

# The biostratigraphic position of the Kap København Formation based upon its foraminifera

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Two lithological units are distinguished in the Kap København Formation (Funder & Hjort 1980; Funder et al. 1984; Funder et al. 1985): a lower member A composed mainly of clay, and an upper member B composed mainly of sand. An upper subunit of the latter, B2, comprises silty deposits. These sediments are in many places deformed and disturbed, partly squeezed and overthrust, most probably by subsequent overriding glaciers. This blurs the stratigraphic picture at many places.

Fossil foraminifera occur in many samples from the fine grained sediments of member A and of unit B2 and also in

some samples from the upper part of unit B1. Some of the foraminiferal assemblages are well preserved, whereas others are in a poorer state of preservation. Many samples were barren of foraminifera even though molluscan shells occurred in them. Dissolution of the delicate calcium carbonate tests by ground water may have taken place. During periods of melting this water probably becomes acidic owing to percolation through the sediments which may be very rich in plant debris.

Foraminiferal assemblages from member A are characterized by the planispiral species *Nonion erucopsis* Todd (1957). This species is an intermediate form between the Oligocene-Miocene *Nonion affine* (Reuss) and the Pleistocene *Nonion barleeianum* (Williamson). *Nonion erucopsis* often occurs abundantly, thus forming a *Nonion erucopsis* assemblage zone. It sometimes occurs together with a probably not previously described *Elphidium* with a sharp, almost keeled periphery. Sometimes *Cassidulina laevigata* d'Orbigny and *Cassidulina teretis* Tappan are more frequent than this *Elphidium*. A few specimens of *Cibicides grossa* Ten Dam & Reinhold may also be present. These assemblages do not reflect a Quaternary arctic environment, but are much closer to Upper Pliocene assemblages from Lodin Elv, East Greenland (Feyling-Hanssen et al. 1982), Clyde Foreland, and the Qivitua Peninsula, Baffin Island (Feyling-Hanssen 1976, 1980, 1985). They are also very similar to Upper Pliocene assemblages in borings from the central North Sea (King 1983; Feyling-Hanssen 1986). The *Nonion erucopsis* assemblages from member A of the Kap København Formation are thus of Upper Pliocene age.

Sediment samples from the upper part of unit B1 and the lower part of unit B2 contain well preserved foraminiferal assemblages. Even though the small species *Nonion niveum* Lafrenz dominates these assemblages, the large, conspicuous, planispiral species *Elphidiella rolfi* Gudina & Palovova characterizes them. (This species was referred to as *Elphidiella* cf. *subcarinata* in Funder et al. 1985). *Elphidiella rolfi* was described from uppermost Pliocene/lowermost Pleistocene deposits of Ajon Island, northern Chukotka, USSR (Gudina et al. 1984). *Elphidiella hannai* (Cushman & Grant 1927) is found together with *Elphidiella rolfi* in the Plio-Pleistocene deposits of the Ajon Island, and a few specimens of this species are also found together with *E. rolfi* in the Kap København Formation. *Elphidiella hannai* is known from Pliocene/Pleistocene transitional deposits in the Nome area (Cushman 1941), on the Seward Peninsula (Hopkins et al. 1974), in Beaufort Sea borings (McNeil et al. 1982) and particularly from the southern North Sea basin (i.a. Doppert 1980).

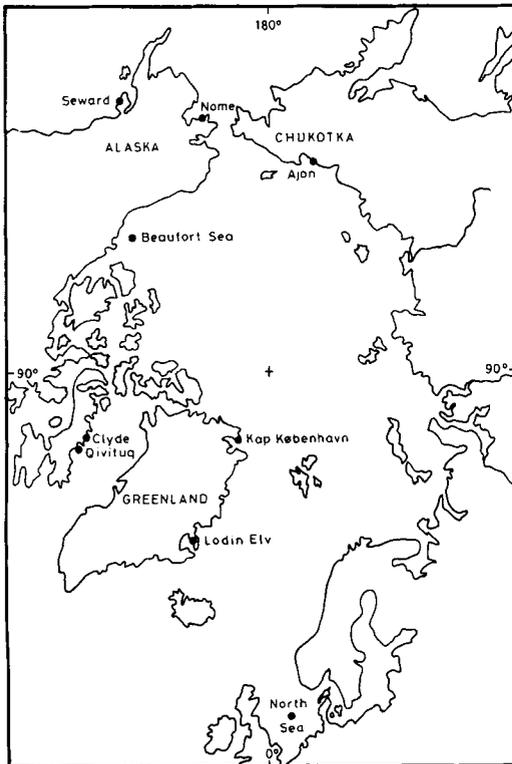


Fig. 1. Localities mentioned in the text.

The *Elphidiella rolfii* assemblage zone of the upper unit B1 and lower unit B2 of the Kap København Formation thus marks the transition between the Pliocene and the Pleistocene.

Samples from the upper and major part of unit B2 usually contain well preserved foraminiferal assemblages with large amounts of *Elphidium excavatum* (Terquem). This species occurs together with *Nonion niveum*, *Nonion orbiculare* (Brady), *Elphidium ustulatum* Todd and *Buccella frigida* (Cushman). Scattered specimens of *Elphidiella hannai* and *E. rolfii* are also present. Assemblages from the lower part of these deposits contain many specimens of the families Polymorphinidae and Glandulinidae, whereas *Cassidulina reniforme* d'Orbigny, *Elphidium bartletti* Cushman and *Elphidium asklundi* Brotzen are more important in the upper part of the subunit. Many specimens of *Elphidium excavatum* from the lower part of these deposits have a more or less subacute periphery, whereas they are more broadly rounded in the upper part. Some specimens of the large and characteristic *Elphidiella gorbunovi* Stschedrina also occur in the upper part of this *Elphidium excavatum* assemblage zone of the Kap København Formation.

This *Elphidium excavatum* zone, particularly its upper part, reflects a high-arctic environment. Comparison with Pleistocene assemblages from many parts of the northern hemisphere (i.a. Cushman 1941; Hopkins et al. 1974; Gudina et al. 1984) shows that it belongs to the lower part of the Pleistocene. In particular, comparison with foraminiferal assemblages in North Sea borings (i.a. Ásbjørnsdóttir 1987) places the *Elphidium excavatum* assemblage zone of the Kap København Formation in the lower part of the Early Pleistocene.

The foraminifera thus reveal that the Kap København Formation, or at least parts of it, was deposited on an inner shelf, in a sublittoral to littoral environment during the Upper Pliocene to lower Early Pleistocene. Open water must have occurred, at least seasonally, in the area during this period. This conclusion is in good agreement with results reached by Funder and co-workers already in 1984.

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