PHANEROZOIC PALEOGEOGRAPHIC MAPS OF ARCTIC MARGINS

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ABSTRACT

The 28 maps of the Arctic margins were produced by the combined efforts of the PALEOMAP Project and Mobil. These paleogeographic reconstructions illustrate the changing configuration of mountains, land, shallow seas and deep ocean basins during the last 545 million years. Active plate boundaries, such as spreading centers and subduction zones, are also shown. The Mesozoic and Cenozoic plate tectonic interpretations are based on the synthesis of linear magnetic anomaly data, paleomagnetic data from continents, hot spot tracks and fracture zone locations compiled by the PALEOMAP Project. The location of Paleozoic plate boundaries, paleolatitudinal position of the continents and the width of intervening oceans though more speculative, are based on evidence of past subduction and inferred sea floor spreading together with biogeographic and paleoclimatic constraints.

PALEOGEOGRAPHIC MAPS METHODOLOGY AND RESULTS

The presented Phanerozoic paleogeographic maps were generated as Intergraph design files using various computer software and databases.The maps were produced by the combined efforts of the PALEOMAP Project (International Lithosphere Program) and Mobil Exploration and Production Technical Center. These 28 paleogeographic reconstructions illustrate the changing configuration of mountains, land, shallow seas and deep ocean basins during the last 545 million years. The active plate boundaries, such as spreading centers and subduction zones, are also shown. The 13 Paleozoic maps (Fig. 1- 13) were generated in Mollweide projection, the 10 Mesozoic (Fig. 14-23) and 5 Cenozoic maps (fig. 24 - 28) are depicted in Stereographic Polar Projection covering the circumarctic regions north of 40°N. All age assignments are based on the Decade of North American Geology timescale.

The information used to map the ancient distribution of mountains, land and shallow seas was taken from numerous sources. The principle references are listed below. The plate tectonic interpretations are based on the synthesis of linear magnetic anomaly data and fracture zone locations compiled by the PALEOMAP Project, International Lithosphere Program. The location of Paleozoic plate boundaries, though more speculative, are based on evidence of past subduction and inferred sea floor spreading.

The Mesozoic and Cenozoic orientation of the continents relative to the Earth's spin axis has been determined using a combination of paleomagnetic data compiled by Rob Van der Voo (1992), and hot spot tracks (R. D. Muller, Scripps Oceanographic Institute). Paleomagnetic data, together with biogeographic and paleoclimatic constraints, were used to determine the latitudinal position of the continents and the width of intervening Paleozoic oceans (Scotese and McKerrow, 1990).

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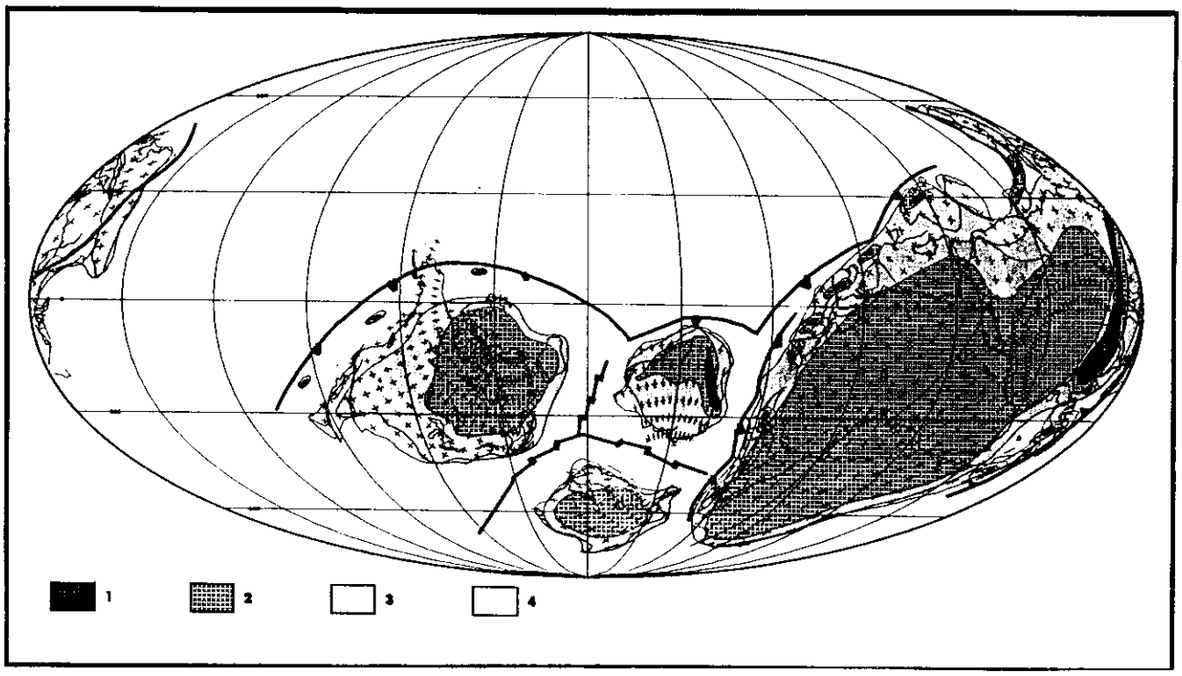

Fig. 1 Paleogeography. Early Cambrian - 547 MYA.
1 - montains, 2 - land masses, 3 - continental margins, 4 - deep water.

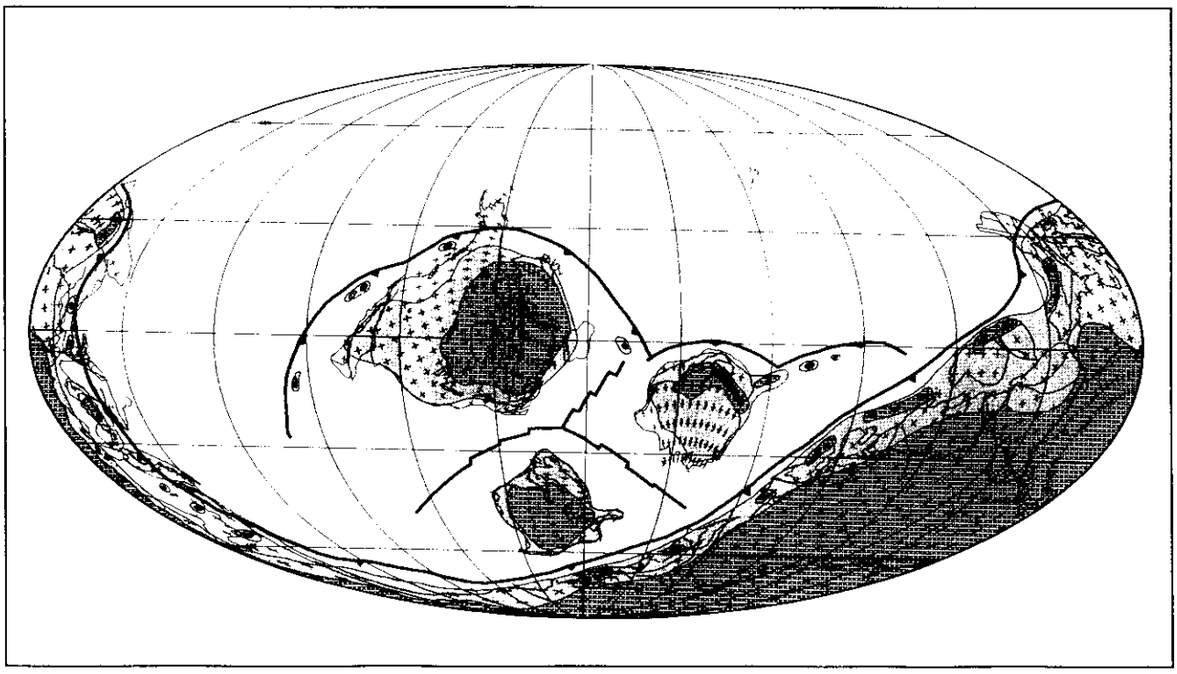

Fig. 2 Paleogeography. Late Cambrian - 514 MY A. Explanations as in fig. 1.

