Cwm Nash

Highlights

This site uniquely shows screes of Devensian late-glacial age and tufas of Holocene age as well as contemporary tufa sedimentation. Its rock and land snail records allow insights into climatic change over at least the last 10,000 years.

Introduction

Cwm Nash [SS 904 700] is a unique site of great interest to the students of Devensian late-glacial and Holocene environmental history in South Wales. The common occurrence of land snails in a sequence of slope deposits comprising tufa, head and hillwash has allowed a detailed reconstruction of Devensian late-glacial and Holocene environmental change in South Wales that complements the available and more widespread pollen records. The site was first described by Driscoll (1953) and was later studied by Bowen (1970a). More recently, Evans (1977a) and Evans et *al.* (1978) have provided detailed descriptions of the site and interpretations of its interest.

Description

Tufa deposits occupy much of the small valley at Cwm Nash which is cut in Lias limestones. The tufa occurs both upstream and downstream of Blaen-y-cwm [SS 909 703] and it appears to thicken considerably towards the coast where it has been cuffed by marine erosion. The critical exposures (at [SS 904 700]) allow examination of the full (*c.* 4m) thickness of the sequence, which extends for about 50m west of the Cwm Nash stream.

The following generalised succession can be recognised, although the five main stratigraphical units listed are not seen to be directly superimposed in any one section (Evans *et al.* 1978):

5 Hillwash and modern soil

4 Buried soil

3 Tufa with several intercalated buried soils

2 'Buried soil weathered into scree'

1 Periglacial scree and intercalated clay bands

The site is also notable for tufa which is forming at the present time along much of the valley. The stream bed is crossed at numerous points by rims of tufa and cemented tree litter, causing local ponding and the formation of a series of stepped cascades. Small exposures through the tufa occur in the banks of the stream at several locations within the valley. Full details of the stratigraphy and molluscan fauna at Cwm Nash are provided by Evans (1977a) and Evans *et al.* (1978), and a simplified section is shown in (Figure 21).

Interpretation

Tufa occurs in a number of small valleys cut into the cuffed Lias along the Glamorgan coastline between Cardiff and Southerndown (Strahan and Cantrill 1904). Driscoll (1953) interpreted the deposits at Cwm Nash as a series of marine and estuarine sediments, but a more detailed study by Bowen (1970a) showed that the sequence was more readily explicable as a series of slope deposits. A preliminary investigation of the molluscan fauna by Kerney (*in* Bowen 1970a) showed that the faunas were terrestrial and that the upper layers of slopewash material were Holocene in age. This is particularly significant since it suggests a Holocene age for hillwash deposits capping Pleistocene sequences elsewhere around the South Wales coast (Bowen 1970a).

The molluscan faunas of Cwm Nash have been investigated in detail by Evans (1977a) and Evans *et al.* (1978), who interpreted the following sequence of events. The virtual absence of marsh snails indicated that the lower scree (bed 1) was deposited during fairly dry conditions, with the interstratified layers of finer material representing incipient soils. The restricted fauna suggested a Late Devensian age for these sediments, with the presence of *Helicella itala* (L.), in particular, implying a Pollen Zone II or Pollen Zone III age (Kerney 1963).

The overlying tufa (bed 3) marked a change from open-ground conditions in the Devensian late-glacial to shaded woodland with marshy conditions and perhaps pools of standing water, although true freshwater species were absent. Three distinct snail biozones have been recognised within the tufa (Evans *et al.* 1978), each reflecting an increase in the degree of tree cover, and being broadly equivalent to Pollen Zone IV, Pollen Zones V and VI combined, and Pollen Zone Vila. Evans et *al.* (1978) stressed that this zonation was tentative. However, the extinction of *Discus ruderatus* (Ferussac) and the appearance of a group of distinctively woodland snail species, probably mark a significant climatic change at the Boreal-Atlantic transition (Evans 1977a).

Soil layers within the tufa were considered by Evans *et al.* (1978) to represent periods of drier climate, including one possibly correlated with Pollen Zone Vic. A series of weakly developed soils within the upper layers of tufa was believed to mark oscillations within the Atlantic period, perhaps reflecting temporary drier conditions (Evans 1977a).

The soil horizon (bed 4) towards the base of the hillwash sediments (bed 5) marked the reappearance of open-country snail species, a corresponding reduction in woodland cover and a cessation of tufa formation. Man was probably responsible for this phase of forest clearance, because the horizon contains charcoal, marine molluscs and angular stones, indicative of human activity. A lack of archaeological material has so far made it impossible to date this clearance phase. The upper hillwash saw the virtual extinction of woodland snail species.

