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Developments in petroleum exploration offshore West Greenland in 1978

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During the winter of 1977–1978 results to date from all work undertaken in the concession areas offshore West Greenland were thoroughly reviewed by the concessionaires. A negative evaluation had already been placed on this area because of the disappointing results from all the wells drilled in 1976 and 1977, in particular the lack of the necessary combination of suitable source rocks and reservoir rocks (Henderson, 1978). After further consideration, companies that had earlier contemplated drilling in 1978 decided against doing so. In the event, the only work undertaken within the concession area was a seismic survey by the Chevron Group in concession 28, amounting to some 341 line kilometres.

By the end of November 1978 notice of intention to relinquish had been given for 10 out of the 13 concessions granted in 1975 (Henderson, 1976) and only three, nos 27 and 28 (Chevron Group) and 32 (Mobil Group) were still retained.

During 1978 Survey staff were engaged in a full evaluation of all geophysical and well data from this part of the West Greenland shelf, firstly in order to be able to advise the Ministry for Greenland on the petroleum potential of this area in the light of developments and secondly with a view to publication of data and interpretations as soon as the periods of confidentiality expire.

The Survey was well supplied through the Ministry for Greenland with data and company

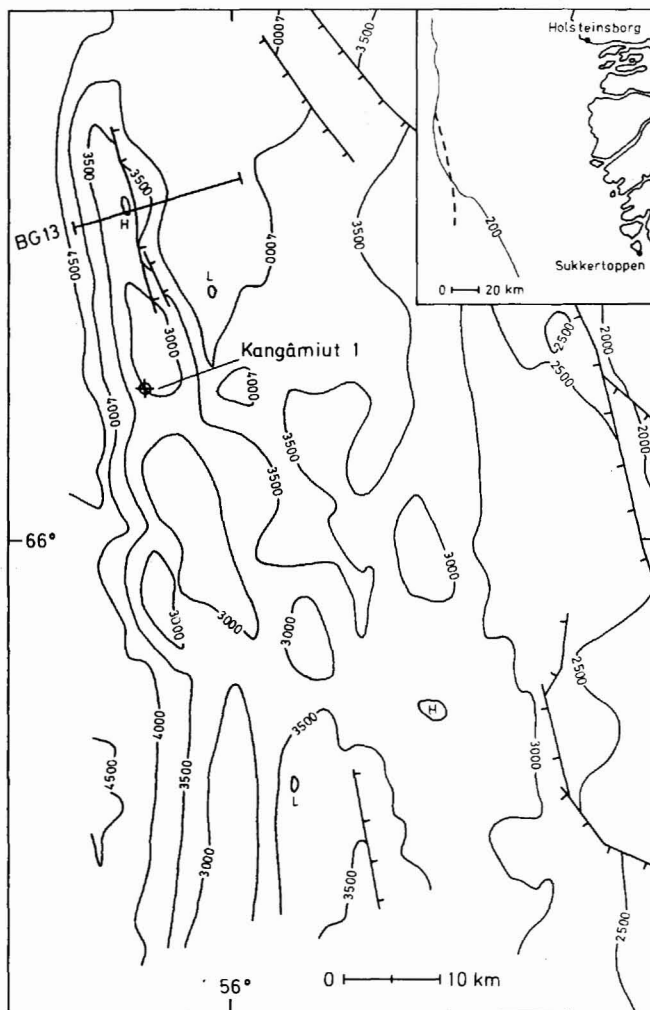


Fig. 15. Depth-to-basement map covering the Kangâmiut structure. Depths in milliseconds of two-way travel time. H = high, L = low, $\perp\perp$ = normal fault, ticks on downthrown side. Based on maps produced before April 1975 by GGU (J. B. Risum) and Negem N.V. Inset map shows location of structure and 200 m isobath.

interpretations of the data, and had frequent contacts with the companies concerned. The Survey has in addition done extensive independent analyses both of data and samples. The analyses undertaken have included biostratigraphic analyses (palynology and micropalaeontology) and source rock analyses. Part of the work has been done by Survey staff and part has been done with the help of outside consultants.

Although there are some differences in opinion on details in the interpretation of the data the Survey can only confirm the overall negative evaluation placed on this area.