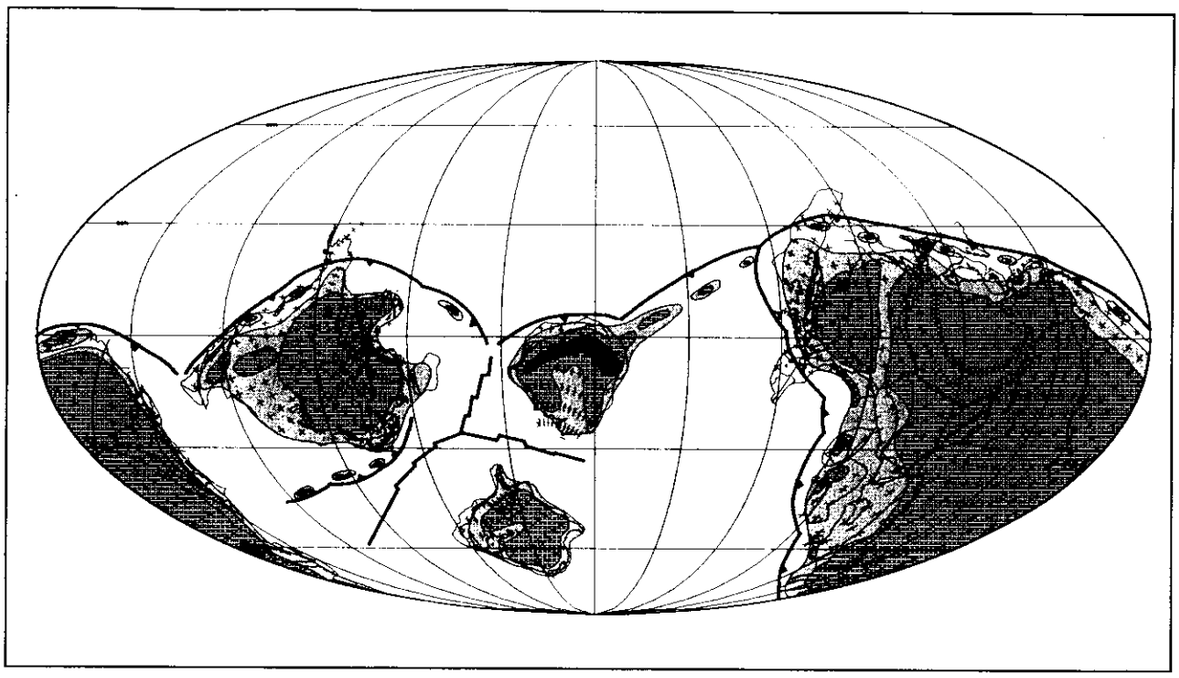

Fig. 3 Paleogeography. Tremadocian - Early Ordovician - 497 MYA Explanations as in fig. 1.

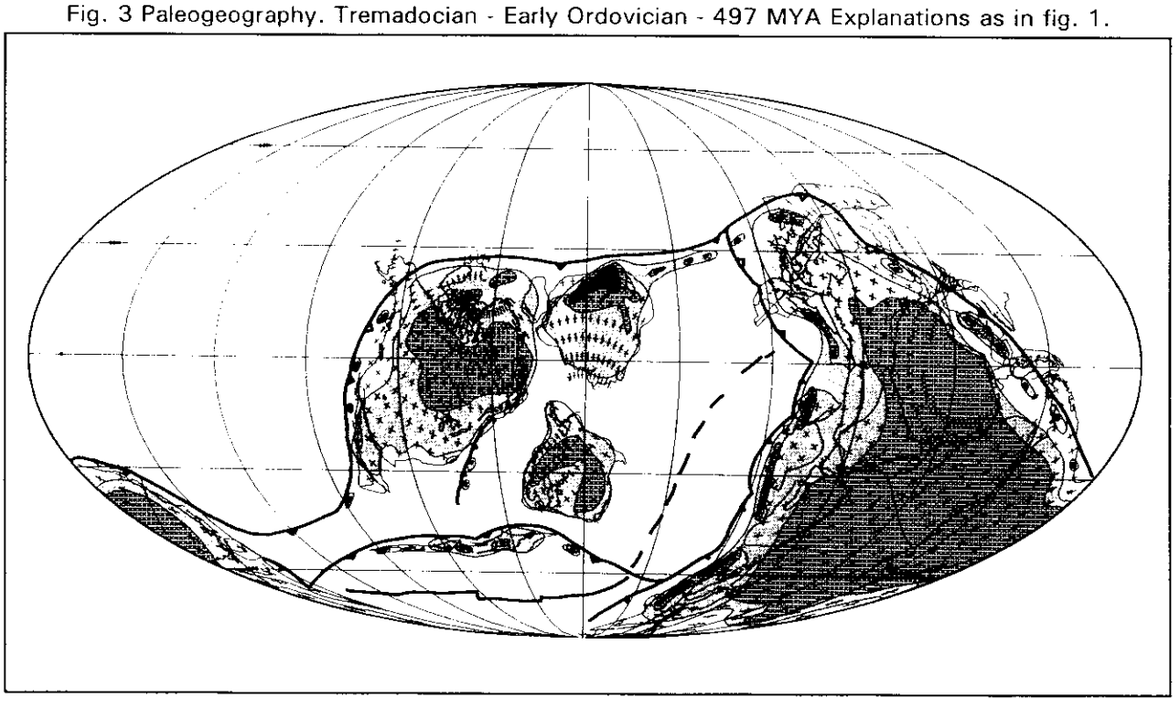

Fig. 4 Paleogeography. Llandeilian - Middle Ordovician - 458 MYA Explanations as in fig. 1.

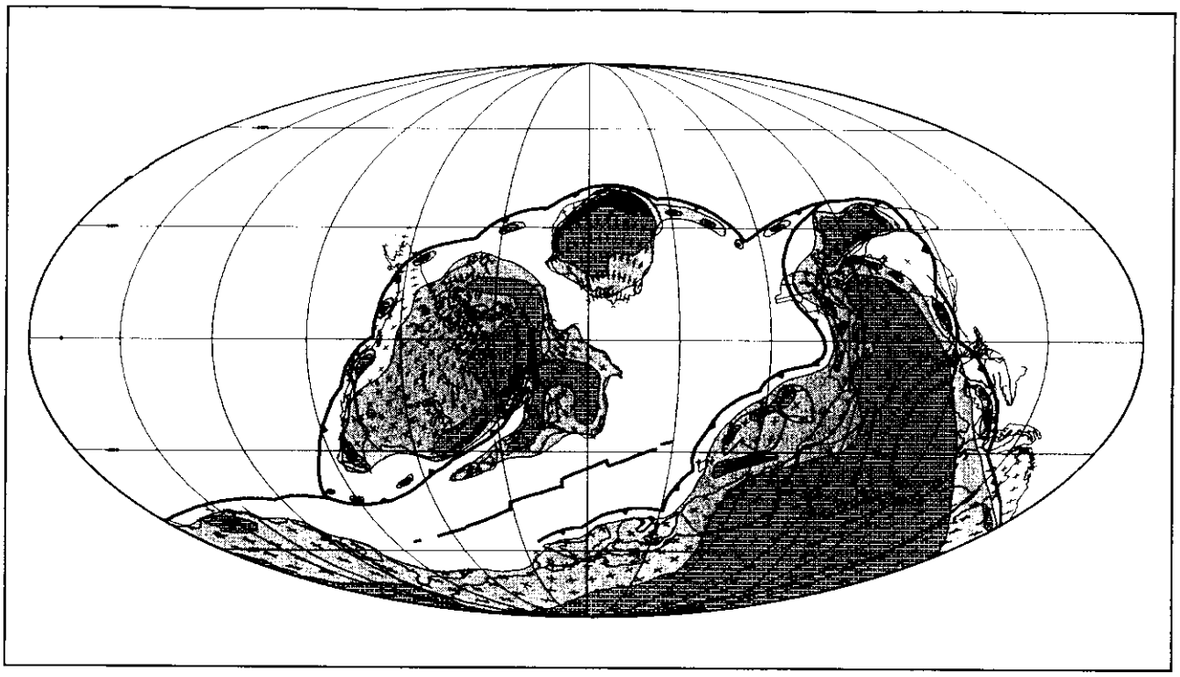

Fig. 5 Paleogeography. Llandoverian - Middle Silurian - 433 MYA Explanations as in fig. 1.

