Hen Borth

Highlights

An excellent example of a drumlin, a landform so well represented in Anglesey but more rare in mainland Wales. Formed beneath the ice-sheet of the last glaciation, this drumlin is shown in cross-section.

Introduction

In Hen Borth Bay [SH 321 931] on the northern coast of Anglesey, an excellent coastal exposure through a drumlin occurs. The prevailing coastal configuration and the alignment of the drumlin at Hen Borth have allowed marine erosion of the drumlin parallel to its long axis, clearly revealing its internal structure and composition. According to Greenly (1919) it is one of the three finest examples of a dissected drumlin on the island.

Description

Drumlins are common in Anglesey, and Greenly mapped over two hundred examples in the north and west of the island alone. The Hen Borth drumlin is one of a large swarm in the Cemlyn Bay area, which show a striking alignment from northeast to south-west. Such an orientation closely matches that of striae found on local bedrock surfaces; the two therefore provide evidence to show that northern Anglesey was glaciated by Irish Sea ice moving to the south-west (Greenly 1919).

The crest of the drumlin, which has an elliptical ground plan, reaches 13m OD and is dissected by the exposure, revealing a maximum depth of about 5m of sediment. Deposits exposed along the 300m long axis are mainly grey-brown, stony Irish Sea till, with weathering and cryoturbation features in the uppermost layers. In the northern part of the bay, where the solid strata of the headland crop out, the sequence of Pleistocene deposits is more complex. Here, a lower head is overlain and incorporated into the overlying till. Greenly (1919) also observed this incorporated material, referring to the "shattered rock worked up into the boulder-clay". The till is overlain by a thin development of what is probably redistributed till.

Interpretation

Exposures through drumlins are generally rare in Wales, and Hen Borth is an unusually fine example, showing sections end to end through an individual feature. Hen Borth is also representative of the drumlins of northern Anglesey, where such landforms are well developed and where they form important elements in the geomorphology of the island.

The drumlins of northern Anglesey are important historically, as it was recognised at an early stage that debris deposited beneath moving ice was frequently streamlined in the direction of ice movement. Thus, using the orientation of drumlin long-axes together with other ice directional indicators such as striae, Greenly (1919) was able to chart the movement of the Irish Sea ice-sheet over Anglesey. Today, Hen Borth is still important in demonstrating patterns of ice movement across North and north-west Wales. In particular, it provides convincing evidence to show that northern Anglesey was last glaciated by southwesterly moving ice from the Irish Sea Basin. Since drumlins frequently occur in lowland areas where ice flow was probably radiative or dispersive, the swarms on northern Anglesey demonstrate that similar conditions pertained over the northern part of the island.

Despite numerous published studies, drumlin formation is still not fully understood (Menzies 1978), and Hen Borth is therefore important for studying the origin of drumlins and for testing theoretical models of drumlin formation. The site provides an unusual opportunity in Britain to study former glacier dynamics, including indications of basal ice pressures and the rates and type of glacier flow.

Conclusions

Hen Borth is an exceptional example of an exposure through a drumlin (a streamlined mound of glacial drift), a type of Pleistocene landform well developed in northern Anglesey, but relatively uncommon elsewhere in Wales. It demonstrates that the last glaciation of northern Anglesey was by Irish Sea ice moving from north-east to south-west, and is therefore important for reconstructing regional patterns of ice movement. It is also important for testing theoretical models of drumlin formation.

References