Newbie

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Highlights

The coastal section at Newbie shows a sequence of interbedded estuarine and organic deposits, including peat. These deposits provide important evidence for interpreting sea-level changes on the Solway coast during the Holocene.

Introduction

The site at Newbie [NY 165 651] is *a* section on the coast of the Solway Firth, 2.5 km south-west of Annan. It shows a sequence of interbedded marine and organic sediments that provides stratigraphic and geochronometric evidence for Holocene sea-level change in the Solway Firth area, notably the Main Postglacial Transgression. The deposits at Newbie have been described in several papers by Jardine (1964, 1971, 1975, 1980b) from section and borehole evidence.

Description

At Newbie Cottages, marine deposits infill the remnants of several small kettle holes in an area of Late Devensian glaciofluvial deposits (Jardine, 1964, 1971, 1975, 1980b). Jardine (1980b) described several sections in detail, but the full generalized sequence is as follows (see also (Figure 18.4)):

5.Blown sands with interbedded layers of sand containing fragments of charcoal and organic matter	up to 3.5 m
4. Peat	up to 1 m
3. Sands, silts or clayey silts (carse)	up to >4.5 m
2. Organic detritus	up to 0.3 m
1. Glaciofluvial sands and gravels displaying at the top, podsolic A2 and B2 soil horizons	

The carse deposits (bed 3) comprise two units. The lower one consists of medium and fine-grained sand, locally laminated, and the upper, of silt and clay. The lower sediments also have a relatively higher content of microfaunal remains, and plant debris is present in the upper sediments. Jardine (1967, 1975, 1980b) and Jardine and Morrison (1976) have discussed the sediment characteristics and environment of accumulation of carse deposits both in general terms and in relation to Newbie.

Radiocarbon assays on material from the upper part of the lower organic layer (bed 2) gave the following dates (Jardine, 1975): 7254 ± 101 BP (GU–64) (Baxter *et al.,* 1969), 7540 ± 150 BP (Birm–222) (Shotton and Williams, 1971) and 7400 ± 150 BP (Birm–325) (Shotton and Williams, 1973). Dates obtained from the lower part of the upper organic layer (bed 4) were (Jardine, 1975): 5630 ± 116 BP (Birm–220) (Shotton and Williams, 1971) and 4290 ± 100 BP (1–5070) (Buckley and Willis, 1972). Of the dates on bed 4, the latter may be less reliable than the former as the sample was not pre-treated for humic acid extraction. Charcoal from the wind-blown sands (bed 5) was dated at 3480 ± 110 BP (Birm–218) (Shotton and Williams, 1971).

A borehole located a few hundred metres inland from the coast section at Newbie Cottages penetrated 0.01 m of organic material dated at 7812 ± 130 BP (GU–375) (Ergin *et al.,* 1972) within the sequence of carse sediments (Jardine, 1975). Sand below this organic layer contained frequent Foraminifera tests and a few small fragments of mollusc shells and echinoid spines; the sand above contained occasional fragments of echinoid spines and sponge spicules.The biostratigraphy of the organic beds at Newbie has not been investigated. However, Nichols (1967) has studied the pollen stratigraphy of comparable peat layers above and below Main Postglacial Transgression sediments in a borehole at Lochar Moss, and Moar (1964, 1969b) has established the Late Devensian and Holocene vegetational successions at a

number of sites in the area.

Interpretation

Jardine (1975, 1980b) interpreted the Newbie deposits to represent a locally diachronous marine transgression controlled by the form of the topography. The lower area where the borehole was located was inundated by the sea before 7800 BP. This was followed by a brief interruption in marine sedimentation at around 7800 BP, then a further transgressive overlap. The kettle holes at Newbie Cottages were not breached by the sea until about 7450 BP. The marine transgression then culminated at, or some time prior to, 5600 BP.

The position of the local succession at Newbie in the overall chronology and pattern of Holocene marine transgression and regression in the Solway area was discussed by Jardine (1964, 1971, 1975, 1980b). Depending on the altitude of the individual sites, the date of the first evidence for the transgression varies from place to place along the north coast of the Solway, ranging from 9400 BP to 7200 BP. The earliest occurrence is recorded in a borehole at Carsethorn [NX 988 594], south of Dumfries (–1.05 m OD: 9400 BP). In the eastern Solway the transgression was first registered at Redkirk Point (2.90 m OD: 8100 BP) and then at Newbie (2.95 m OD to 5.80 m OD: between 7500 BP and 7200 BP). The Newbie dates are broadly similar to that for the transgression into the northern part of the Lochar 'gulf' (7400 BP). In the western Solway at the head of Wigtown Bay the transgression started prior to 7900 BP.

Jardine (1975, 1980b) inferred from the radiocarbon dates on the peat overlying the grey silts and clays that the culmination of the transgression was also diachronous. He suggested that the Lochar 'gulf' was abandoned by 6600 BP, but that regression did not start at Newbie until 5600 BP and at the head of Wigtown Bay until 4700 BP. This interpretation has been disputed by Sissons (1983a), Sutherland (1984a) and Haggart (1988a, 1989) who have indicated that the evidence available does not conflict with a synchronous maximum to the Main Postglacial Transgression along the north coast of the Solway Firth.