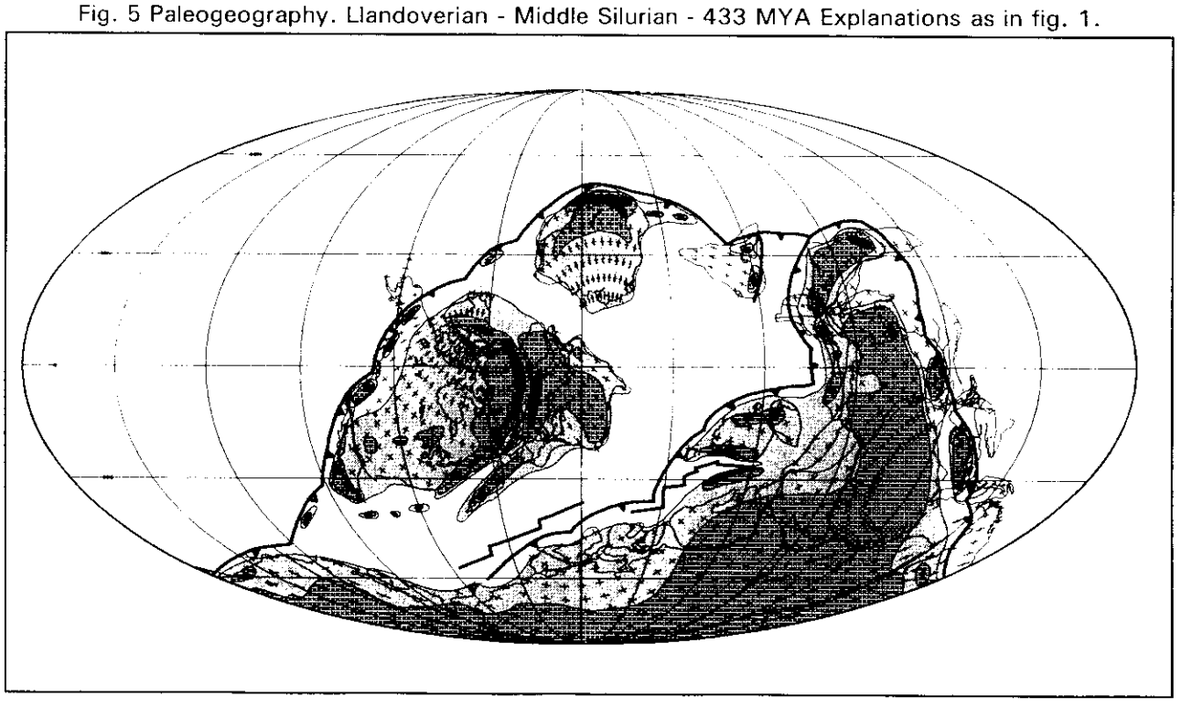

Fig. 6 Paleogeography. Wenlockian - Middle Silurian - 425 MYA Explanations as in fig. 1.

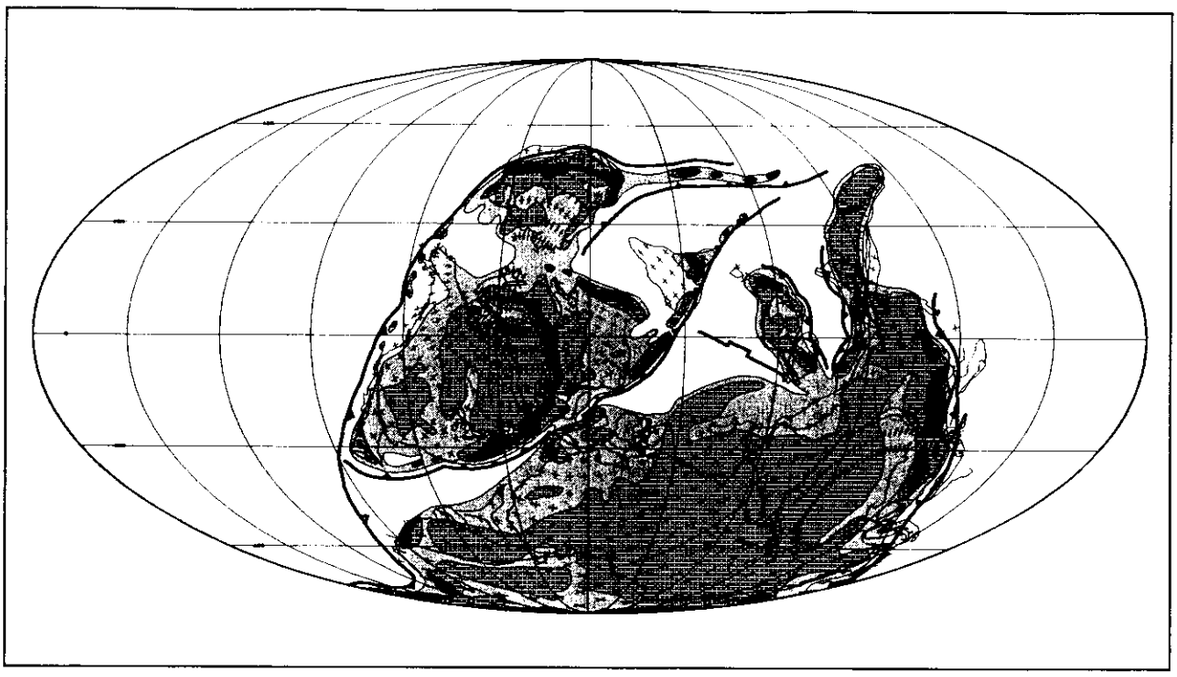

Fig. 7 Paleogeography. Gedinian - Early Devonian - 390 MYA Explanations as in fig. 1.

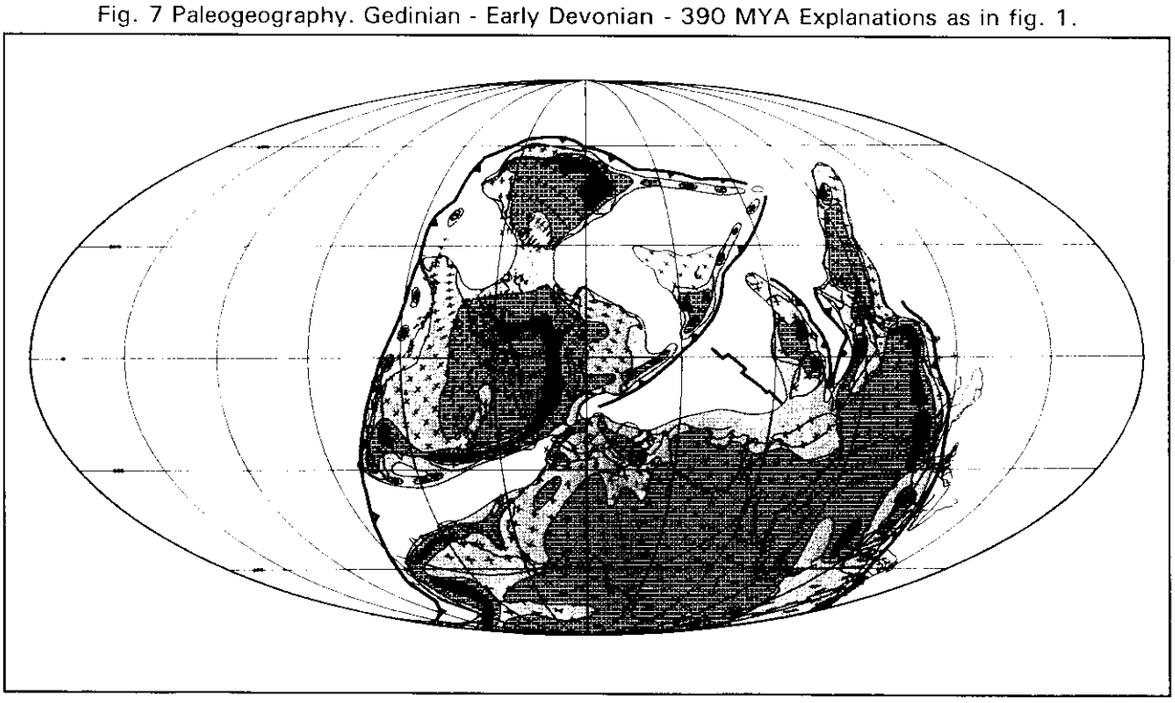

Fig. 8 Paleogeography. Givetian - Middle Devonian - 377 MYA Explanations as in fig. 1.

