

## The age of the Hauer seter delta

ODDVAR LONGVA & MORTEN K. THORESEN

Longva, O. & Thoresen, M. K.: The age of the Hauer seter delta. *Norsk Geologisk Tidsskrift*, Vol. 69, pp. 131–134. Oslo 1989. ISSN 0029–196X.

Shell fragments from an earlier described locality at Brenni on Romerike are dated by  $^{14}\text{C}$  to  $9730 \pm 160$  BP. The date gives an age for the Hauer seter delta.

During Quaternary geological mapping in the Romerike area (Longva 1987) a shell locality at Brenni (Fig. 1), about 3 km east-northeast of Jessheim, was recovered and excavated. The locality, situated on the distal part of the Hauer seter delta, has been described earlier by Holmboe (1924) and Øyen (1924). They both found fragments and some unbroken shells of *Balanus crenatus* and *Mytilus edulis* in clay (Holmboe) and gravelly sand (Øyen). These sediments were deposited on bedrock and capped by a sand bed.

The excavated site lies 197 m a.s.l. 300 m east of the farm Brenni and about 17–18 m north of the highest point of a bedrock exposure on the field (UTM 247711).

### Lithostratigraphy

The lithostratigraphy consists of three main units above bedrock (Fig. 2). At the bottom a bed with layers of gravel, sand and silt/clay occurs. This bed shows an inclined stratification more or less parallel to the bedrock surface underneath. Rounded pebbles are common and these particles often lie in a shell matrix. Both fragments of *Balanus* and *Mytilus* are present (as described by Øyen 1924) and *in situ* well-preserved shells also occur. Many pebbles have *Balanus* growth marks on their surface. This lowermost unit wedges out against the dipping bedrock surface and is interpreted as a littoral lag deposit.

Above this unit an approximately 0.5 m thick marine clay occurs. The clay has lenses of sand/

silt and in the lowermost part shell fragments are common. In between this clay and the cultivated soil on top there is a ca. 0.45 m thick well-sorted, homogeneous glacial fluvial sand, which is interpreted as a distal deposit of the Hauer seter ice marginal delta.

### Dating

A sample with shell fragments from the lowermost unit was washed in water and the best preserved pieces of both *Balanus* and *Mytilus* were chosen for  $^{14}\text{C}$ -dating. The  $^{14}\text{C}$ -dating yielded an age of  $9730 \pm 160$  BP.

### Discussion

Ice marginal deposits in Norway have been given formal names with both a chronological and a morphological meaning (e.g. stage and substage (Holtedahl 1960) and Hauer setertrinnet (Holtedahl 1924)). We have followed the North American Stratigraphic Code (NACSN 1983) and the recommendations of the Norwegian Committee on Stratigraphy (Nystuen 1986) and have used the diachrone unit *Span*. The lateral extension of the ice marginal deposits of the Jessheim Span (Holtedahl 1924) is uncertain east of Jessheim, but is interpreted by Longva (1987) to lie south of the described locality (Fig. 1); this interpretation is adopted in this paper. The ML 200 m a.s.l. at Dal, north of the site, means that the area was dry land when the ice margin stood at that position (Sørensen 1982) (Fig. 1).

