
Craig Cerrig-gleisiad

Highlights

This locality shows the best evidence, in the form of a pollen record and landforms, for the last cirque glaciation of the Brecon Beacons during the Younger Dryas (Late Devensian), and the climatic amelioration which followed in the early Holocene.

Introduction

Craig Cerrig-gleisiad, a fine example of a northeast facing cirque in the Brecon Beacons, contains moraines and a pollen record significant in understanding and dating climatic and vegetational changes in upland South Wales since the Younger Dryas. The site contains the best example of an unequivocally dated moraine in the region. The cirque and its associated moraines have been described by Lewis (1970b) and Ellis-Gruffydd (1972, 1977), and more recently the pollen biostratigraphy by Walker (1980, 1982b, 1984).

Description

Craig Cerrig-gleisiad occurs on the north flank of the Old Red Sandstone escarpment of the Brecon Beacons [SN 964 220]. The steep back wall of the north-east facing cirque reaches 622m OD, and it contains a complex of glacial depositional landforms that occupy an area of nearly 1 km² (Walker 1982b). These deposits extend beyond the cirque lip and comprise a series of undulating, subdued mounds. Nearer to the back wall a more prominent boulder-strewn ridge, up to 5m high, encloses a peat-filled depression (Walker 1982b).

The deepest part of the bog was sampled by Walker (1980, 1982b) who proved about 6m of deposits comprising the following sequence:

- 9 Poorly humified *Molinia* and *Eriophorum* peat
- 8 Fibrous peat
- 7 Amorphous sedge peat with wood layers
- 6 Telmatic (?) peat
- 5 Fine telmatic peat grading down into dark brown organic mud
- 4 Brown-green organic mud
- 3 Fine silt and clay (with some laminae)
- 2 Coarse silt and sand
- 1 Sand and gravel

This sequence is shown in simplified form together with identified pollen assemblage zones and a radiocarbon determination in (Figure 20).

Interpretation

Whereas the glacial origin of the cirque and its deposits at Craig Cerrig-gleisiad has long been accepted, their precise dating and interpretation have been debated. Following pollen studies by Trotman (1963) and J J Moore (see Lewis

1970b), it was suggested that separate cirque glaciers had existed in the Brecon Beacons in both Pollen Zones Ic and III of the Devensian late-glacial (Lewis 1970b). Lewis considered the more diffuse mounds at Craig Cerrig-gleisiad to belong to an 'older series' of moraines formed during Pollen Zone Ic, and the fresher inner ridge he believed to belong to Pollen Zone III (Younger Dryas). Ellis-Gruffydd (1972, 1977), however, suggested that many of the more diffuse forms could date from wastage of the main Late Devensian ice-sheet.

Recently, more detailed pollen work by Walker (1980, 1982b) has provided evidence for the dating of the deposits at Craig Cerrig-gleisiad and for elucidating the environmental and vegetational history of the area during the early to middle Holocene.

During the Younger Dryas, a small glacier developed in the cirque at Craig Cerrig-gleisiad. The landscape of the surrounding area at this time was tundra, with pioneer herb communities and taxa indicating disturbed, unstable soils and extensive tracts of bare ground. Dwarf willow and occasional juniper and birch may also have been present in more sheltered locations. The deposits at this time reflect a severe periglacial environment, with solifluction and clastic inwash into the basin from poorly vegetated slopes. This phase of inorganic deposition (beds 1–3) is also recorded at Traeth Mawr, a few kilometres to the north, but at Craig Cerrig-gleisiad the renewed pulse of glacial activity during the Younger Dryas removed any evidence of earlier Allerød deposits. The radiocarbon date of $10,860 \pm 70$ BP (SRR-1564) marking the beginning of the Holocene (bottom of bed 4) at Craig Cerrig-gleisiad, has been considered (Walker 1982b) to be erroneously old, and the date of $10,030 \pm 100$ BP (SRR-1563) for the same boundary at nearby Craig-y-Fro to be more reasonable.

The transition from the Younger Dryas to the Holocene is marked at Craig Cerrig-gleisiad by a change to organic sedimentation (bed 4 upwards), and a marked rise in juniper pollen indicating improving climatic conditions. Such a peak of juniper is a common feature in early Holocene sections in north-west Britain and upland Wales. This rise cannot, however, be detected at certain lowland Welsh sites (for instance, Glanllynau, Clarach, Esgyrn Bottom), and the behaviour of juniper in western Britain during the early Holocene is therefore not straightforward (Walker 1982b).

This early Holocene phase of *Juniperus* dominated scrub was followed by expansion of birch woodland over much of the area, and these forests were subsequently invaded by hazel *Corylus*. Mixed oak woodland then followed during the climatic optimum of the Holocene, with *Quercus* and *Pinus* on the hillsides and *Ulmus* in more sheltered base-rich sites on the valley floors (Walker 1982b, 1984). Increasing climatic wetness, commencing at c. 7,000 BP, was seen by Walker (1984) to have led to the decline of elm and birch, and the expansion of *Quercus* and *Alnus* throughout the woodlands of South Wales.