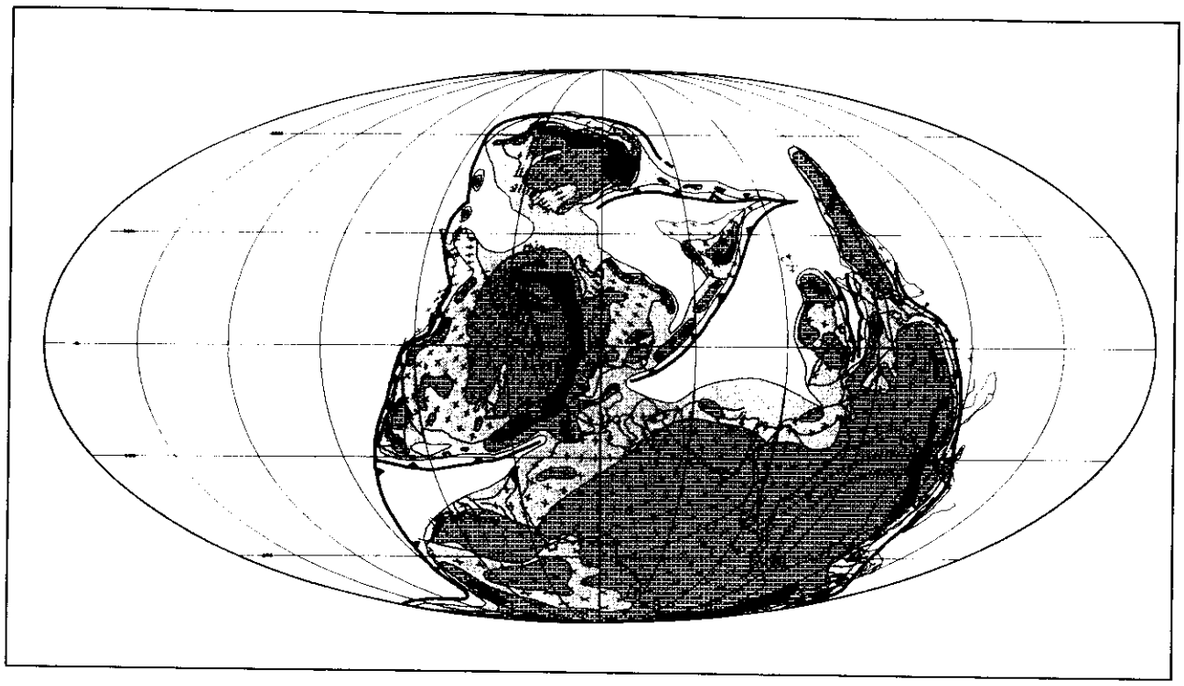

Fig. 9 Paleogeography. Fammenian - Late Devonian - 363 MYA Explanations as in fig. 1.

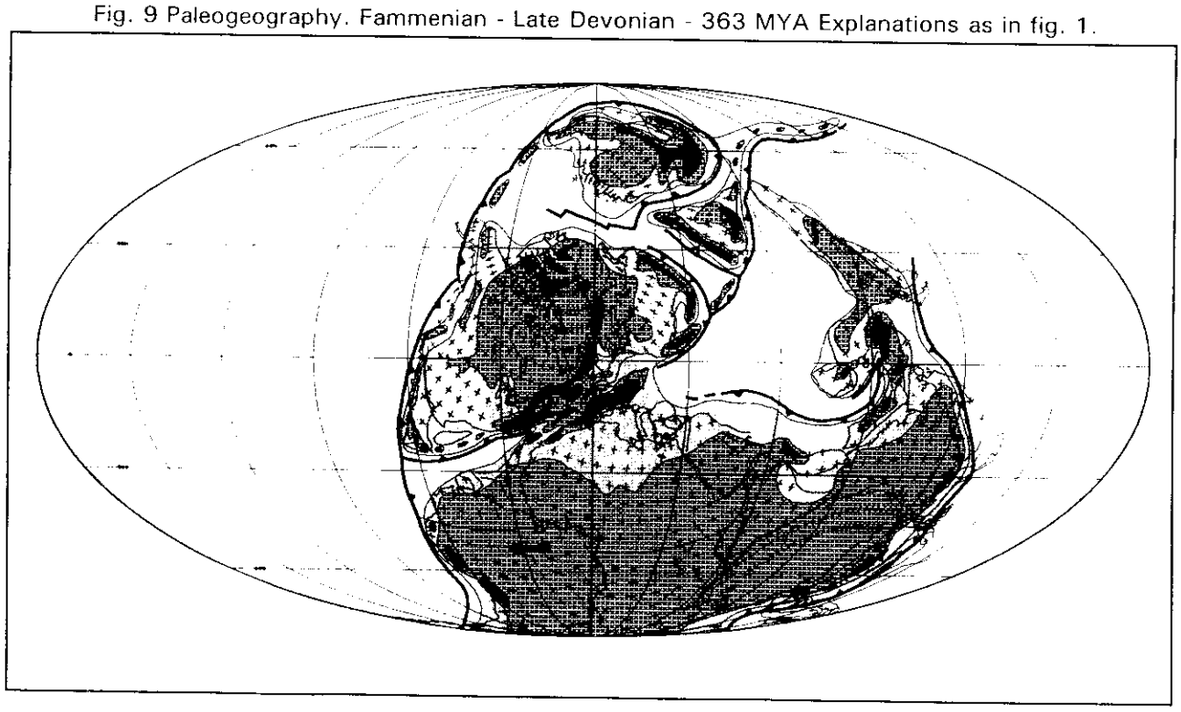

Fig. 10 Paleogeography. Visean - Early Carboniferous - 342 MYA Explanations as in fig. 1.

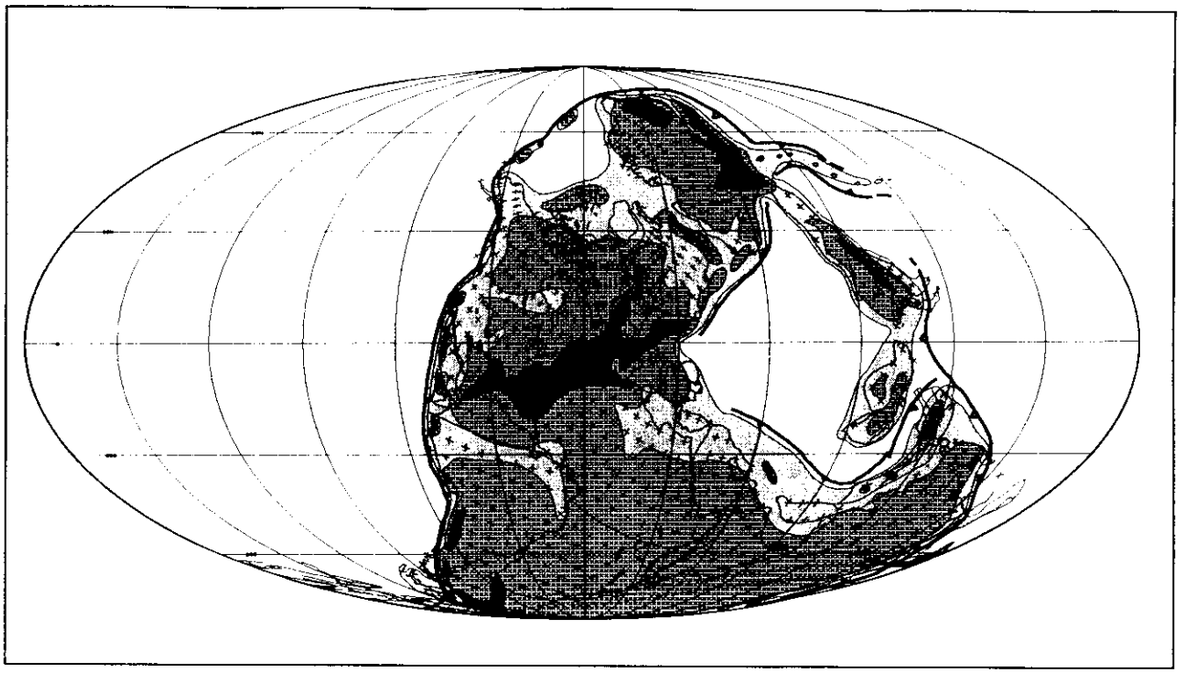

Fig. 11 Paleogeography. Westphalian - Late Carboniferous - 306 MYA Explanations as in fig. 1.

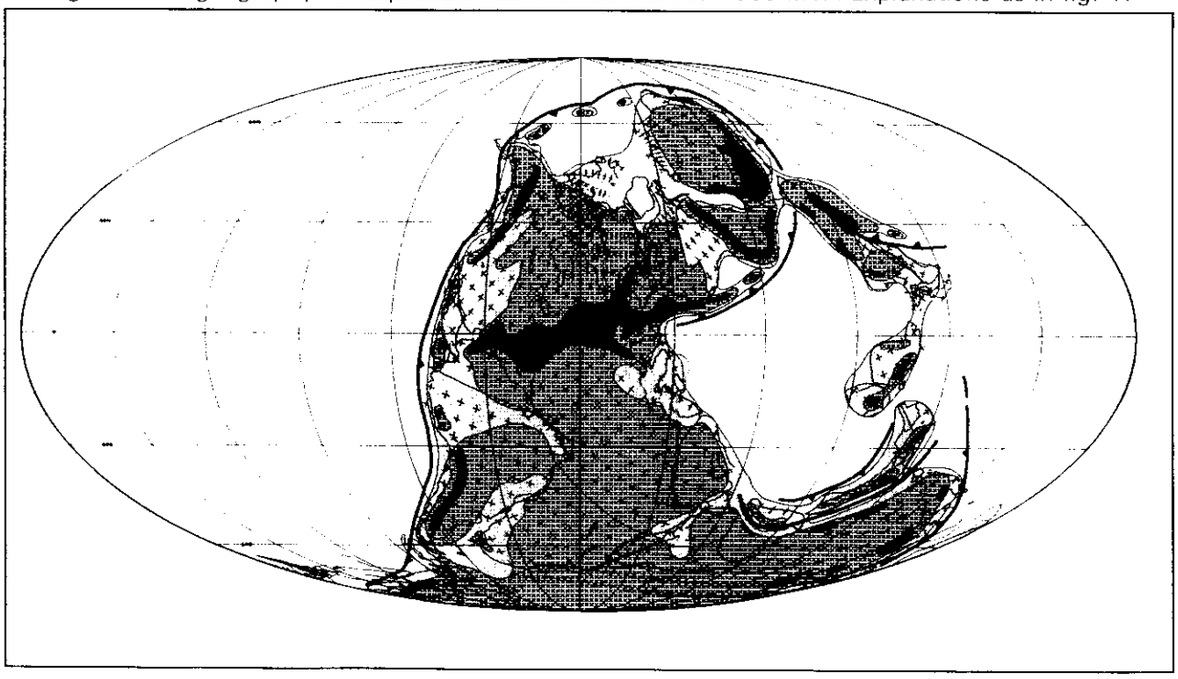

Fig. 12 Paleogeography. Artinskian - Early Permian - 277 MYA Explanations as in fig. 1.

