

SHORT COMMUNICATIONS

SIGNIFICANCE OF A NEW BASAL PEAT DATE FOR THE TREND OF HOLOCENE MEAN SEA LEVEL RISE IN THE NETHERLANDS¹

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Van de Plassche, O. 1982 Significance of a new basal peat date for the trend of Holocene mean sea level rise in The Netherlands – Geol. Mijnbouw 61: 397-399

BERENDSEN (1982) has recently published eight new radiocarbon dates from the base of the peat that occurs on the gently seaward sloping Pleistocene surface in the mid-western Netherlands. The peat forms the base of the Holocene deposits in the area. This basal peat originated mainly in response to fresh-water supply by seepage and rivers and to the Holocene sea level rise. One of these eight time-depth results – sample Kamerik III (5770±60 BP, GrN-9157; depth -7.5 m NAP³) – plots below the MSL⁴-trend curve recently established for the western and northern Netherlands (VAN DE PLASSCHE, 1982; Fig. 1). This implies that the MSL curve may be in error, since it is unlikely that initial basal peat growth occurred after MSL crossed the -7.5 m NAP line. The anomalous time-depth position of sample Kamerik III might, however, be due to causes such as contamination of the sample, removal of the initial peat layer and replacement by younger material, or later initial peat growth depending on special local conditions.

This short communication evaluates the reliability and significance of the Kamerik-III sample by reference to available evidence. First, however, it should be mentioned that the precise altitude of the sample has been established correctly and that, given the sandy nature of the substrate, it must be considered very unlikely that local subsidence of underlying Pleistocene deposits is involved.

The surface of the Pleistocene deposits in the mid-western Netherlands shows a typical eolian morphology. It consists of an irregularly undulating surface with small to moderate

(<2m) height differences and closed depressions. On the basis of 17 radiocarbon-dated basal peat samples obtained from the highest parts of the Pleistocene topography in eight sample areas between Hazerswoude and De Meern (Fig. 2), the approximate basal peat surface at c. 7000, 6400, 5900, and 5500 BP could be reconstructed (VAN DE PLASSCHE, 1982). The

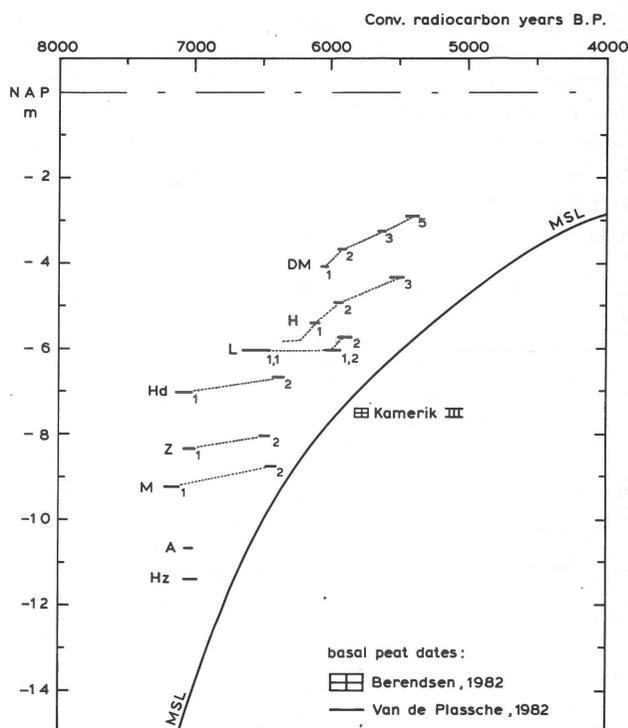


Fig. 1
Time-depth plot of basal peat data from the mid-western Netherlands and section of the MSL-trend curve for the Dutch coastal area.

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³NAP Nieuw Amsterdam Peil = New Amsterdam Datum

⁴MSL Mean Sea Level

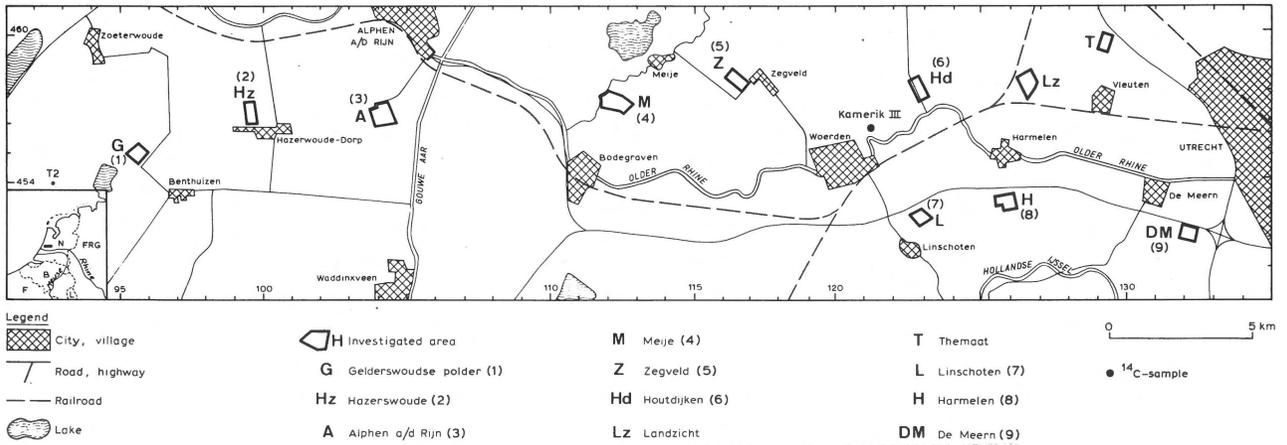


Fig. 2
Location map of basal peat sample areas.

pronounced seaward slope and height above contemporaneous MSL of these former peat surfaces (Fig. 3) indicate that basal peat growth on the sandy substrate in this region was strongly controlled by considerable fresh-water supply (seepage and river water).

