A geosyncline occupied northern parts of the Arctic Islands in Late Proterozoic time. It received sediments from the continent and deepened in a northerly direction. A northwestern belt, which included northernmost Ellesmere Island and the present shelf off Ellesmere and Axel Heiberg Islands, underwent an orogeny in latest Proterozoic or Cambrian time. The orogen behaved as an intermittently rising geanticline, and remained a site of volcanism, plutonism, and metamorphism, from Cambrian to Devonian time.

Sediments derived from the geanticline accumulated in a clastic basin on its southeast side. The basin was flanked on the southeast by a subsiding carbonate shelf, in turn grading southward to stable carbonate platforms.

Three phases of sedimentation are recognized in the clastic basin in northeastern Ellesmere Island: (1) Middle to Upper Cambrian (?) post-tectonic deltaic deposition; (2) Early to Middle Ordovician deep-water deposition of starved-basin type (radiolarian chert, graptolitic shale, *etc.*); (3) late Middle Ordovician to Middle Silurian deep-water deposition of flysch-type (graywacke, shale, *etc.*).

The trough must have formed by subsidence of the continental crust rather than by sea-floor spreading, because the deep-water sediments lie on shallow-water sediments and not on volcanics. The trough, which was separated from subaerial parts of the geanticline by a shelf on which carbonates, clastics, and volcanics were deposited, expanded until about mid-Silurian time, then migrated southeast, ahead of the southeast-migrating geanticline. The southeast flank of the trough, characterized by graptolitic shales and limestones, has been traced from northwestern Greenland to northwestern Melville Island. There, starved-basin conditions persisted from Early Ordovician to Early Devonian time.

A north-trending belt in the central islands, extending from the stable platform to the geanticline, was elevated in the Early Devonian. The uplift was basement controlled and reflects Precambrian basement trends unrelated to the early Paleozoic basin configuration.

An orogeny of the entire northern regions, locally accompanied by intrusion of quartz diorite, occurred in Middle Devonian to Mississippian time. Deformation and uplift proceeded from northwest to southeast.

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PALEOZOOLOGICAL DIVISION OF PLEISTOCENE MARINE BASINS ON ARCTIC COAST OF EURASIA

Stratigraphic and paleontologic data on the Pleistocene marine transgressions make it possible to establish biogeographic regions and subregions in the late glacial (interstadial), ultimate, and penultimate interglacial stages. Morphologic stability of species suggests that the ecology was unchanged, and that the zoogeographical units established recently by Z. A. Filatova can be used for reconstruction.

In nearshore zones of Mindel-Riss sea basins (Stör, Holstein, North, Kolvin-Padymey, Sanchugovka, Pinakul seas), the northern limit of the Atlantic middle boreal subregion was near Denmark, the high boreal subregion was in the eastern part of the "Pechora Land," and the low arctic boundary was on the right tributaries of the Yenisey River. The Pacific boreal region extended to the west coast of Bering Strait. Open shelves were inhabited by low arctic mollusks on the western side of Eurasia; east from the Kanin Peninsula there lived high arctic species now distributed in the Eurasian marine province (fauna with *Propeamussium groenlandicum, Bathyarca,* and *Cuspidaria*).

In the Riss-Würm (Eem, Boreal, Kazantzevo, Val'katlen) seas, the boundaries of the Atlantic middle boreal and high boreal subregions were in the North Dvina River basin and on the Pyasina River, respectively. The Atlantic low arctic subregion was connected with the Pacific. A province with a *Portlandia* fauna was present in the eastern Baltic.

In the Bølling-Allerod stage, middle boreal mollusks were distributed as far north as Bergen; high boreal mollusks reached Tromsö and the Danish Straits. Pacific low arctic species were displaced to 175°W long.

The Mindel, Riss, and Würm seas were inhabited by arctic mollusks along the entire coast.

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MARINE UPPER PALEOZOIC DEPOSITS OF ARCTIC

Marine upper Paleozoic deposits within the Arctic are widespread in Novaya Zemlya, the Pechora basin, Taimyr, the Verkhoyansk basin, northeastern USSR, Spitsbergen, Greenland, the Arctic Archipelago of Canada, and Alaska. The upper Paleozoic in all these regions includes not only Permian, but also widespread middle-Upper Carboniferous deposits.

Fossils of middle-Upper Carboniferous deposits in the western Arctic sector (Pechora basin, Novaya Zemlya, Spitsbergen, Greenland, Arctic Archipelago of Canada) do not generally differ from those of the corresponding deposits of the Urals, Russian platform, and other regions of the tropic paleozoogeographical province.

The middle-Upper Carboniferous fauna of the eastern Arctic sector (Taimyr, Verkhoyansk basin, northeastern USSR) is marked by complete lack of fusulinids, colonial corals, and some other groups. This fauna contains several endemic genera of brachiopods and ammonoids (*Yakutoproductus, Orulgania, Taimyrella, Yakutoceras,* and others). This fact allows one to consider the region as a boreal zoogeographical province. Within this region the Bashkirian and Moscovian stages and the Upper Carboniferous are tentatively recognized. The boundary between the Carboniferous and the Permian is drawn at the appearance of *Yakutoproductus verchoyanicus,* which does not correspond to the base of the *Schwagerina* zone.

A westward shift of the boundaries of the boreal province occurred in the Permian. At the beginning of the Late Permian this province covered all the territory considered. In the Early Permian two stages may be distinguished and traced here: the Asselian within the *Schwagerina* zone and the Artinskian, within the limits established by A. P. Karpinskiy.

The Lower-Upper Permian boundary is determined by the appearance of brachiopod genera such as *Grumantia, Megousia,* and *Pterospirifer,* and by flourishing pelecypods of the genera *Prosrassatella, Prooxytoma, Pseudobakewellia,* and a development of the genus *Kolymia.* This renovation of the fauna is connected with a general transgression of the seas and establishment of short-term connections between the Arctic and Tethys seas.

The Pay-Khoy and Kazanian stages may be distinguished in the Upper Permian. In the Arctic, ammonoids became extinct at the end of the Pay-Khoy stage, and brachiopods in the middle of the Kazanian.