Data from the four wells drilled in 1977 are still confidential. General information concerning the Kangâmiut 1 well drilled in 1976 was released in the summer of 1978 (Manderscheid, 1978 & in press; the Geological Survey of Greenland, 1978) and results of palynological studies on samples from this well are given by Croxton (this report). Some

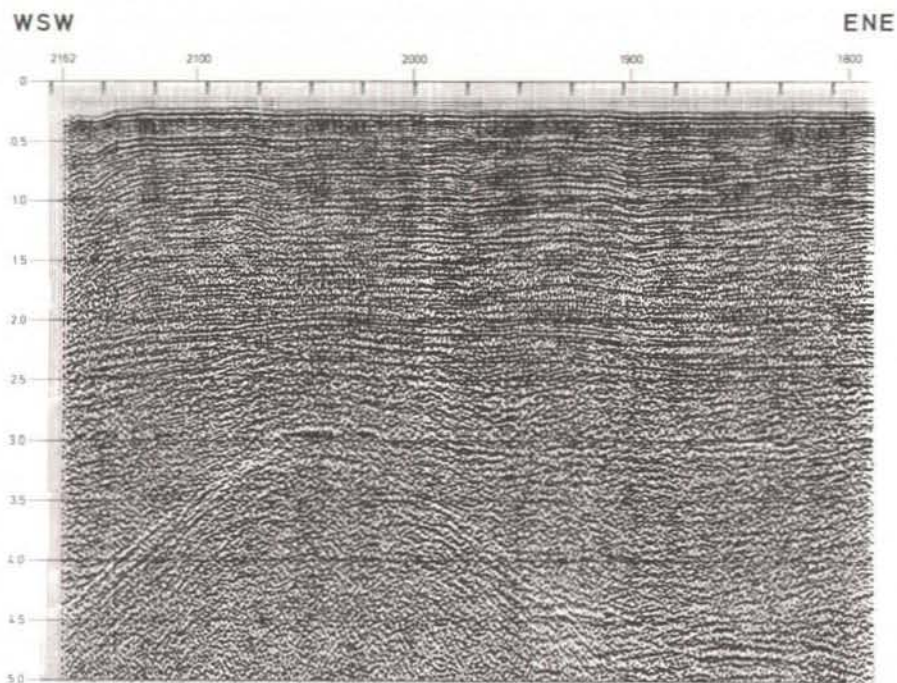


Fig. 16. Part of seismic section BG-13 between shotpoints 1800 and 2162. Depths in seconds of two-way travel time. The deep reflector with crest at 3.0 seconds is Precambrian basement.

comments on the well will help to explain why the results of petroleum exploration so far have not fulfilled early hopes.

Kangâmiut 1 was located near the crest of an elongated dome on a very large basement high largely located beneath the outer margin of the continental shelf (figs 15 & 16). The structure continues southwards into areas of deeper water below the continental slope. At basement level the main structure is 10–15 km wide and at least 90 km long. The particular closed area tested by Kangâmiut 1 as defined by the lowest encircling contour is over 15 km long and 5 km wide at basement level, and closure extends into the lower part of the overlying sedimentary section. The structure within the sediments is largely due to differential compaction over a pre-existing, fault-controlled basement structure.

Thus in terms of its size, depth of burial and volume of sediments within the structural closure the Kangâmiut structure was considered very attractive as a drilling target.

The section down to 2625 m in the well was largely sandy. From 2625 m to 3700 m (top Precambrian basement) the section was almost entirely shaly (clayey) with conglomerate in the lowermost 30 m. A drillstem test in the lowest interval yielded no formation fluids and the pressure data obtained did not allow conclusions to be drawn about the reservoir characteristics of the interval. Small gas shows were encountered in the mud above basement (Manderscheid, in press). Although the lower part of the sedimentary section in this area

might thus have some potential for gas generation (see also Croxton, this report) there is a lack of any good reservoirs in this critical section.

The oldest sediments above basement were found to be of Paleocene age and quite contrary to expectations there were no Cretaceous or older sediments.

These concession areas cover only about 2 per cent of the Greenland shelf. However the region in which they are located was regarded as being very promising. Although only five wells have been drilled the results from these extend beyond the immediate vicinity of the wells. Moreover, results from the Labrador shelf have not been as encouraging as was hoped for in the early days of exploration, and only gas with small amounts of gas condensate has so far been discovered.

The exploration on the West Greenland shelf has thus greatly reduced, but not entirely eliminated, the possibilities for finding commercial petroleum deposits south of Disko. The prospects for Melville Bugt are as yet untested, while much work will be required on the East Greenland shelf before areas of potential interest can be delineated.

Acknowledgements

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Palynological studies offshore West Greenland with preliminary results from the Kangâmiut 1 well

Catherine A. Croxton

During the summers of 1976 and 1977 a total of five wells were drilled offshore West Greenland (Henderson, 1978). GGU received samples of cuttings from all the wells while drilling was in progress and at a later date received the remnants of sidewall core material.