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Multidisciplinary Investigations embedded in a photogrammatric three dimensional survey in an archaeological site and St Peter and Paul Church in Agro Valley (Messina, Italy)

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In the framework of the National School "Science and Cultural Heritage: from Non-Invasive Analysis to 3D Recostruction" (19-23 September 2016, Messina-Valle d'Agrò, Italy), organized by the Department of Mathematical and Computer Sciences, Physical Sciences and Earth Sciences of the University of Messina, in co-opeartion with the Department of Geosciences of the University of Malta and in agreement with the Regional Order of Geologists of Sicily, non-invasive investigations have been performed aimed at the exploitation, fruition and safeguard of the archaeological site of Scifì and the St Peter and Paul Church in Agro Valley. Different georadar prospections [1-2] were carried out at both sites. Prospections have been performed by using a Ris-Hi mode system equipped with a dual antenna at the central frequencies of 200 and 600 MHz [3], and made along an orthogonal grid with 40 cm spacing. Data processing involved a zero timing, background removal on all tracks, a gain in-depth, a one-dimensional Butterworth filtering and a Kirchoff migration. Measurements of ambient vibrations were also performed [4-5], that revealed the absence of remarkable side heterogeneities, or large impedance contrasts associated surface stratigraphy. Measurements were also taken to measure the natural frequency of the church. In the two investigated sites, we also conducted spectroscopic investigations. The analysis was mainly focused on the study of variations, in terms of elemental composition by means of X-ray fluorescence (XRF) measurements as well as Raman spectrospopy which allow to determine the elemental composition of the sample under investigation. In addition, several images (by means of drones) were also collected in order to create a detailed 3D model for each site the ultimate goal of creating a digital archive for the virtual use of sites of interest.

References

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