



GPR survey to detect buried prehistorical remains at North Ballachulish Moss (Scotland).

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This work deals with the Ground Penetrating Radar (GPR) exploitation to map the underlying topography of North Ballachulish Moss as part of an archaeological evaluation of the area that was under threat of development. The aim of the survey has been to reconstruct peat depth and detect and locate buried localised targets [1].

During the survey many radar anomalies have been detected and the reliability of the radar survey has been confirmed by ground-truthing under the form of sediment coring, test-pitting and trial excavations.

Sediment coring and test-pitting provided corroborative evidence for the peat depths as defined by the radar survey. Trial trenching revealed that a suite of radar anomalies, identified during the course of the survey, are related to a buried prehistoric surface with an associated abundance of man-made artefacts (wooden stakes).

The data interpretation has benefited of the representation of the GPR results under the format of horizontal time-slices that well pointed out the depth of the peat and the localization and the shape of the buried localised targets.

In particular, the series of time-slices show the development of discrete surfaces and their relationship to an adjacent headland. The orientation of the site and its proximity to the location of a buried prehistoric wooden figure suggest ritual importance.

Finally, the measurements have been processed by a novel data processing approach based on the microwave tomography [3-4]; the results of this data processing have been compared with the ones of the standard data processing and have confirmed the above said outcomes of the standard data processing.

[1] C.M. Clarke, E.Utsi, V. Utsi, "Ground penetrating radar investigations at North Ballachulish Moss, Highland, Scotland", *Archaeological Prospection*, vol. 6, no. 2, pp. 107-121-75 , 1999

[2] E. Utsi, "Ground-penetrating radar time-slices from North Ballachulish Moss", *Archaeological Prospection*, vol. 11, no. 2, pp. 65-75, 2004.

[3] F. Soldovieri, R. Persico, G. Leone, A Microwave Tomographic Imaging Approach for Multibistatic Configuration: The Choice of the Frequency Step", *IEEE Transactions on Instrumentation and Measurement*, Vol. 55, Issue 6, pp. 1926 – 1934, Dec. 2006.

[4] F. Soldovieri, R. Bernini, I. Catapano, and L. Crocco, "The integration of novel diagnostics techniques for multi-scale monitoring of large civil infrastructures", *Advances in Geosciences, Geophysical monitoring of the near-surface by electromagnetic and other geophysical methods* (L. Eppelbaum and F. Soldovieri, Editors), vol. 19, pp. 67-74 , Nov. 2008