The importance of Newbie is that it is one of the few sites on the Solway coast providing a clear exposure through the deposits of the Main Postglacial Transgression, including dated organic deposits at both the bottom and the top of the sequence. It complements the site at Redkirk Point (see above), where the close of the transgression is less clear. Newbie is also important in illustrating the effects of local topographic controls on marine sedimentation during a transgressive episode.

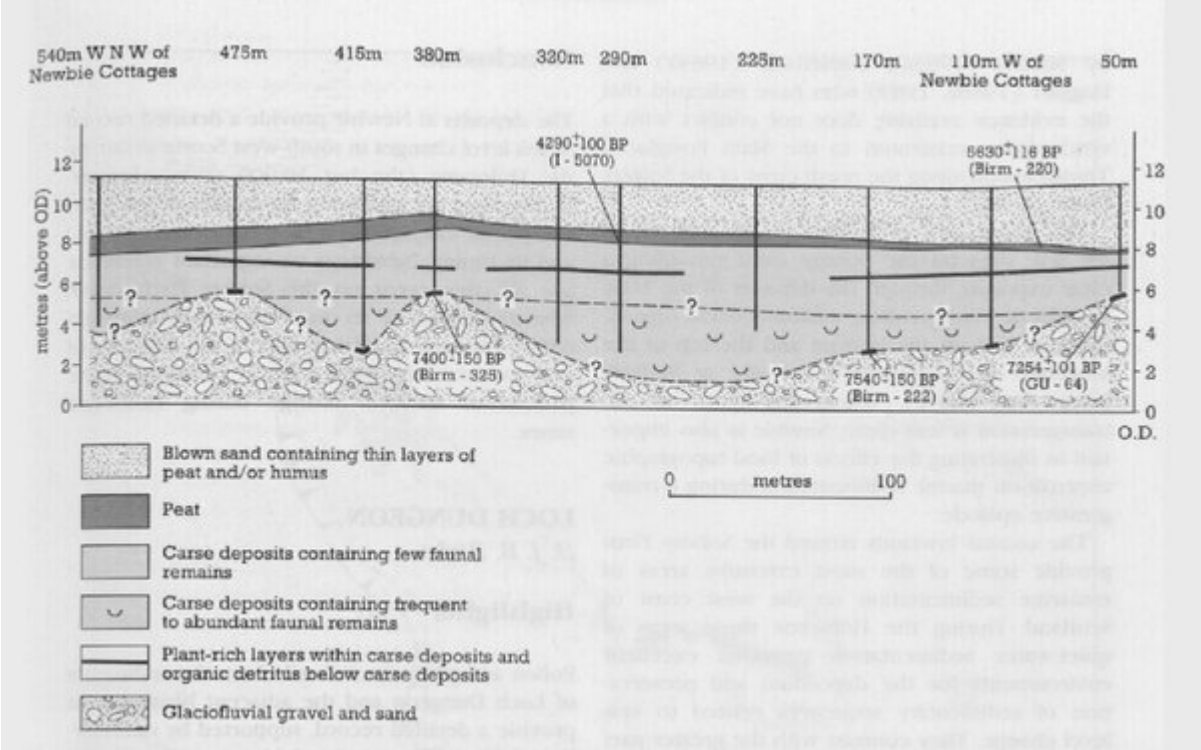
The coastal lowlands around the Solway Firth provide some of the most extensive areas of estuarine sedimentation on the west coast of Scotland. During the Holocene these areas of quiet-water sedimentation provided excellent environments for the deposition and preservation of sedimentary sequences related to sea-level change. They contrast with the greater part of the west coast, where higher energy environments were typical, resulting in the reworking and destruction of much of the sedimentary evidence. The Solway Firth estuarine sequences are more akin to those found around the large estuaries on the east coast and comparison between these various locations is instructive. For example, it is notable that no equivalent has been found in the Solway of the grey, micaceous, silty, sand layer deposited widely along the east coast at around 7000 BP (see Western Forth Valley, Silver Moss and Maryton). This suggests that the event that led to deposition of this sand was confined to the North Sea Basin, thus lending support to its interpretation as a storm surge or tsunami (Smith *et al.,* 1985a; Dawson *et al.,* 1988). The date of the maximum of the Main Postglacial Transgression may also provide an instructive contrast between the two regions. Most east coast sites suggest that the transgression reached its maximum increasingly late with increasing distance from the western Highlands ice centre. However, in the Solway Firth area, the transgression may have reached its maximum relatively early compared with its distance from the western Highlands, thus suggesting a significant role for the Southern Uplands ice centre in glacio-isostatic depression and recovery.

Conclusion

The deposits at Newbie provide a detailed record of sea-level changes in south-west Scotland during the Holocene (the last 10,000 years). In particular, they are significant for studies of the Main Postglacial Transgression (see Silver Moss

above) and its timing. Newbie is an important reference site for this event on the Solway Firth coast, where it reached its maximum approximately 6500 years ago and forms part of the network of sites for establishing the regional variations in the pattern of sea-level change during Holocene times.

References



(Figure 18.4) Newbie: sediment succession (from Jardine, 1980b).