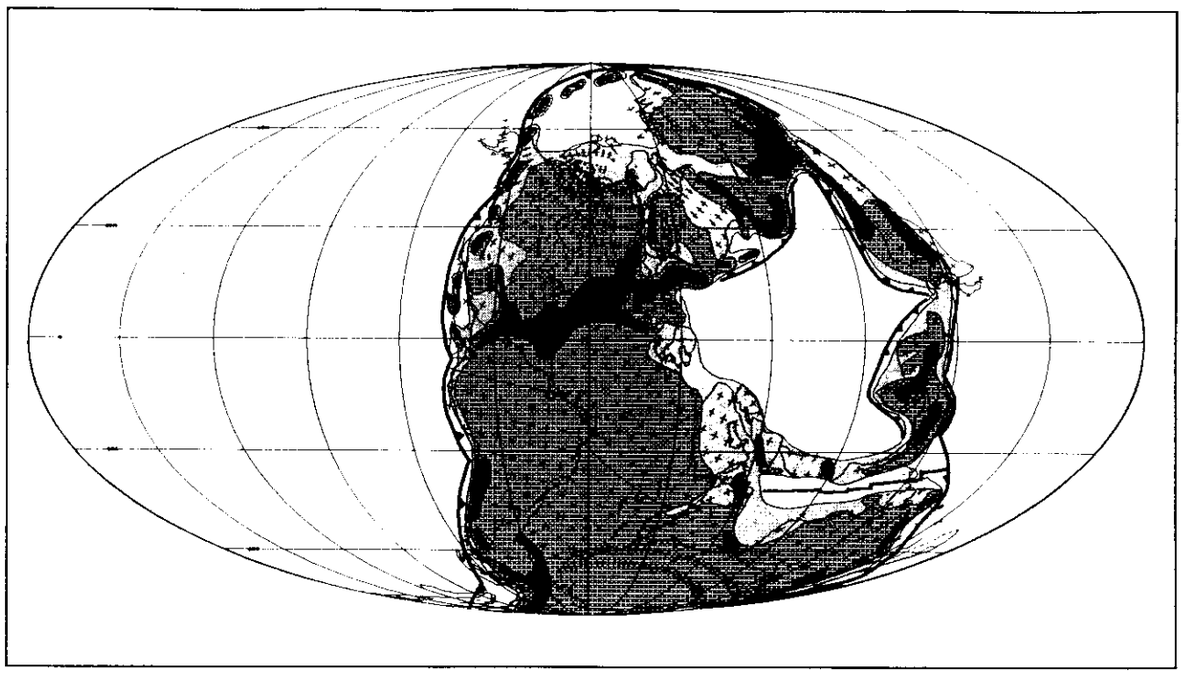

Fig. 13 Paleogeography. Kazanian - Late Permian - 255 MYA Explanations as in fig. 1.

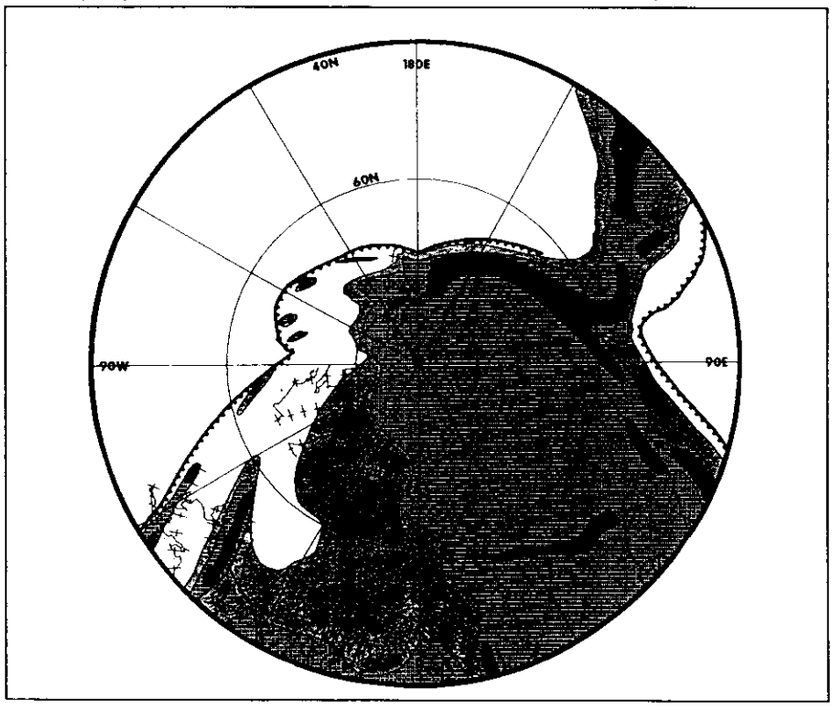

Fig. 14 Paleogeography. Induan - Early Triassic - 237 MYA Explanations as in fig. 1.

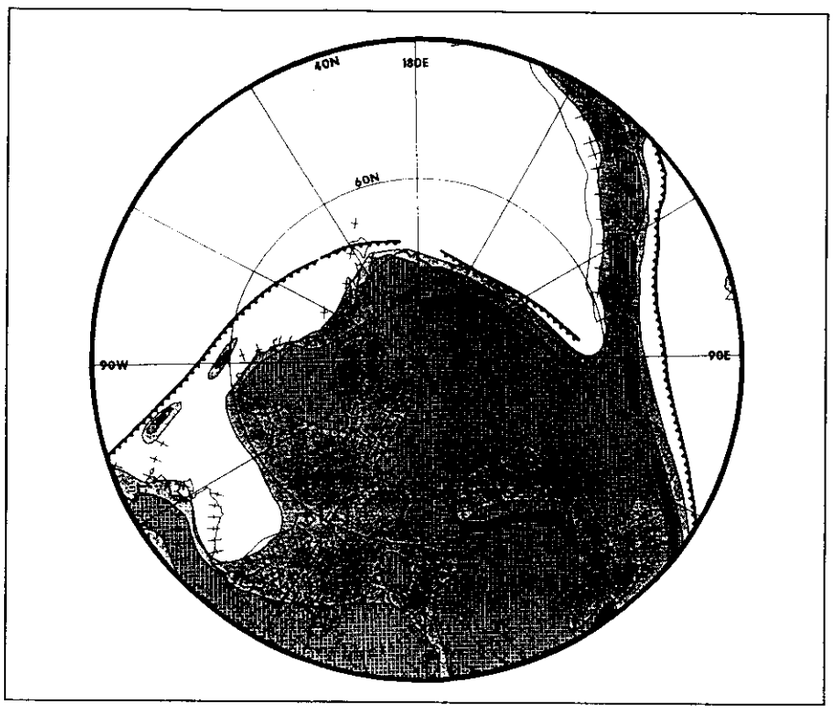

Fig. 15 Paleogeography. Norian - Late Triassic - 216 MYA Explanations as in fig. 1.