Given its depth and geographical position between Zegveld and Houtdijken (Figs. 2 and 3) and assuming negligible lateral inclination of the peat surfaces at these two locations, it is possible to project sample Kamerik III on figure 3: it coincides approximately with the c.7000-BP peat surface. Since development and maintenance of an inclined basal peat surface presupposes a regular fresh-water supply, it is, judging from figure 3, very difficult to see how the sampling site under discussion could have remained sufficiently dry to prevent initial peat growth until 5770 ± 60 BP.

Other data suggesting that sample Kamerik III constitutes an isolated index point are the time-depth positions of samples Oude Rijn and Kockengen (BERENDSEN, 1982). Sample Oude Rijn relates to the top of the basal peat about

250 m south of the Kamerik sampling site. This sample gave a radiocarbon age of 5595 ± 35 BP (GrN-7963); its observed depth is -7.2 m NAP. The (compact) basal peat at this locality is 0.65 m thick and is overlain by 1 m of clay, 4 m of peat containing several intercalated clay beds, and a clay cover of about 1.25 m. Assuming a minimum compaction factor of 2.5, a minimum original altitude for the top of the basal peat is derived as -6.15 m NAP. Figure 3 shows that the position of the Oude Rijn sample accords reasonably well with the (extrapolated) c. 5900-BP and 5500-BP basal peat surfaces, particularly when it is considered that the original position of the sample may well have been somewhat higher and/or that peat growth may have occurred in shallow water.

With respect to sample Kockengen, which was collected 4.5 km northwest of the Kamerik sampling site, it is noteworthy that this basal peat sample from a depth of -7.2 m NAP gave an age of 7100 ± 45 BP (GrN-8710). This result is in agreement with other basal peat time-depth data obtained by the present author.

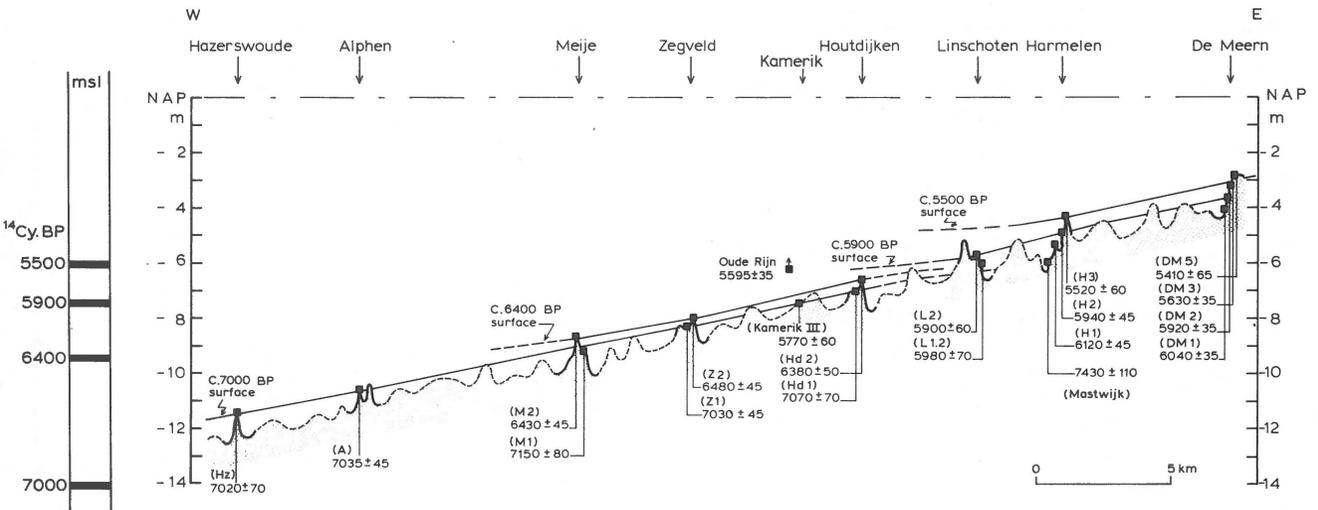


Fig. 3
Reconstruction of inclined basal peat surfaces between Utrecht and The Hague at c. 7000, 6400, 5900, and 5500 BP.

In conclusion, the above discussion of time-depth data suggests that the Kamerik-III sample, if not in error, represents an isolated deviation of the general trend of basal peat growth in the studied area. Hence, it would be unwise to modify the MSL-trend curve on the basis of this anomalous index-point alone.

With regard to a possible explanation of this anomaly it may be of significance that within the basal peat in the immediate surrounding of the Kamerik sampling site there occurs a sharp boundary, 0.5 to 2 dm above the sandy substrate, separating very well preserved *in situ* *Phragmites* peat above from root-free, clayey, gyttja-like material and black, amorphous peat below. For comparison, the base of the basal peat sampled at Zegveld and Houtdijken (Fig. 2) was composed entirely of, or contained many well preserved, *in situ* plant remains. Evidently, the causes of these marked vertical and lateral lithological differences, and their possible consequences for the reliability of the dated material, should be

investigated prior to any attempt to explain the abovementioned anomaly in terms of primary, special local conditions that resulted in absence of initial peat growth until at least 1000 years later than in the wider surrounding.

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