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 field-walking 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.