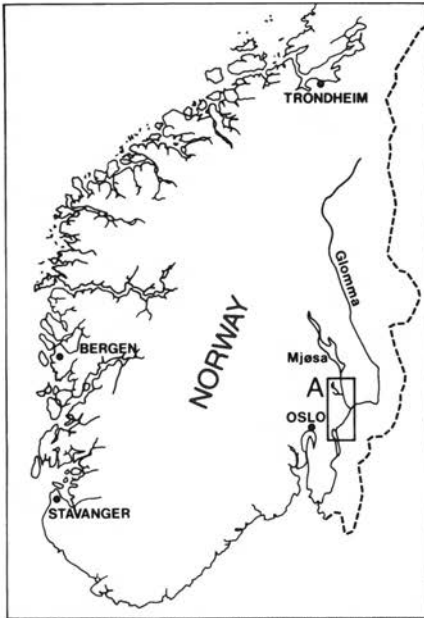
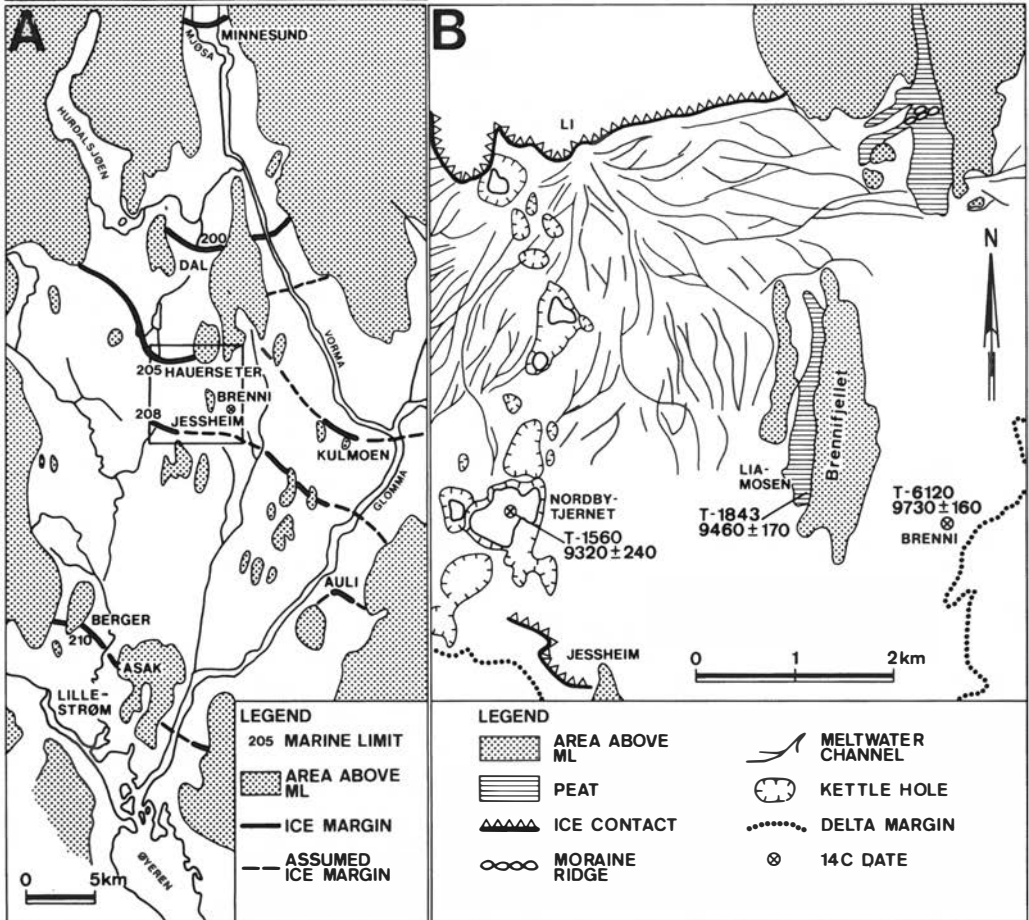


Fig. 1. Location map. A. The main ice marginal positions during deglaciation of the area. B. The location of <sup>14</sup>C dates and the morphology of parts of the Hauerseter delta.



