



Assessing the accuracy of 3D GPR results by comparing them to 3D laser scanner models: the case study of the archaeological site of Peluda Cave (Sierra de Atapuerca, Burgos, Spain)

Lucía Bermejo (1,2), Ana Isabel Ortega (1,3,4), Lawrence B. Conyers (5), Alfonso Benito-Calvo (1), Adrián Martínez-Fernández (1), Josep M. Parés (1), José María Bermúdez de Castro (1), Eudald Carbonell (6,7)

(1) Centro Nacional de Investigación sobre Evolución Humana (CENIEH). Paseo Sierra de Atapuerca 3, 09002 Burgos, Spain. (lucia.bermejo@cenieh.es), (2) Doctorado Interuniversitario de Evolución Humana, C/ Don Juan de Austria, 1, 1ª planta, 09001 Burgos, Spain., (3) Fundación Atapuerca, Carretera de Logroño, 44 - 09198 Ibeas de Juarros (Burgos, Spain)., (4) Grupo Espeleológico Edelweiss, Excma. Diputación Provincial de Burgos, C/Paseo del Espolón s/n, 09071, Burgos, Spain., (5) Department of Anthropology, University of Denver, 2000 E. Asbury Ave., Denver, CO 80208, USA., (6) IPHES, Institut Català de Paleoecologia Humana i Evolució Social. Unitat associada al CSIC, C/ Escorxador s/n, 43003 Tarragona, Spain., (7) Universitat Rovira i Virgili (URV), Campus Catalunya, Avinguda de Catalunya 35, 43002 Tarragona, Spain.

The Sierra de Atapuerca sites (Burgos, Spain) consist of various caves filled with sediments that bear outstanding archaeo-palaeoanthropological remains (Bermúdez de Castro et al., 1997; Carbonell et al., 2008; Ortega et al., 2014). Identifying the development of this karstic system is therefore crucial for understanding these sites formation processes as well as for excavation planning strategies. For this reason, the Sierra de Atapuerca is being the target of different geophysical methods.

As for GPR (Ground Penetrating Radar), the study of single profiles reported preliminary successful results (Bermejo et al., 2015; Bermejo et al., 2016), which encouraged to carry out an extended survey. This consisted in parallel GPR profiles (grids), which allow creating horizontal slices and, subsequently, 3D models of the subsurface.

The aim of this work is to assess the accuracy of our GPR interpretations by comparing this 3D model with one generated by a laser scanner. To this end, we scanned Peluda Cave, which constitutes a perfect test site as it is found only two meters below the ground surface and has thoroughly been studied along the years.

The results show the lateral limits of the cave precisely and portrait quite accurately the top of the cave. On the contrary, the velocity increase of the radar wave when entering the void space of the cave, results in an apparent pull-up of the floor.

We can therefore conclude that comparing both 3D models has revealed itself to be a useful tool for assessing, at least, a part of the GPR results. However, more experiments in different environments and conditions are needed to go deeply into this subject.

Keywords: Ground Penetrating Radar, Geophysics applied to archaeology, Sierra de Atapuerca sites.

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