

# **GROUND-PENETRATING RADAR SURVEY APPLIED TO THE CHARACTERIZATION OF A GLACIAL, CHANNEL-LOBE SYSTEM IN THE VILA VELHA SANDSTONE, PARANÁ BASIN, BRAZIL**

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Ground Penetrating Radar (GPR) is a technique that offers a high-resolution, shallow subsurface profiling for use in sedimentological and reservoir analogue studies. GPR is similar to seismic reflection profiling but uses electromagnetic radiation in the 10 to 1000 MHz frequency range (when applied to a geological target). A GPR survey was performed in the Vila Velha sandstone, part of a glacial channel-lobe system of the Itararé Group (C-P) in Paraná Basin, southern Brazil, to delineate its three-dimensional geometry and internal structures. The Vila Velha sandstone defines subhorizontal plateaus at the surface and is interpreted as shallow marine lobes. By using a signal of relatively high frequency (50 MHz), 2D GPR profiles were collected, and processed with a similar standard sequence of operations applied to conventional seismic data. The technique used to interpret the profiles was analogous to the approach applied in seismic stratigraphic analysis, integrated with sedimentological studies in outcrops. It allowed the identification of a number of radar-bodies, radar-facies and the geometry of these channel-lobe system deposits. The data show some bounding surfaces that indicate a relationship between the complexity of internal structures and the multiples lobes that constitute part of an interpreted transgressive system tract of a third order depositional sequence (ca. 5 m.a. of duration). This study demonstrated the usefulness of the GPR technique in resolving the internal elements and the three-dimensional geometry of those sandstone bodies. It is also cheap, easy-to-move and highly productive in terms of data acquisition.