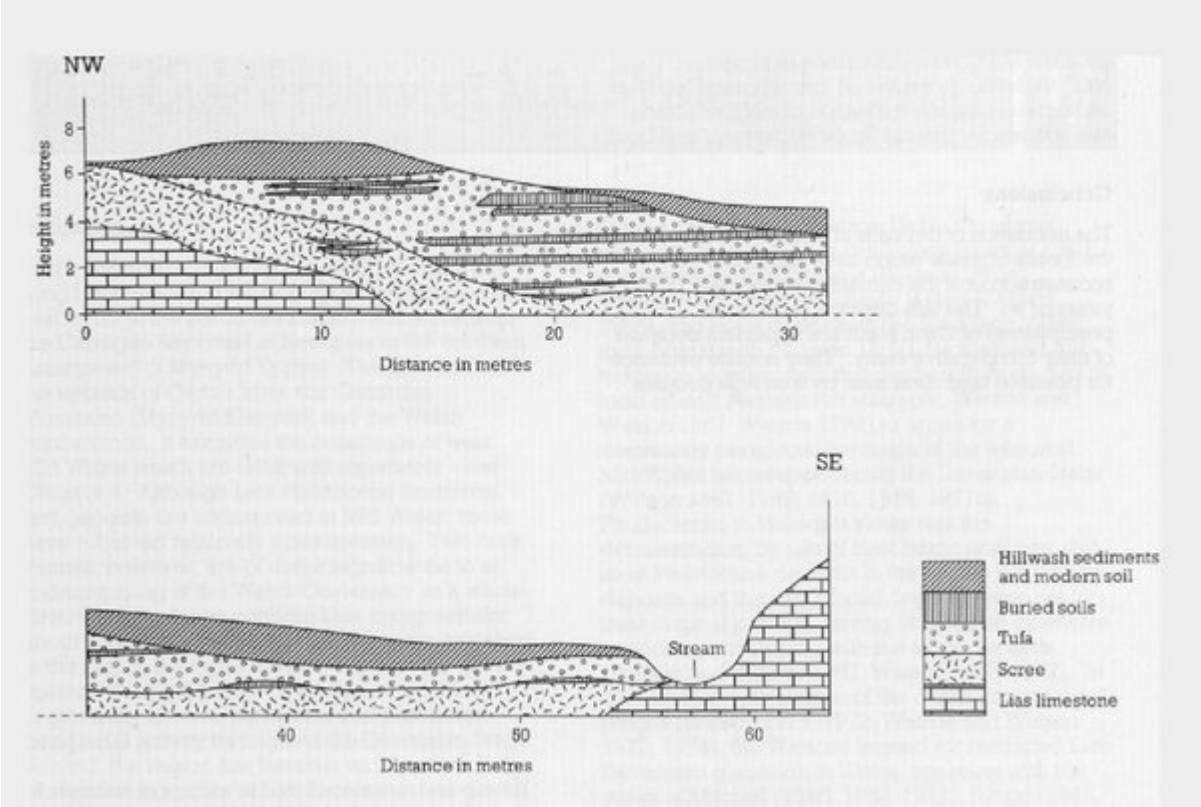
Cwm Nash has yielded the most detailed molluscan record of Devensian late-glacial and Holocene environmental changes in South Wales. The lower scree, with its fauna indicative of a Devensian late-glacial age, demonstrates a period of open-country and probably periglacial conditions. Land snails from the overlying tufa show a range of environments varying from marsh, open-woodland to closed-woodland, and they record detailed changes that may mark the Boreal-Atlantic transition. Land clearance, perhaps during the Iron Age, is indicated by the fauna of the overlying sediments.

The site is also of considerable geomorphological interest as one of the few places where it is possible to study tufa formation in progress. Cwm Nash therefore provides an important modern day analogue for the interpretation of lengthy ancient tufa sequences such as those at Caerwys and Ddol.

Conclusions

The sequence of deposits at Cwm Nash contains the fossils of snails which have allowed a reconstruction of the climate over the past 12,000 years or so. The tufa deposits (limestone precipitates) of Cwm Nash are important because of their comparative rarity. They contain evidence for possible land clearance by Iron Age peoples.

References



(Figure 21) Quaternary sequence at Cwm Nash (after Evans et al. 1978)