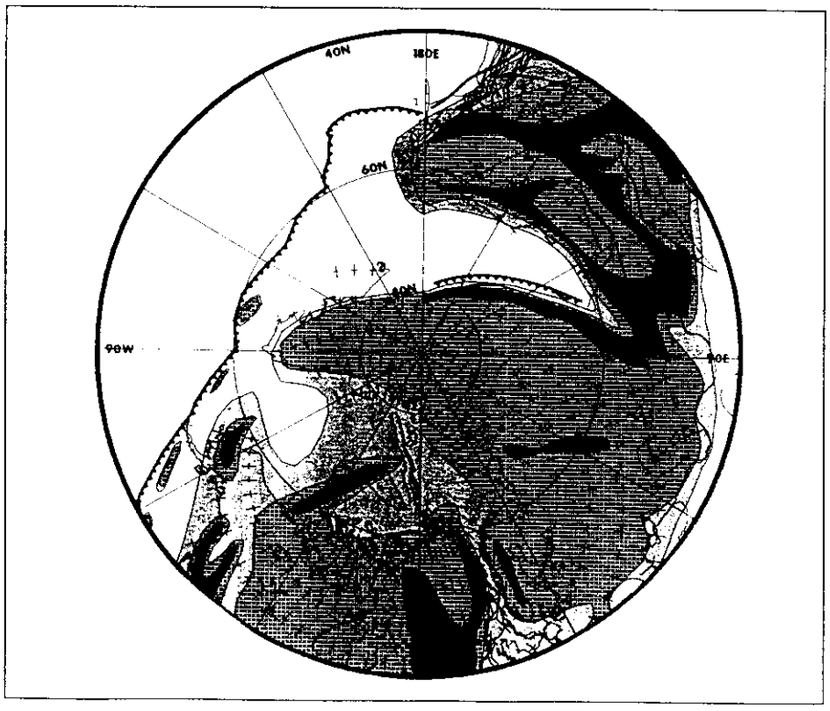

Fig. 16 Paleogeography. Pliensbachian - Early Jurassic - 195 MYA Explanations as in fig. 1.

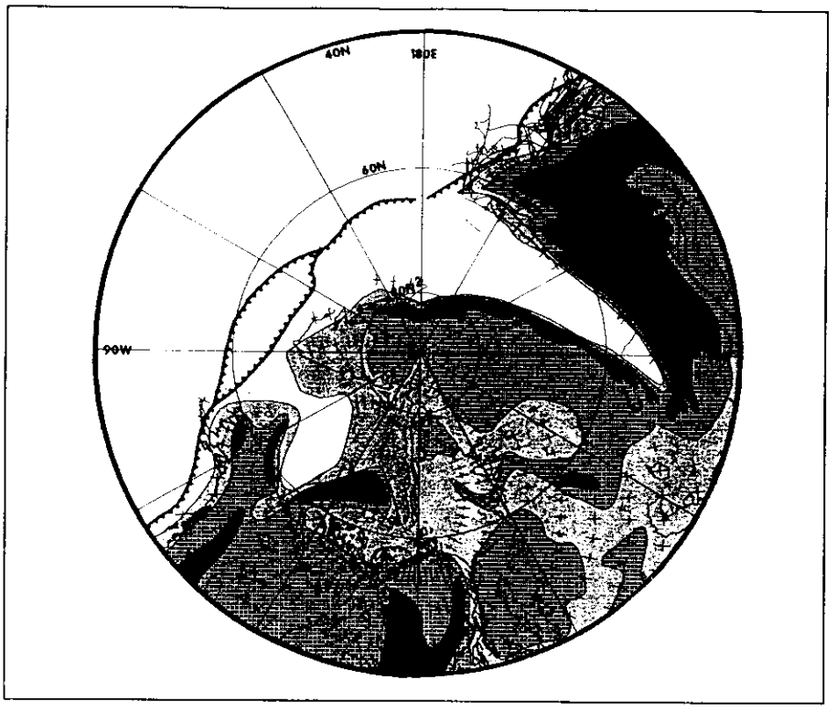

Fig. 17 Paleogeography. Callovian - Middle Jurassic - 166 MYA Explanations as in fig. 1

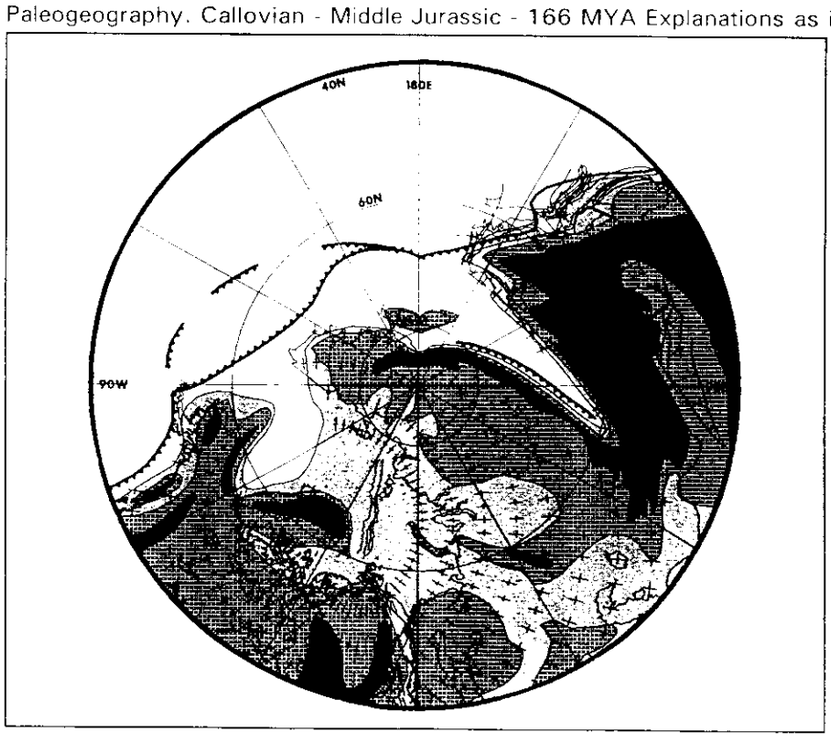

Fig. 18 Paleogeography. Tithonian - Late Jurassic - 152.2 MYA Explanations as in fig. 1.

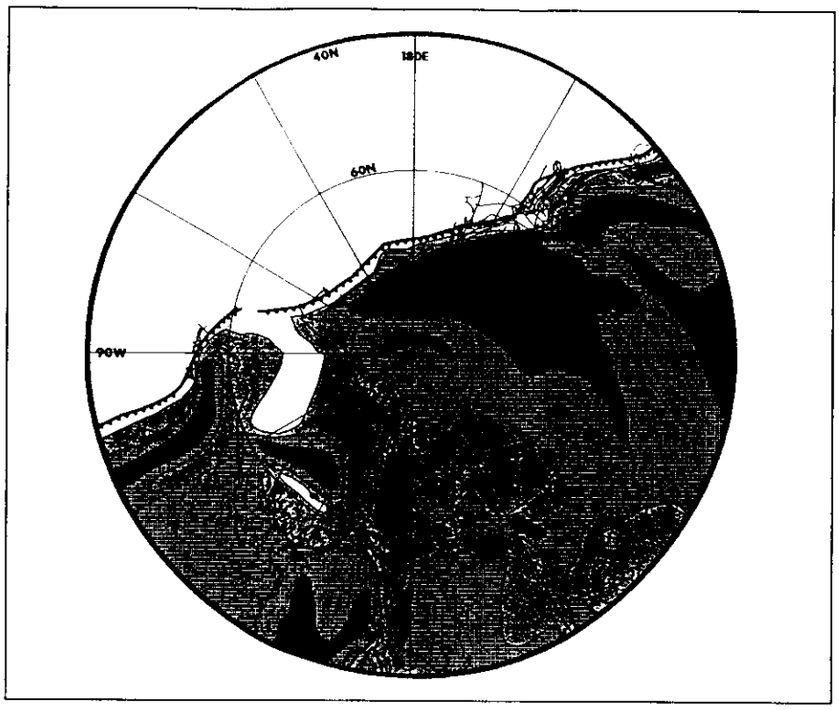

Fig. 19 Paleogeography. Valanginian - Early Cretaceous - 130.2 MYA Explanations as in fig. 1.

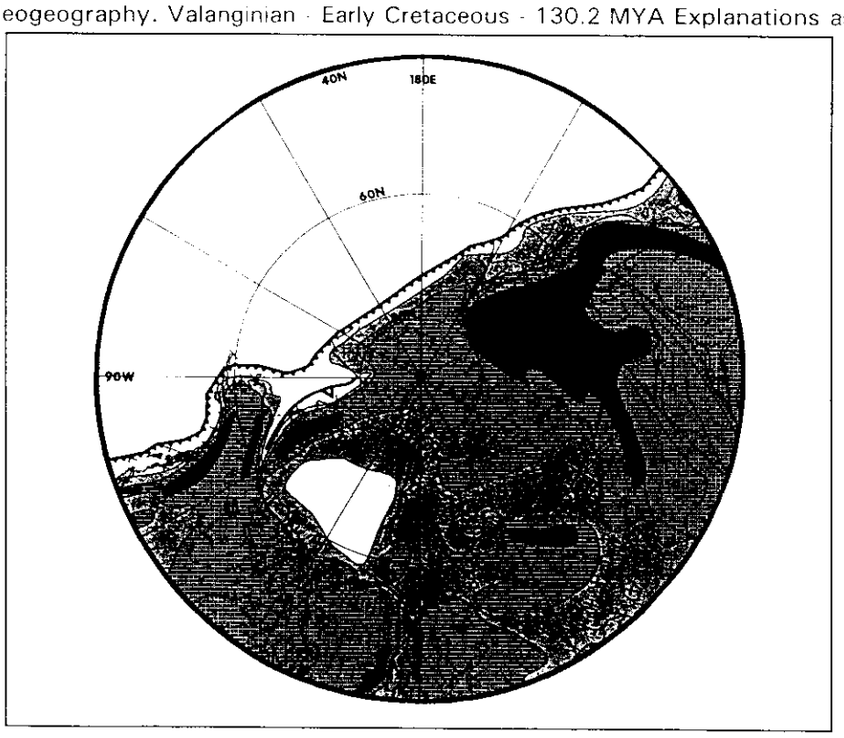

Fig. 20 Paleogeography. Aptian - Early Cretaceous - 118.7 MYA Explanations as in fig. 1

