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A binocular view of a marginal landscape: GIS and geophysics in the Yorkshire Dales National Park

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The Yorkshire Dales National Park in Northern England contains some of the best preserved and most extensive Late Prehistoric landscapes in the United Kingdom. The subject of frequent investigation by antiquarians and surveyors of the late 19th to mid 20th centuries (e.g. Speight 1895; Curwen 1928; Raistrick 1937), these remains have undergone limited modern research and are poorly known or understood in relation to comparable resources elsewhere in Britain and Northwest Europe. Of particular interest, a collection of so-called 'coaxial' field systems, taking the form of low stone and turf banks, runs across the landscape (Fig. 1).

The landscape of the Dales is a product of its geology: an uplifted area sculpted by ice, it is characterized by extensive areas of limestone and gritstone moorland, cut through by the discrete valleys, each of unique character, that give the area its name (Waltham 2007). The lack of pressure from development (restricted by both the physical topography and the planning authority) has not only contributed to the survival of a rich archaeological heritage, but limited the motivation for field investigation seen in many other (lowland) areas.

This research is the product of two related strands of work conducted at the University of Bradford, in collaboration with the Landscape Research Trust and the Yorkshire Dales National Park Authority, funded by the AHRC. The first strand looks at the extensive prehistoric field systems across the National Park at a macro level, collating various disparate data sources in a GIS in order to investigate the relationships between the archaeology and the landscape. The second project complements this by zooming in to investigate the microlevel, using a fieldwork based approach. A battery of geophysical techniques is being applied, which are helping to construct an increasingly complex picture of the past landscape.

The GIS draws on antiquarian records, the Historic Environment Record database (a record of known finds and features held by the National Park Authority), the National Mapping Project data (aerial photograph transcriptions from English Heritage (Horne and MacLeod 1995), Ordnance Survey data, LiDAR, aerial photographs, ongoing community fieldwork and field observation. These sources have been combined to provide information about known and previously unknown archaeology in combination with local and regional landscapes. Interrogation of this data, facilitated by the GIS, is allowing consideration of questions relating to the spatial and temporal distribution of the later prehistoric field systems. This includes, for example, consideration of topographical trends and elements of slope, aspect, shadow, altitude, geological variation, and alignment on natural features, which may shed light on the origins and development of the field systems. Similarly, issues of seasonality and movement through the landscape, related to the distribution of water and other resources, are being examined. The prehistoric boundaries, which demonstrate considerable time-depth, also suggest an intricate

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Fig. 1. A network of field boundaries on the limestone terraces above the village of Grassington

relationship with the later, medieval patterns of land use; the GIS provides a means to test these observations.

The second research strand focuses on an area to the north of the village of Grassington in Upper Wharfedale, an area subject to much of the antiquarian and early twentieth-century investigation. Because of the work that occurred here, together with the resulting publications, this area is often presumed to be fully understood. However, by considering an area of approximately 200 ha in some detail, it can be seen that the archaeology is far more complex, multi-faceted and has a far greater temporal span than has previously been assumed. Where LiDAR exists for this area, an attempt has been made to interpret and phase the visible features, prior to the application of a barrage of geophysical and survey techniques in several focus areas. Geophysical survey, particularly in the form of magnetic susceptibility and magnetic survey, begins to elucidate the function of parts of this landscape and suggests the presence of intensive manuring and possible deep soils (Fig. 2). Where such deposits are indicated by geophysical survey, coring will be used to test soil depth and to attempt to retrieve datable material. In other landscapes, such as in the Northern Isles (e.g., Simpson 1997), it is known that similar remains originate from the Neolithic period and this would fit with finds of flint previously noted from across the study area. Rather than there being one large, single phase, field system in this area, the results of this fieldwork and associated analysis very much suggest a multi-phase, evolving palimpsest of features, together with the re use and rebuilding of existing remains in later periods. Rather than being constructed out of nowhere, it now seems that the idea of the monumental enclosure of the landscape evolved from an existing tradition of delineation and demarcation, likely to have originated in the Early Bronze Age, if not before. The use of LiDAR in particular has also brought into sharp focus the number of funerary monuments present in the area and suggests that rather than being a purely agricultural, functional landscape, this was an area where both the living and the dead were held in equal regard. By drawing out the