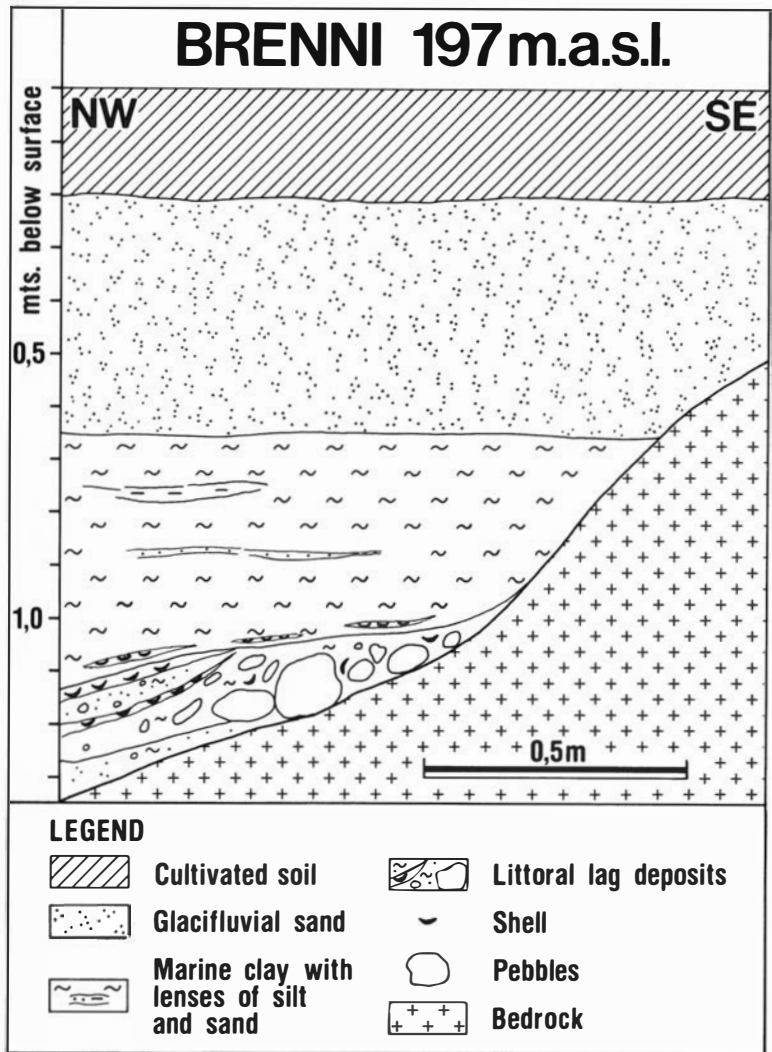


Fig. 2. Lithostratigraphy at the Brenni site.

This brackets the time the shells and balanae lived to the Hauer seter Span. The locality lies in a sheltered position behind Brennifjellet, 5 km from the root point of the Hauer seter delta at Li. As the delta expanded, the amount of suspended material in the seawater increased and the salinity was reduced. Both these effects would finally kill the shells and balanae. When they died, the shells and balanae loosened from the rock surface and were enriched in the littoral lag and the lower parts of the clay.

Within the limits of the method, the date gives an age to the formation of the Hauer seter delta. From Sørensen's (1982) equidistant shoreline diagram, it can be seen that the formation took less

than ca. 80 years. The base of the bog Liamosen west of Brennifjellet is dated to  $9460 \pm 170$  BP (T-1843 v.R. Østmo and R. Sørensen in Sørensen 1979). Bottom sediments in the Nordbytjernet, a kettle hole just north of Jessheim (Fig. 1), yielded  $9320 \pm 240$  BP (Sørensen 1982). These dates, together with a date of the Aker Span represented by marginal deposits further to the South ( $9850 \pm 350$  BP, T-118 Nydal 1960), led Sørensen (1979) to estimate an age for the Hauer seter Span of ca. 9500 BP. The present date overlaps with the Liamosen date within one standard deviation, but it may suggest that deposition took place some years earlier than Sørensen (1979) proposed.

*Acknowledgements.* – The  $^{14}\text{C}$ -dating was carried out by the Laboratory for Radiological Dating in Trondheim. E. Larsen and R. Sørensen critically read the manuscript and D. Roberts corrected the English language. Irene Lundquist drew the figures. To all of these persons and institutions, and to Trond Furuseth, the farmer at Brenni, we give our sincere thanks.

Manuscript received January 1989

## References

- Holmboe, J. 1924: Et fund av balaner paa Brenni i Ullensaker. *Naturen*, 62–65.
- Holtedah, O. 1924: Studier over isrand-terrassene syd for de store Østlandske sjøer. *Videnskapselskapets Skrifter I. Matematisk Naturvidenskabelig Klasse 14*, 1–110.
- Holtedah, O. 1960: Geology of Norway. *Norges geologiske undersøkelse 208*, 540 pp.
- Longva, O. 1987: Ullensaker 1915 II. Beskrivelse til kvartær-geologisk kart – M 1:50,000 (med fargetrykt kart). *Norges geologiske undersøkelse Skrifter 76*, 1–39.
- North American Commission on Stratigraphic Nomenclature (NACSN) 1983: North American Stratigraphic Code. *The American Association of Petroleum Geologists Bulletin 67*, 841–875.
- Nydal, R. 1960: Trondheim natural radiocarbon measurements II. *Radiocarbon 2*, 82–96.
- Nystuen, J. P. 1986: Regler og råd for navnsetting av geologisk enheter i Norge. Av Norsk stratigrafisk komite. *Norsk Geologisk Tidsskrift Supplement 1*, 96 pp.
- Sørensen, R. 1979: Late Weichselian deglaciation in the Oslofjord area, South Norway. *Boreas 8*, 241–246.
- Sørensen, R. 1982: Preboreal–Boreal isavsmelting i Sørøst-Norge. *Institutt for geologi, Norges Landbrukshøgskole, Ås, Rapport nr. 17*, 68 pp.
- Øyen, P. A. 1924: Romeriksetten, Norges største terrasse. *Naturen*, 16–37.