ABSTRACT

The study is focused on implementation of integrated, three-dimensional geophysical and topographical surveys investigation of Early Prehistoric sites on the example of Fumane Cave (Verona, Italy). The methods applied include electrical resistivity tomography (ERT), seismic surface waves (HVSR), laser scanner and photogrammetry. The study involved the use of two resistivity arrays, Wenner-Schlumberger (WSC) and Pole-Pole (PP), both for the shallow resolution in the first 2-3 meters of the deposit and to get information about the total depth and the position of bedrock. Seismic surface-waves may show amplitude resonances at certain frequencies depending on the thickness and elastic parameters of near-surface layers seismic velocity variations and can provide information about the geometry of the bedrock. Two and three-dimensional inversion models provided suggestive resistivity images, that provided detailed information about deposit's texture spatial characteristics, indicating areas of low resistivity values where potential archaeological materials may be found. Moreover, the maximum depth of the deposits is believed to be around 4-5 m based on the Pole-Pole resistivity images, while the maximum depth of investigation was around 8 meters confirmed by seismic data. Furthermore, by comparing the resistivity, seismic and archaeological data, it is possible to characterise better the nature of sedimentary infill and to locate different post depositional processes involved into the creation of cave deposit. Laser scanner and photogrammetric survey provided georeferenced, high-resolution, three-dimensional, morphologically accurate model of the cave and stratigraphy profiles, serving as a starting point for the modelling of the geophysical data. Furthermore, the detailed survey of the surfaces, such as cave walls, stratigraphy sections and excavation sections, is an important aspect of archaeological data collection, investigation, interpretation and archiving of the site.