Geophysical Research Abstracts
Vol. 19, EGU2017-13080, 2017
EGU General Assembly 2017

Void Detection in High Dielectric Medium: (GPR Borehole System)

Yossi Salmon
Israel (salmony@technion.ac.il)

The detection of voids using the GPR system is well documented in the literature. However, the detection of small voids buried deep in high dielectric media is posing a major challenge. Using crosshole surveys to detect deep voids have been found to be successful in rocky media and in low dielectric sedimentary media especially for large targets.
The present work aims to evaluate the problems and potentials of void detection using the GPR Borehole System in known sedimentary environments of loess, clay and sand units. We have used conventional acquisition methods i.e. transillumination methods in a testing field comprised of two physical void models buried in different sedimentary media in a depth greater than 7m. The results of the field data were subsequently compared to equivalent numerical models and field surveys conducted in a nearby area.
The results show that the detection of voids is possible and more efficient using the 1D method known as the Zero Offset Profile (ZOP) due to the limitations of the dynamic range of the current available GPR systems. However, in order to obtain reliable results, the GPR survey should be complimented with an accurate depiction of the borehole position and inclination, and an independent investigation of the geophysical properties of the inherent sedimentary attributes of the medium, like volumetric water content, soil density, and grain size, using Time Domain Reflectometry (TDR) and other available laboratory methods. The values of these tests and analyses can be compared to the GPR results and help in the interpretation of the GPR data and in practicality help negating false positive results.