
Garrigill, River South Tyne, Cumbria

[NY 739 421]

Highlights

Garrigill is an important locality in the upper South Tyne basin for Late Pleistocene and Holocene river terraces and palaeochannel sequences. It also is a site at which Holocene river incision through bedrock can be demonstrated.

Introduction

The valley floor of the South Tyne at Garrigill displays some of the best preserved flights of Holocene and Pleistocene river terraces in the Tyne basin (Aspinall *et al.*, 1986). On the surface of terraces believed to be of Holocene age are a series of exceptionally well defined palaeobars and high-sinuosity palaeochannels.

Description

Immediately downstream of the village of Garrigill [NY 740 420], the River South Tyne flows within an alluvial basin (350 m wide and 600 m long), in which six unpaired terraces have been identified above the present floodplain (Figures 5.1 and 5.6). On the surface of terraces on the north bank of the river are preserved a number of high-sinuosity palaeochannels infilled with between 1 and 1.5 m of organic rich, fine sands and silts. At the northern end of the basin, river bank sections in the oldest of these terraces (just over 4 m above the present river-bed level) show 1 m of sandy cobble-gravels resting directly on bedrock, overlain by 0.75 m of laminated silts and sands. Sections in higher terraces on the south bank of the river reveal poorly sorted, cobble- and boulder-sized sediments that are typical of Pleistocene glaciofluvial deposits in the region. Judging from their high heavy metal concentrations (Pb 1000–1400 mgkg⁻¹), deposition of fine sediments that form part of the lowest north bank terrace (2–3 m above the bed of the present River South Tyne), was contemporaneous with upstream metal mining. At present, the precise date for this period of mining is unknown. Garrigill does, however, lie downstream of some of the oldest mines in the Northern Pennine orefield, which were known in the 12th century as the 'silver mines of Carlisle'. There is also circumstantial evidence for lead extraction nearby during the Roman occupation (Raistrick and Jennings, 1965).

At the north-west end of the study reach, the modern river is confined by Quaternary terraces and bedrock which have restricted recent lateral movement of the channel. Below the footbridge (Figure 5.6) the valley floor widens and the channel has moved 70 m in the past 130 years, depositing a sequence of coarse-grained lateral accretion sediments. These deposits span the heyday of metal mining in the catchment (c. 1840–80) and contain high concentrations of heavy metals (Pb 1600–1750 mgkg⁻¹). Investigations of the chemical and physical characteristics of alluvial soils developed on the three north bank terraces were carried out in an attempt to clarify their ages (Aspinall *et al.*, 1986). This showed very little variation in the degree of pedogenic modification of hydrous iron oxides, which suggests that there is no great difference in age between these alluvial units.