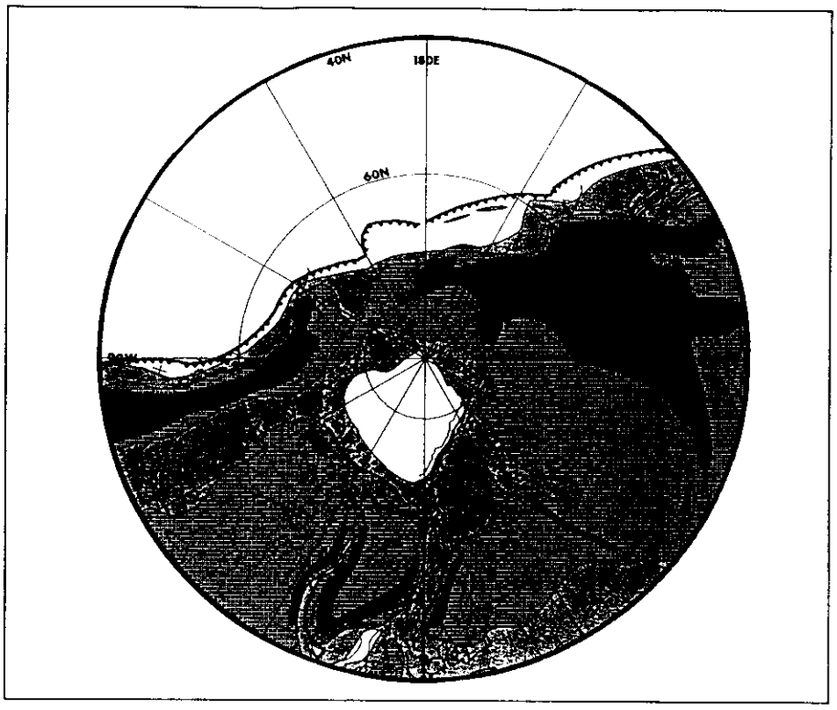

Fig. 21 Paleogeography. Cenomanian - Late Cretaceous 94.0 MYA Explanations as in fig. 1

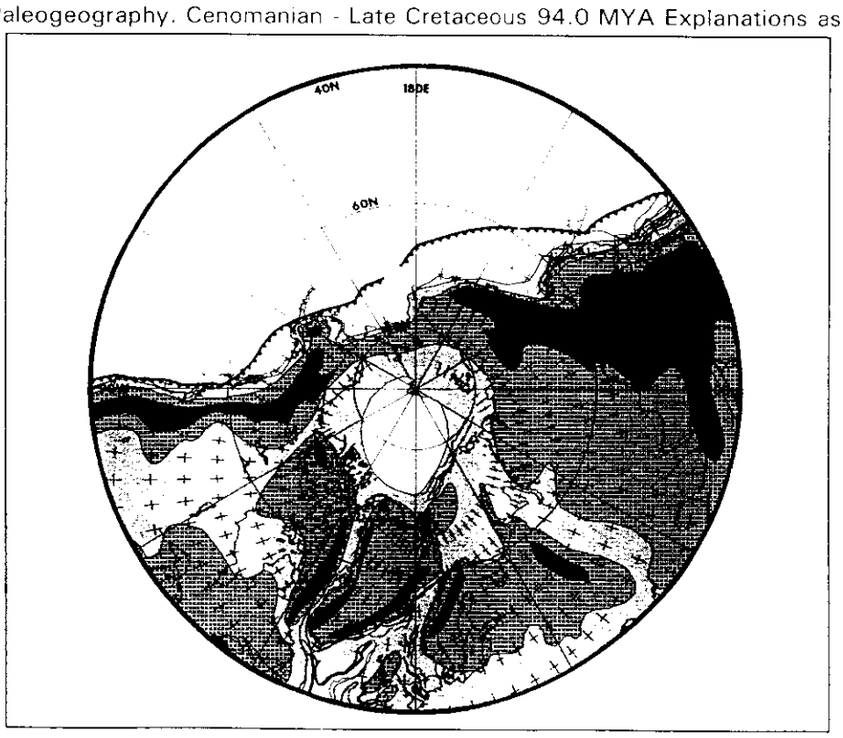

Fig. 22 Paleogeography. Coniacian - Late Cretaceous - 88.0 MYA Explanations as in fig. 1.

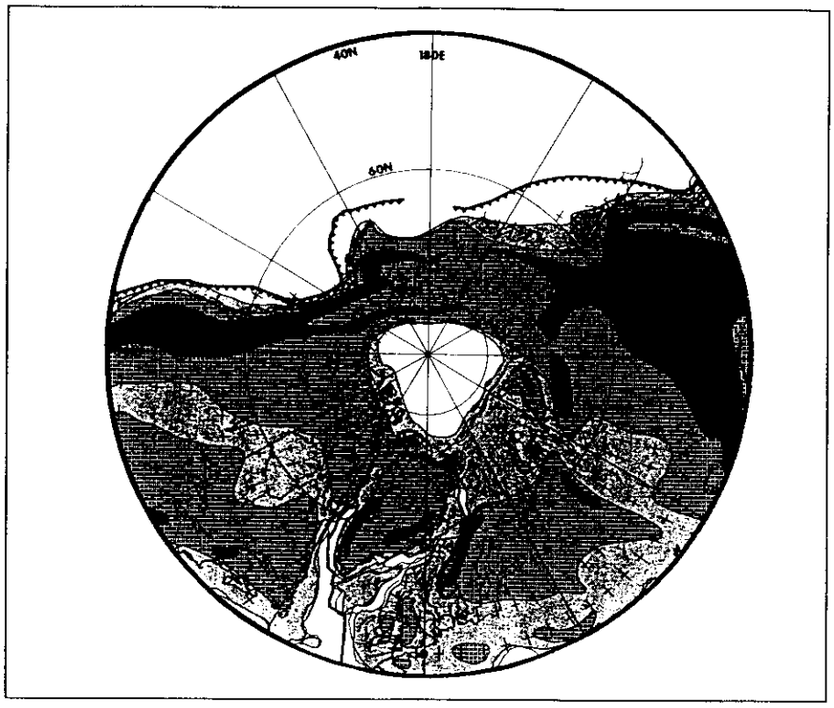

Fig. 23 Paleogeography. Maestrichtian - Late Cretaceous - 69.4 MYA Explanations as in fig. 1

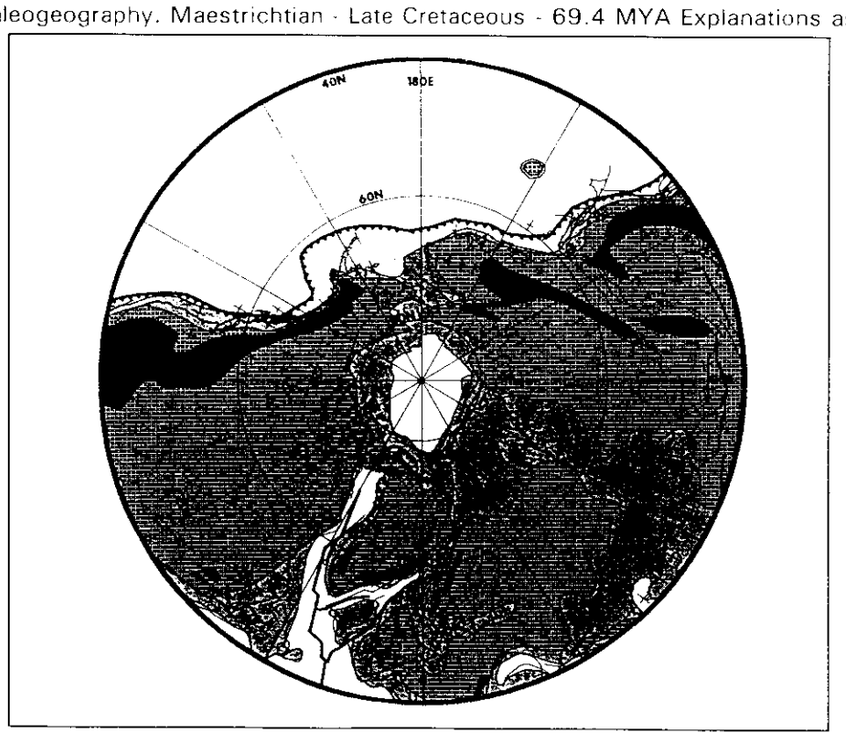

Fig. 24 Paleogeography. Thanetian - Late Paleocene - 59.3 MYA Explanations as in fig. 1

