MILTON NESS

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OS Grid Reference: NO770649

Highlights

The assemblage of raised beaches and a shore platform at Milton Ness provides important geomorphological and sedimentary evidence for Quaternary sea-level changes in eastern Scotland. This evidence, from an exposed headland location, allows valuable comparisons with nearby estuarine sites.

Introduction

Milton Ness (NO 770649) lies 8 km north of Montrose and is important for a series of raised shorelines and associated deposits. The headland displays evidence of both Late Devensian and Holocene relative sea levels, together with an extensive intertidal rock platform, the age of which is uncertain. The site was first described by Campbell (1935), and subsequently by Cullingford and Smith (1980), Smith and Cullingford (1985) and Smith (1986).

Description

The bedrock at Milton Ness is composed of resistant Upper Old Red Sandstone sediments (Hickling, 1908; Campbell, 1913) overlain by Quaternary deposits largely consisting of till with some sands and gravels at the surface. The oldest Quaternary feature on Milton Ness is undoubtedly the extensive intertidal rock platform, particularly well developed on the northern side of the headland (Figure 14.7). This platform passes beneath both the till and sands and gravels. Dawson (1980a; in Smith, 1986) has remarked on its extent and correlated it with the Low Rock Platform elsewhere in Scotland. It is well-developed along this stretch of coast and northwards to Inverbervie (Myers, 1872; Campbell, 1935) but whether it was formed in part by periglacial processes during glacial episodes, or by temperate marine erosional processes during interglacials, is unknown.

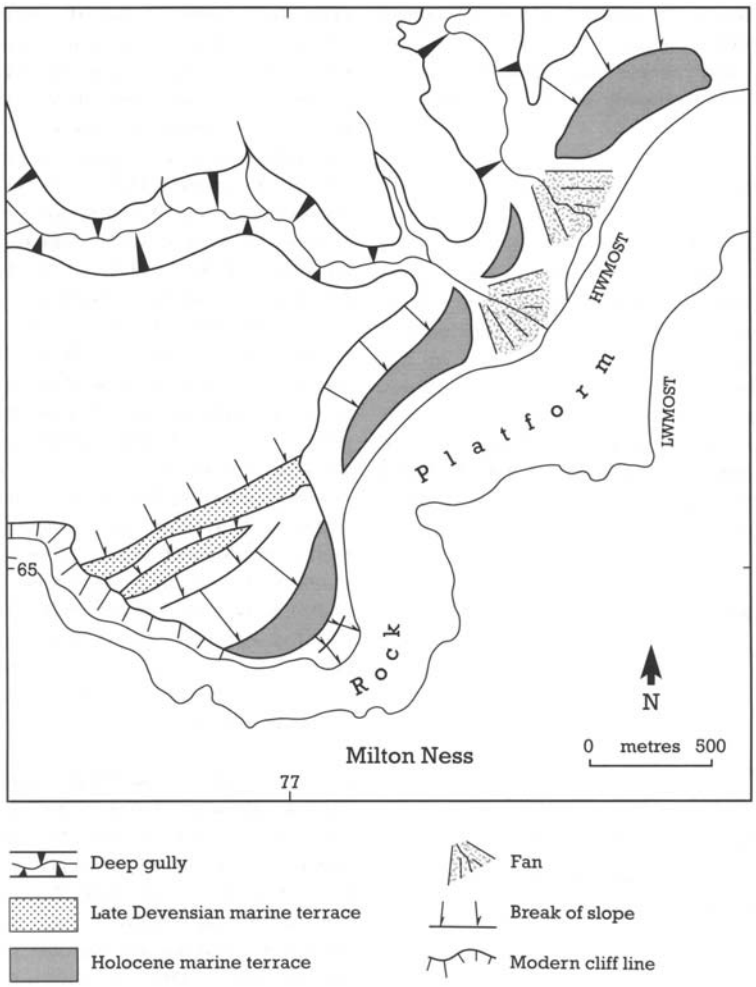

Figure 14.7: Raised shorelines and intertidal shore platform at Milton Ness.

In his paper on the Mearns coastline, Campbell (1935) noted that three raised shorelines were well developed at Milton Ness, reflecting former changes in relative sea level. More recently, Cullingford and Smith (1980) and Smith and Cullingford (1985) have identified a sequence of both Late Devensian and Holocene shorelines there, each shoreline marked by a terrace formed of sands and gravels, often with shell fragments. The upper two terraces are thought to be of Late Devensian age (Cullingford and Smith, 1980). They are associated with shorelines at, respectively, 20.1–20.7 m O.D. and 21.1–23.7 m O.D. The highest terrace is almost 0.5 km long. An exposure in the middle terrace on the south side of the headland shows 5 m of bedded gravel and sand with shell fragments. The highest terrace is correlated with the shoreline DS1 of Cullingford and Smith (1980), which slopes eastward across the general area of Fife, Angus and Kincardine at 0.85 m/km, whereas the middle terrace is correlated with shoreline DS2, also sloping eastward, at 0.73 m/km. These shorelines are the highest in the sequence identified by Cullingford and Smith, who maintain that they were formed very early in deglaciation (prior to 14,000 BP), when ice still occupied much of the surrounding area. The lowest terrace was found to be of Holocene age by Smith and Cullingford (1985). It forms a shoreline at 5.2–5.5 m O.D., which they have suggested may correlate with the Main Postglacial Shoreline in the Montrose Basin carselands.

On the south side of Milton Ness, the present cliffline lies at right angles to the shoreline and there are extensive exposures which reveal the composition and internal structure of the middle and lowest raised beach terraces. Although these have not been studied in detail, they provide a potential opportunity to relate raised beach morphology and sediments.

Interpretation

Milton Ness demonstrates an assemblage of several important features associated with relative

sea-level changes in eastern Scotland. The interest includes first, an intertidal shore platform of uncertain age but pre-dating, at least in part, the last glaciation; second, two Lateglacial raised beaches which are part of the earliest shorelines to form in the general area following deglaciation; and third, a prominent Holocene raised beach terrace possibly related to the Main Postglacial Shoreline. Each feature is clearly identifiable and extensive exposures illustrate the structure and composition of the raised beach terraces. Elsewhere in eastern Scotland, comparable sequences of raised beaches occur in East Fife (Cullingford and Smith, 1966), and between Dundee and Arbroath and north of Johnshaven (Cullingford and Smith, 1980), but they lack comparable exposures to those at Milton Ness. This rare combination of both morphological and sedimentary evidence is important in the study of coastal evolution in eastern Scotland. The morphological and sedimentary evidence from the exposed headland at Milton Ness complements the stratigraphic evidence for sea-level change represented nearby at Maryton and Dryleys in the more sheltered estuary of the South Esk. Milton Ness, together with Dunbar and Kincraig Point, provide good examples of the range of coastal landforms and sediments developed on the exposed (as opposed to estuarine) coasts of the east of Scotland. They can be compared directly with the similarly exposed coastal sites in the west (Glenacardoch Point, Northern Islay and West Coast of Jura) to illustrate the differing histories of coastal evolution during the Late Quaternary.

Conclusions

Milton Ness is important for the study of coastal changes in eastern Scotland during the Late Devensian and Holocene (approximately the last 16,000 years). The features of interest include a shore platform and raised beaches with good exposures in the deposits. The particular value of Milton Ness lies in this combination of geomorphological and sedimentary evidence and its location on an exposed headland, which contrasts with sedimentary evidence in the estuarine situation of Dryleys and Maryton.

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