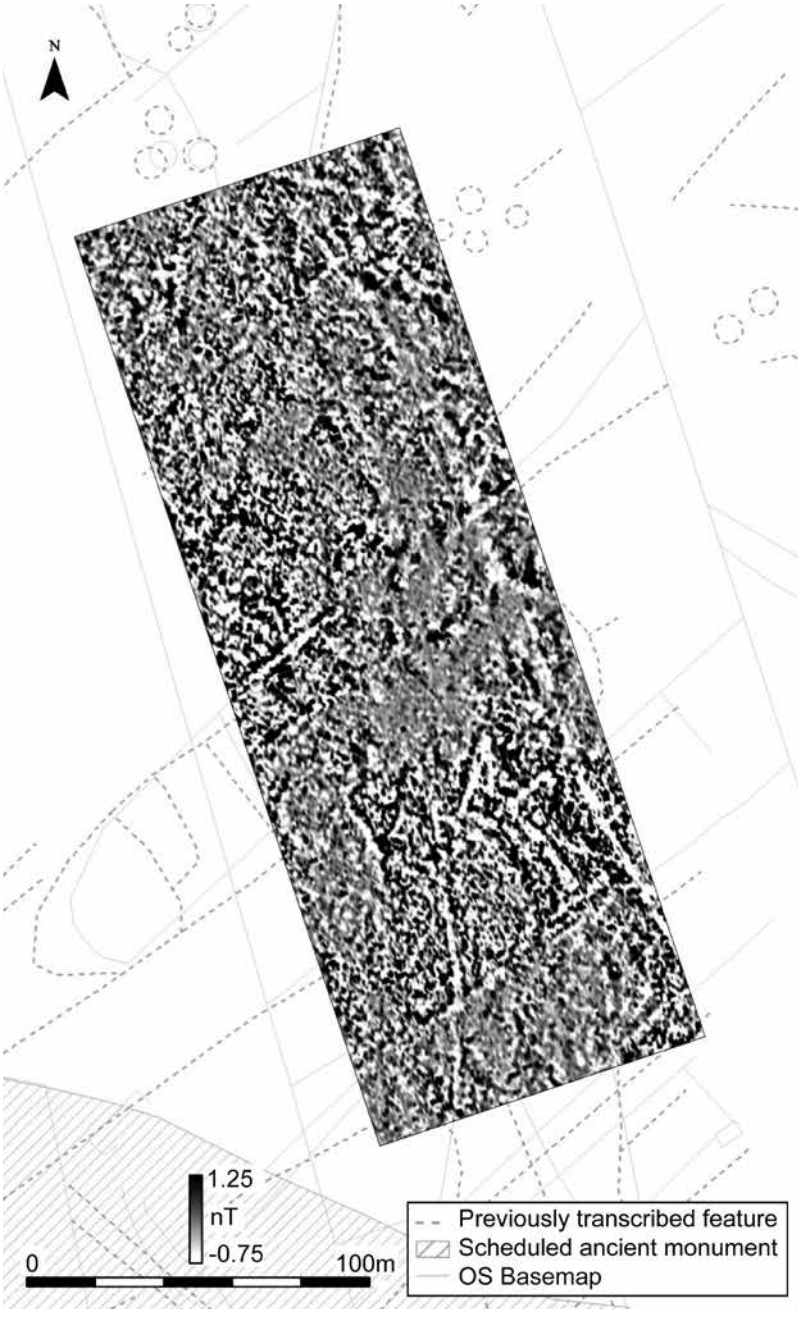

Fig. 2. Magnetic survey of part of a field system near Grassington

phasing and function of this area, it is possible to begin to interpret the factors in society that were driving the development of this landscape and this will form one of the main outcomes of the research.

While the GIS approach offers a broad-brush, outward-looking overview, it also facilitates the incorporation of the focused, inward-looking fieldwork approach; the collaboration has in turn ensured that the subsurface investigation will enhance the understanding of the extant archaeological resource and can be extrapolated through the GIS to characterize the landscape on a wider scale. Moreover, the format also works in conjunction with the Historic Environment Record, aiding public interpretation and heritage resource management, with the potential for further research.

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