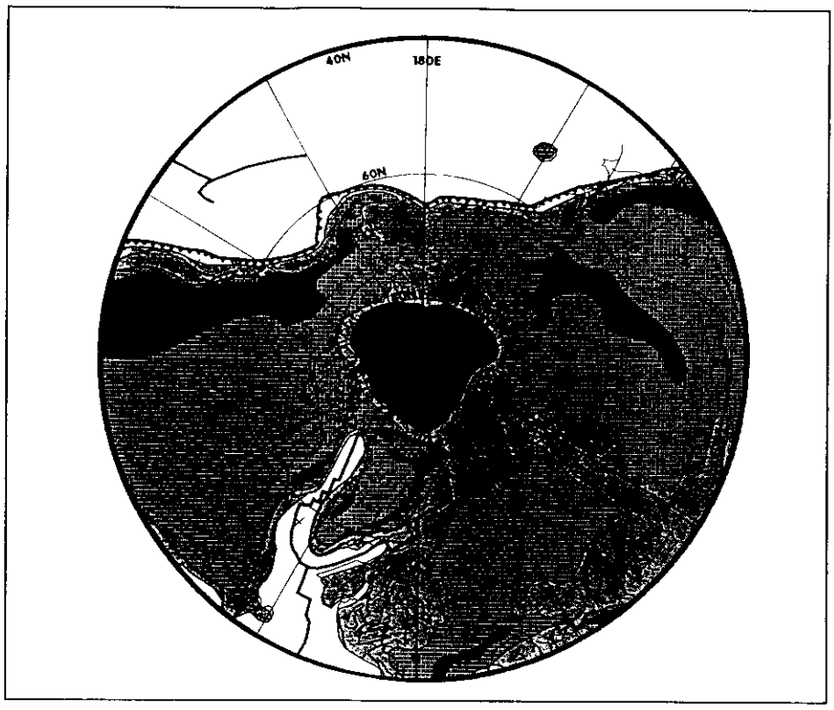

Fig. 25 Paleogeography. Lutetian - Middle Eocene - 50.3 MYA Explanations as in fig. 1.

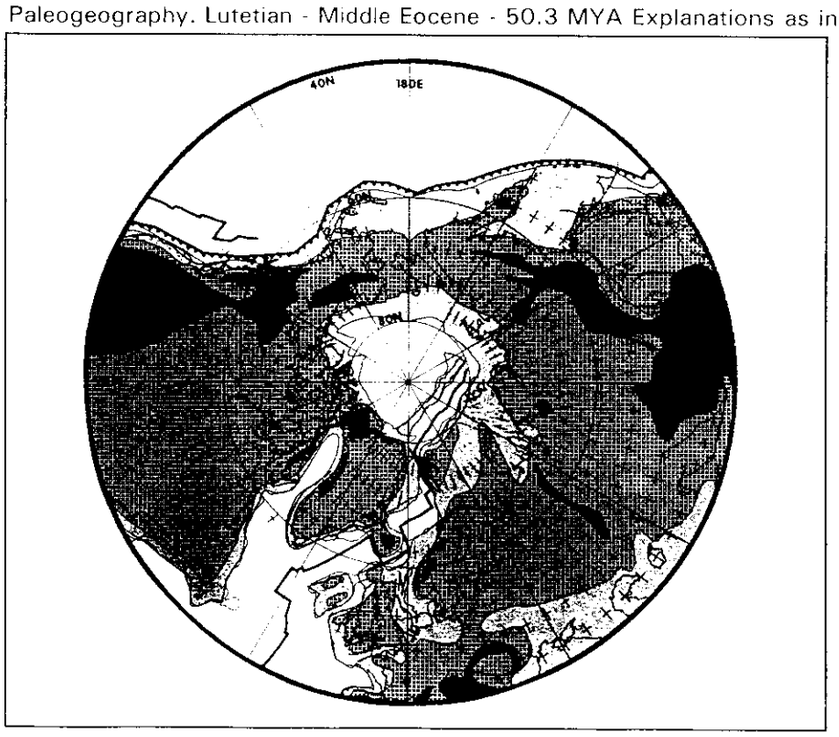

Fig. 26 Paleogeography. Chattian - Late Oligocene - 27.7 MYA Explanations as in fig. 1.

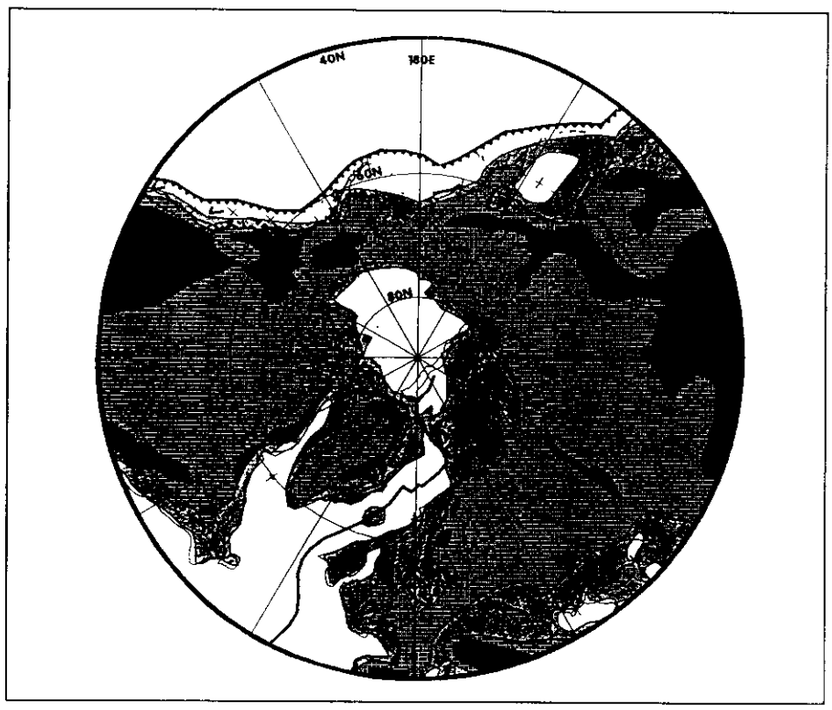

Fig. 27 Paleogeography. Vindobonian - Middle Miocene - 14.0 MYA Explanations as in fig. 1

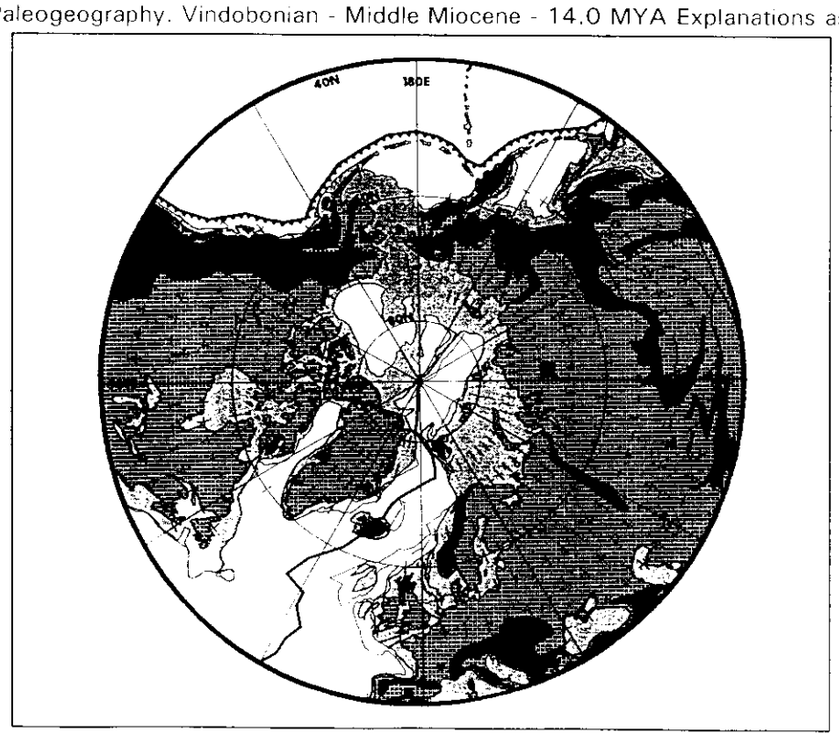

Fig. 28 Paleogeography. Present Day. Explanations as in fig. 1.