Colluvial and alluvial response to land use change in Midland England: An integrated geoarchaeological approach

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ARTICLE INFO

Article history:
Accepted 4 December 2007
Available online 12 February 2009

Keywords:
Colluviation
Alluviation
Geoarchaeology
Archaeological survey
Medieval period
Soil erosion

ABSTRACT

This paper presents geomorphic, soils and palaeoecological data from a small sub-catchment in the English Midlands in an attempt to provide an integrated picture of Holocene landscape change. The area used has also been the focus of a multi-disciplinary and long-term archaeological survey (Raunds Area Project) and so has a wealth of archaeological and historical data which can be related to the environmental record. The paper combines these data, much of which are only published in the archaeological literature with new interpretations based upon unpublished data and new data particularly from the hillslopes and new radiocarbon dating from the valley floor. It is inferred that despite a long history of pastoral and arable agriculture (since the Neolithic/Bronze Age), colluviation on lower slopes, significant soil redistribution and overbank alluviation only began to a measurable extent in the Late Saxon–Medieval period (9th Century AD onwards). It is suggested that this is due to a combination of land-use factors, principally the laying out of an intensive open field system and the establishment of villages combined with a period of extremes in climate well known throughout Europe. Indeed the critical element appears to have been the social changes in this period that created this regionally distinctive landscape which happened to have a high spatial connectivity and facilitated intensive arable production with high tillage rates. Intense rainfall events during this period could therefore detach and mobilize high volumes of soil and the open field system facilitated transport to slope bases and valley floors. The need for detailed and spatially precise land-use data in order to interpret accelerated landscape change is stressed.

1. Introduction

The physical environment has changed significantly during the Holocene, and many environmental factors are themselves the result of both inadvertent and purposive human activity (Brown, 1992). Since the adoption of agriculture this has included not only the effects of deforestation and cultivation on slopes but also the construction of terraces, lynchets, headlands and the establishment of field boundaries. It is difficult to define one period in the Holocene when a static and natural condition obtained, as the natural condition is one of both externally forced and internally driven change (e.g., climatic fluctuations and soil development in the Early Holocene). Indeed as far as the geoarchaeologist is concerned the earth’s surface does in effect change over time as mediated through soil formation, erosion and deposition (Brown, 1997a). For example, the location and pattern of flint scatters in many regions, including the English East Midlands, is at least partially determined by geomorphological processes and history, particularly soil erosion and alluviation (Clay, 2002). It is important therefore to understand these processes at the landscape scale in order to both identify biases in the archaeological record and to investigate human impacts on landscape change. Studies of small catchments and archaeology have generally been qualitative (Bork, 1989; Bell and Boardman, 1992; Smith et al., 2005; Reiß et al., 2006) although in recent years numerical models have been utilized (Wainright, 1992; Coulthard et al., 2005; Peeters et al., 2006). A parallel approach has been to reconstruct past sediment fluxes in small catchments (Trimble, 1983; Brown and Barber, 1985; Passmore and Macklin, 2001) an approach which is highly dependant upon the resolution and precision of the alluvial chronology (Rommens et al., 2005; Brown et al., 2009). In time it may be possible to unify these approaches by using independent and local estimates of land-use change derived from archaeological data. This paper reports an attempt to integrate geomorphic data from all the landscape zones of a small catchment with a local land-use record derived from a long-term archaeological survey and associated palaeoecological studies. It brings together some data already published (e.g. the magnetic profiles, Brown, 1992) with new data (e.g. radiocarbon dates, soil textural and some additional magnetic data) and attempts an integrated picture of Holocene landscape evolution in a small catchment.

2. The Raunds Area Project and its regional setting

The Raunds Area Project is a multi-disciplinary archaeological project centred around the village of Raunds in the Nene Valley, Northamptonshire (Fig. 1), which effectively started in 1984 (Foard...
and Pearson, 1985) and is currently being published (Parry, 2006). The area included a section of the East Midland landscape from the low interfluves to the valley floor of the Nene Valley. The survey has produced a vast amount of archaeological data from a small area and has included fieldwalking, cropmark survey, excavations and studies of all the available historical documents. The Raunds survey area is part of a low energy environment with a relative relief of only 52 m and average slopes of around 0.04 m·m\(^{-1}\) with very few steep slopes and no free faces. The Raunds survey area covers some 40 km\(^2\) (3950 ha) of Medieval parishes of the Jurassic scarplands of Central England stretching from the River Nene across the interfluve to tributaries of the River Great Ouse. It forms part of the drift (Boulder Clay) covered lowlands which lie between the maximum Pleistocene ice limit and the last ice limit, during the Devensian, which is generally believed to have reached about 80 km north of Raunds (Institute of Geological Sciences, 1977). The orientation of the Nene valley across the Boulder Clay plateau from Northampton to Peterborough partly follows a drift-filled buried channel (Horton, 1970), which is almost certainly pre-Devensian in age. Traditionally the Boulder Clay is ascribed to the Wolstonian glaciation, but with the doubts over the status of the Wolstonian in Central England (Rose, 1987) it is safer to regard it as having been deposited by a post-Hoxnian, but pre-

Fig. 1. The location of the Raunds Survey Area and sites along the Nene Valley (inset), geomorphic zones and sites mentioned in the text.