.

Geology of the inter-island areas is much more speculative. Preliminary interpretations based on erosion and isostatic readjustments after the melting of the continental ice sheet may have to be revised after a review of geophysical data which is becoming available. Block faulting with horst and graben development becomes a conservative approach while consideration of rift and drift hypothesis gain popularity.

Recently obtained reconnaissance data indicate the possibility that an entirely new geologic section exists offshore. This conclusion is based on regional geophysical data obtained by Government and industry. Magnetic and gravity surveys cover much of the Arctic Archipelago. Seismic profiles in marine areas of the southern Arctic Islands indicate a wide range of large structures. Refraction probes are useful in defining the velocity, and thus the possible geologic age, of these sediments.

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MIDDLE PALEOZOIC REEFS OF SIBERIAN NORTH AS POTENTIAL RESERVOIRS OF OIL AND GAS

Middle Paleozoic buried reef masses are believed to be possible oil and gas reservoirs in the Arctic, because similar reefs yield commercial oil and gas in adjacent areas (Ural foothills, Western Canada, etc.). This possibility is based on the wide distribution of middle Paleozoic carbonate formations in the Arctic and on the prediction of the presence of ancient reefs.

The middle Paleozoic carbonate formations containing reef limestones occur with the terranes of Arctic Siberia from Novaya Zemlya on the west to the Chukotsk Peninsula and Koryak Upland on the east, suggesting favorable paleoclimatic environments. The middle Paleozoic tropical belt had a strike across the Arctic Ocean oblique to the modern latitudes. The available data on paleotectonic conditions in the Arctic during the middle Paleozoic indicate the presence of certain structural zones controlling the distribution of reefs, i.e., geosyncline-platform boundaries and depressions within platforms. If one considers these facts and takes into account lithologic features of the ancient reefs (organic framework, nearreef, and related facies) the following reef provinces may be distinguished: Pechora-Novaya Zemlya, Taimyr-Tungusy, and East Siberian-Chukotsk provinces.

Only for the Pechora-Novaya Zemlya province do we have a direct evidence for widespread reefs. Devonian reef structures in the southern part of this province are oil-productive in the Pechora basin.

In the Taimyr-Tungusy province, reefs are not yet known, but a set of features is present which are critical for the prediction of ancient reefs (e.g., thick salt deposits). Here the possible reef coral-stromatoporoid

limestones have a fairly high porosity with generally abundant aquifers and gas shows.

The East Siberian-Chukotsk province is questionable, because the possibility that reefs are present has been recognized only from indirect data on the old Hyperborean platform and from the presence of the middle Paleozoic carbonate complex in the New Siberian Islands, Kolyma, and Chukotsk, as well as the presence of graptolitic facies (which commonly border reefs) in the New Siberian and De-Longa Islands. The middle Paleozoic reef bodies known from the Koryak Upland seem to have no relation to the East Siberian-Chukotsk reef province; those may be isolated reef frameworks on the slopes of volcanic cones.

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MEZOZOIC TECTONICS AND CORRELATIONS IN YUKON-KOYUKUK PROVINCE, WEST-CENTRAL ALASKA

The Yukon-Koyukuk province of west-central Alaska is a broad, wedge-shaped depression of Mesozoic and early Cenozoic rocks bordered on the west, north, and southeast by metamorphic rocks of Paleozoic and possibly older age. The province is not a simple sedimentary basin, as formerly believed, but a highly mobile tract that was subjected to repeated volcanism and plutonism during Cretaceous and early Tertiary times. Sedimentation was largely volcanogenic in character and confined, mostly, to a relatively short interval in mid-Cretaceous. Recent mapping on St. Lawrence Island suggests that the Mesozoic and early Cenozoic rocks of the Yukon-Koyukuk province swing in a broad arc across the Bering Sea and western St. Lawrence Island to join the Okhotsk volcanic belt of northeastern Siberia.

Three different structural trends are recognizable among the intensely deformed pre-Tertiary rocks of the Yukon-Koyukuk province: East-west trends in the northern part of the province and adjoining Brooks Range, north-south trends along the western edge of the province from the western Brooks Range to the Yukon delta, and northeast-southwest trends along the Yukon and Koyukuk valleys. The province is transected between Ruby and Unalakleet by the Kaltag fault, a major strike-slip fault with 40-80 mi of probable right-lateral offset. Major structural discontinuities also occur along the Kobuk fault zone at the northern edge of the province, but the evidence for large-scale strike-slip displacement is inconclusive.

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SADLEROCHIT RESERVOIR AT PRUDHOE BAY, ALASKA

The sandstone interval of the Sadlerochit Formation will be the initial producing zone in the Prudhoe Bay field. Initial field production will be approximately 500,000 bbl/day from about 90 wells drilled on 640-acre spacing. Oil in place has been estimated to exceed 10 billion bbl. The Sadlerochit sandstone is postulated to be a Triassic deltaic deposit obtaining a thickness exceeding 600 ft with a west-northwest depositional trend and a probable northerly source. The sands are fine grained to conglomeratic with porosities averaging over 20% and permeabilities generally high and in places exceeding 1 Darcy. Lithology can generally be described as quartzose sandstone with an exotic mixture of pyrite, siderite, tripolite, heavy minerals, and clays.