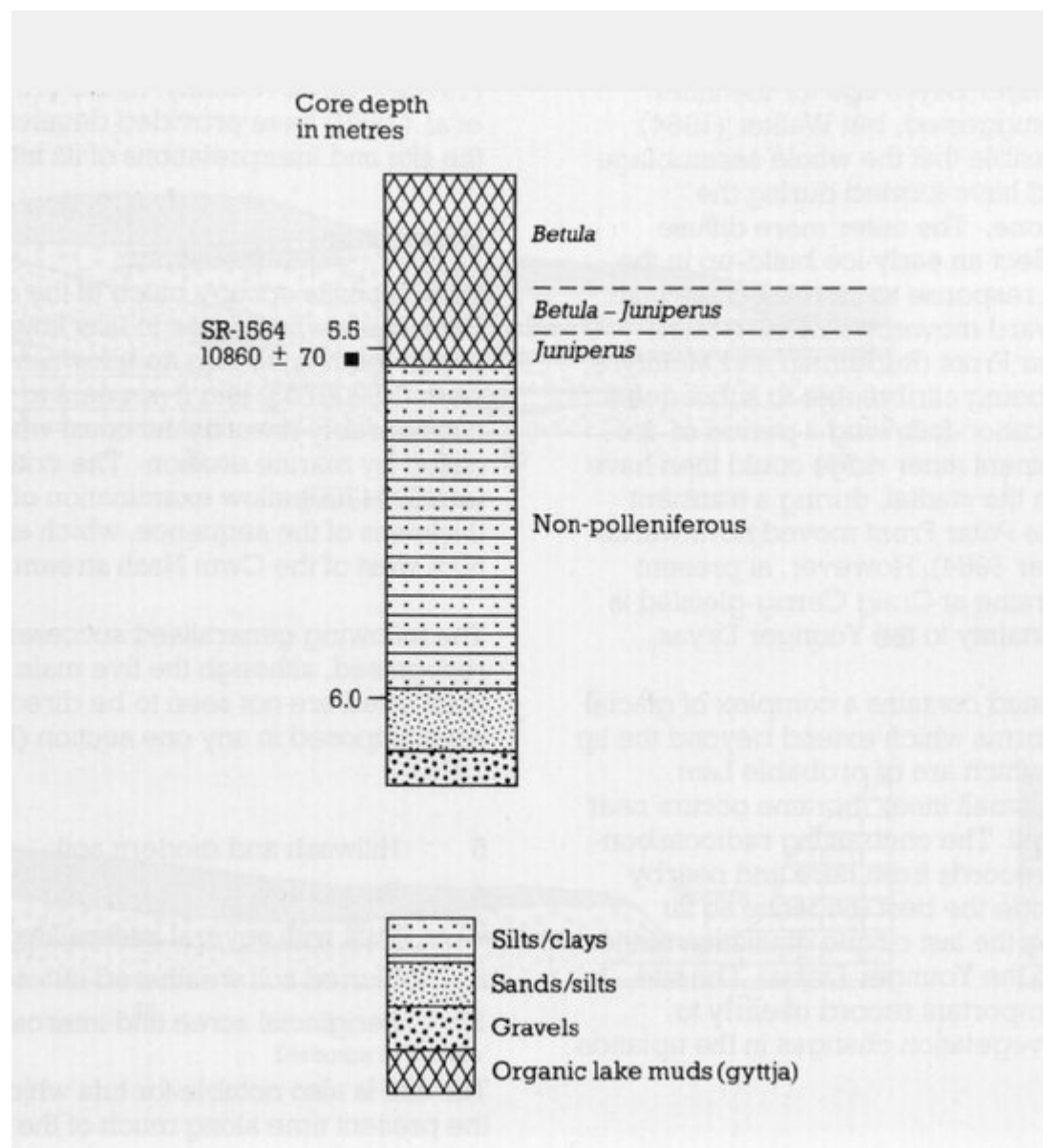
The interest of the site is enhanced by the apparent complexity of the depositional landforms. A Late Devensian age for the diffuse outer mounds and ridges, and a Younger Dryas age for the inner ridge have been suggested, but Walker (1984) considered it plausible that the whole assemblage of landforms could have formed during the Younger Dryas alone. The outer more diffuse mounds might reflect an early ice build-up in the Younger Dryas in response to increased snowfall caused by southward movement of the ocean surface water Polar Front (Ruddiman and McIntyre 1981); their form being attributable to subsequent periglacial modification following a period of ice decay. The prominent inner ridge could then have developed later in the stadial, during a transient glacial pulse as the Polar Front moved northwards once again (Walker 1984). However, at present only the inner moraine at Craig Cerrig-gleisiad is dated with any certainty to the Younger Dryas.

Craig Cerrig-gleisiad contains a complex of glacial depositional landforms which extend beyond the lip of the cirque and which are of probable Late Devensian age. A small inner moraine occurs near the cirque back wall. The contrasting radiocarbon-calibrated pollen records from here and nearby Traeth Mawr provide the best evidence so far available for dating the last cirque glaciation of the Brecon Beacons to the Younger Dryas. The site also provides an important record of early to middle Holocene vegetation changes in the uplands of South Wales.

Conclusions

Craig Cerrig-gleisiad is a large cirque which was occupied by glacier ice during the last major ice age in Wales. The site's importance, however, stems from evidence which shows that the cirque was re-occupied by ice, certainly between 11,000 and 10,000 years ago, and possibly also somewhat earlier.

References



(Figure 20) Craig Cerrig-gleisiad: a summary of pollen, lithological and radiocarbon evidence (from Walker 1984)