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Using the FDTD method for locating buried organic objects

Abstract

The analysis of the finite difference time domain (FDTD) numerical simulation of ground penetrating radar (GPR) measurement for locating burial sites is described in this paper. Assumed electromagnetic properties (electrical permittivity, conductivity and magnetic permeability) have been used to define the geological multilayer model. During modelling the electrical parameters of a buried body and the surrounding soil were various. It allowed to predict the changes of the buried body within time. The field measurements were conducted with different antennae of various central frequencies ranging from 100MHz to 800MHz. During measurements the ProEx System GPR made by Mala Geoscience Inc. was used. The measurements were carried out on site where a domestic pig cadaver was buried. In that case, an interpretation of GPR results is very difficult. The comparison of the FDTD numerical simulation and the observed field measurements show that there is similarity in the two approaches to the signal amplitude response. The results have demonstrated that FDTD modeling is an important tool for enhancing the reliability of GPR data interpretation particularly for forensic study.