

Use of Ground Penetrating Radar (GPR) for cultural heritage analysis at Yachay Archeological site in Imbabura UNESCO Global Geopark

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“Sitios Arqueológicos de Yachay” is one of the twelve geosites of Imbabura UNESCO Global Geopark. The relevance of this geosite is related to the cultural heritage of the ancient Caranqui Culture. This archeological site is known from 1909-1911 expeditions of Jijón y Caamaño, but the most relevant evidence was found during the building of Yachay infrastructures, in the last decade. Commonly, archaeological studies made in Ecuador are based mainly on the exhaustive excavation of the areas of interest, which may endanger the archaeological remains. Around the world, the first step includes geophysics methods to locate rest underground. For this reason, geophysical methods are relevant before the excavation in archeological research. This aims to provide a non-invasive technique for an archaeological prospection decreasing the damage to areas of high archaeological sensitivity using the Ground Penetrating Radar (GPR). Since the geosite is part of Imbabura Geopark, it is fundamental to preserve the architectonic elements such as tolas, pucarás and pyramids from Caranqui culture. The GPR consists of the propagation of electromagnetic waves, reception of reflections, and it analyzes the changes in electromagnetic properties of the subsurface. In areas of archeological interest, these anomalies provide an idea of the stratigraphy and locations of the archeological remains. The study area is in the polygon of Yachay Tech University at Urcuquí county. For this study, data were collected from three tolas using GPR, employing a grid design carefully to minimize environmental impact. The data processed with Radan7 software showed improved quality compared to other geophysical techniques. For example, the quality data reached 5m. in 2020 with a 5106/A GPR, and the 50200HS GPR reached 20m. Furthermore, enhanced resolution allows the detection of smaller remains. The research determines the grade of archeological sensitivity more precisely because this new GPR model offers superior resolution and depth.

Key words:

Safeguarding, Conservation, Heritage, Archaeology, Geophysics, GPR.