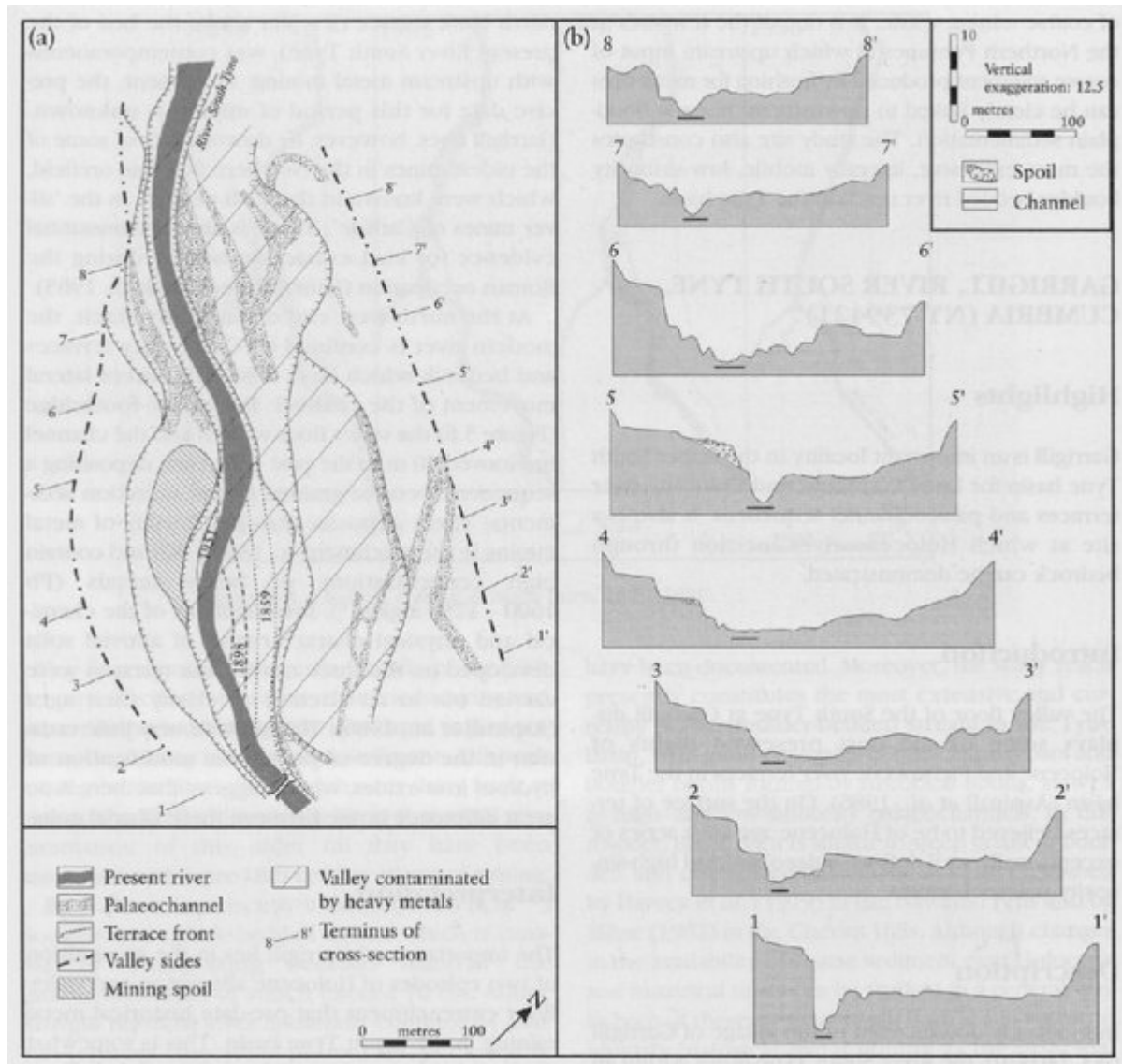
Interpretation

The importance of Garrigill lies in the recognition of two episodes of Holocene alluviation and valley floor entrenchment that pre-date historical metal mining in the South Tyne basin. This is somewhat unusual in the upper reaches of the South Tyne basin, where high rates of lateral channel movement during the Holocene have usually resulted in the erosion and removal of older alluvial units. Pollen analysis and ¹⁴C dating of palaeochannel fills could in the future establish the ages of these alluvial units. Holocene river terraces at the site can be compared with similar Holocene alluvial sequences in Mid-Wales (Macklin and Lewin, 1986), the Bowland Fells (Harvey and Renwick, 1987) and the Cairngorms (Robertson-Rintoul, 1986a). Although Holocene river incision is chiefly through bedrock, it has been more pronounced at Garrigill.

Conclusion

Holocene alluvial and Pleistocene glaciofluvial terraces are well developed at Garrigill. Well defined high-sinuosity palaeochannel traces are preserved on Holocene age river terraces at this site, and investigation of their sediment infill may in future help to clarify the Holocene alluvial history of the upper South Tyne basin.

References



(Figure 5.6) Garrigill, River South Tyne: (a) alluvial landforms, palaeochannels and sediment units and (b) cross-sections of the valley floor. (After Aspinall et al., 1986.)