



Ground Penetrating Radar for Forensic Geophysics: Detecting Hidden Evidence in Crime Scenes

Cláudia da Silva Xavier¹, Welitom Rodrigues Borges¹, Rafael Spindola Canata¹ Instituto de Geociências, Universidade de Brasília.

Copyright 2023, SBGf - Sociedade Brasileira de Geofísica.

This paper was prepared for presentation during the 18th International Congress of the Brazilian Geophysical Society held in Rio de Janeiro, Brazil, 16-19 October 2023.

Contents of this paper were reviewed by the Technical Committee of the 18th International Congress of the Brazilian Geophysical Society and do not necessarily represent any position of the SBGf, its officers or members. Electronic reproduction or storage of any part of this paper for commercial purposes without the written consent of the Brazilian Geophysical Society is prohibited.

Abstract

This work aims to carry out research in the area of forensic geophysics, through the development of the Ground Penetrating Radar (GPR) method. The problem, which is necessary for the elaboration of this study, is linked to the lack of research and qualified professionals to issue forensic reports related to the use of equipment and software for the use of this method. The objective of the research is to carry out data acquisition on two types of walls, one of drywall and the other of ceramic brick, and then to carry out the concealment of objects that are commonly found in crime scenes (such as weapons, money, and drugs) to identify the signals generated by these objects. For data processing, the Reflexw software was used, in which the data were treated and the synthetic model was also generated to evaluate the collected data. For data acquisition, antennas of different frequencies were used to differentiate the signals obtained for each crime scene. From the data collection, it was possible to observe anomalies in the signs referring to the walls that suffered tampering, making it possible to observe the materials hidden in the walls. The use of different frequency antennas made it possible to observe an increase in the resolution and observation quality of the caustics with an increase in frequency. From the acquisition of the acquired data and comparison through modeling, it is observed that the GPR is an effective method of investigation and adulterated environments. Consequently, this method can be employed to detect hidden evidence, enabling indoor data collection without compromising the integrity of the crime scene.