B. Cech, G. Walach

The Importance of Integrated Prospection Techniques for Archaeological Investigations on Mining Sites in Rugged Alpine Topography

The investigation of mining archaeological sites in the Alps requires a special approach to investigation due to the difficulties of the terrain conditions (topography, vegetation). Using a gold mining region from the 15th and 16th century in the Gasteinertal (High Tauern) as a testbed, a method of prospection was developed and tested which is being called the integrative model of prospection. The main characteristic is a partition of the process into a number of phases, thus archieving a significant degree of improvement of the cost-result ratio. Through the specific use of research, non-invasive and invasive methods, the prospected area is being successively reduced from phase to phase by a ratio of about 1000:100:10:1, while the density of information increases at the same time. The area of prospection is indicated by research (phase 1). The location of finds is determined by systematic archaeological and geomagnetic profiling (phase 2). In phase 3 the boundaries of the site areas are determined through geophysical methods (geomagnetics and electromagnetics). Finally in phase 4 the detailed scenario of the site is investigated through the use of archaeological, geodetic, geophysical and geochemical methods and the area to be dug is determined. During the excavation, geophysical methods are used for detailed investigation of difficult digging areas, archaeologically not accessible areas (steep inclines, rock fall areas, snow fields) and for the resolution of problems of the geology of the deposit (SP method) and of mining technical problems. Also petrophysical methods (rock density, susceptibility) are being used as well, both in situ and on finds (ores, slags, soil discolorations).

In the area of the mining field Bockharttal and the precious metal smelter Angertal mining, processing and smelting installations were prospected and archaeologically excavated in the years 1994 to 1998. The method of prospection, its significance for planning and execution of the excavation and the archaeological results for this application will be presented.

H. Chapman

The Prospection of Archaeological Features in Wetland Landscapes: an Approach Using Cell-based GIS Modelling of High Resolution GPS Data

The value of wetlands lies in their extraordinary potential for the preservation of archaeological remains. This value has been reflected by the number of projects which have been centred around finding and assessing sites within wetland landscapes. Despite this, however, there has been very little development in the methods of prospection which have centred around fieldwalking and ditch surveys. This paper outlines a new method of prospection within wetland landscapes using GIS to model three dimensional surfaces from high resolution, high accuracy surveys of micro-topography. This method has been able to identify the locations and nature of buried archaeological deposits due to differential shrinkage of biogenic deposits relative to clastic sediments which is reflected in the surface.

Two sites were surveyed using high accuracy differential Global Positioning System (GPS) equipment at a standard deviation of 0.02 m. They were surveyed in transects aligned upon ranging rods at a surface resolution of between approximately 8.0 m and < 1.0 m in areas of greater archaeological potential. The data from these surveys was processed using ARC/INFO© Geographical Information System (GIS) software to generate an interpolated cell-based surface. This surface was generalised in a number of ways including basic contour banding and light-source allocation to provide hill-shading in order to highlight natural and archaeological features represented through elevation, aspect and slope. The results from this modelling were later assessed through ground-truthing.

The first site was at Sutton Common (South Yorkshire) in the Humber wetlands. Here a pair of Iron Age lowland enclosures exist within a wetland landscape, positioned on "islands" on opposing sides of an infilled palaeochannel. Enclosure B remains as an upstanding earthwork monument while enclosure A was bulldozed in 1980 and was under intensive arable agriculture until 1997. Despite seventeen years of ploughing, the outline of enclosure A was clearly visible along with a number of further features such as the presence of a ditch on its western side. Also the position of a causeway between the enclosures, crossing the palaeochannel, was indicated.

Ground-truthing at this site was assisted through a programme of excavations, commissioned by English Heritage, which were positioned on the basis of the model. This work revealed a direct correlation between features identified from the modelling and those identified in the excavation trenches.

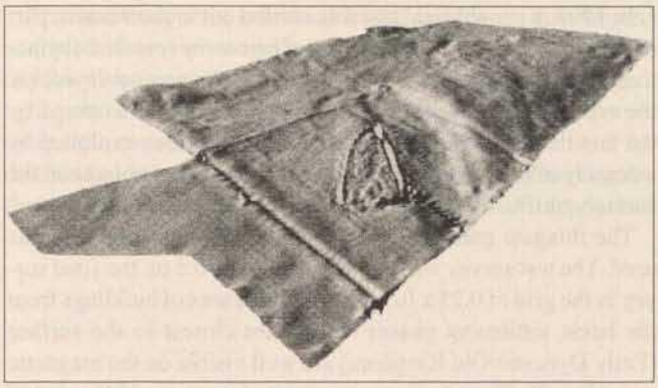

Fig. Sutton Common GIS model showing the positions of the upstanding and bulldozed enclosures – the full landscape measures 880 x 580 m

The second site was Meare Village East (Somerset) in the Somerset Levels. Here an Iron Age site had been identified on a raised peat mound within a peat-filled hollow. The settlement was characterised by clay spreads and mounds which were occupied by industrial remains and hearths. The results from the GIS model of this site reflected the positions of many of the known clay mounds which cover the site as very slight rises, most of which were imperceptible on the ground. Further it identified a number of other mounds which had been located through a magnetometry survey. Other mounds were indicated outside of the known area of the site. The results were checked by excavating a number of borehole transects. These identified correlations with some of these new mounds, but also a lack of correlation with others which appear to have been influenced by later activity.

In each of these cases the identification of archaeological features has been possible due to the increased shrinkage of biogenic sediments relative to clastic sediments within the framework of the current drainage regimes at each site. At Sutton Common, this increased shrinkage was identified in the peat-filled palaeochannel and the archaeological ditches. At Meare Village East, the scenario was reversed with the increased shrinkage lying in those areas not covered by the clay mounds. Overall the method has proven to identify archaeological features within wetland landscapes which cannot otherwise be seen on the ground.

M. Chlodnicki, T. Herbich

The Magnetic Survey at Tell el Farkha, Egypt

The site of Tell el Farkha is located immediately to the north of the modern village of Ghazala (14 km east of Simbillawein), in the Sharqiya province, Eastern Nile Delta, Egypt. The site was identified by the Italian Archaeological Mission (led by R. Fattovich) in 1987, the excavations were carried out between 1987 and 1990. From 1998, the excavation has been continued by the Polish Archaeological Mission, led by M. Chlodnicki (as a joint project of the Poznan Prehistoric Society, the Jagiellonian University and the Polish Centre of Mediterranean Archaeology in Cairo).

The site is located on the top of a sand gezira and extends over an area of ca. 400 x 110 m, with a maximum height of about 4.5 m over the level of the cultivated plain. It is marked by three mounds along the northern edge of gezira and a gentle slope delimited by the village houses in the south (fig. 1). The maximum thickness of an anthropogenic deposit, above the water table, can be evaluated at 5–6 m.

So far, the excavations have shown three main occupational phases of the site, the earliest one going back to the Predynastic period (4th millennium B.C.), and the later ones to the Late Predynastic/Early Dynastic period and the Old Kingdom (3rd millennium B.C.). The last two occupational phases are characterized by occurrence of mudbrick buildings. The Predynastic phase exhibits only pits and light clay installations.