

Abstract EGU23-8782

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Forensic geosciences investigations on experimental fields

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The search for homicide graves is a very strenuous activity that may lead to the identification of the burial site if it is planned based on articulated scientific approaches considering several aspects of forensic sciences. Moreover, another difficult task in such criminal cases may be the estimation of the Post-Mortem Interval (PMI) of the victim. Discrepancies between PMI estimation through entomological studies and other evaluations may be. This inconsistency is at the base of the necessity to examine and well understand the human decay process of human beings and the decay consequences in the surrounding environmental context. It is noteworthy that several processes may occur on the surrounding site the burial. Phenomena as a depression, a different growth of plants, or the occurrence of peculiar insect associations may be observed on the grave, due to the body's decay, and the body fluids release in the underground. These aspects may be analysed in experimental fields where pig carcasses, usually used as analogues for the human cadavers, are inhumated in holes dug by means of hand instruments (pick and shovel) or mechanical excavators. These sites may be monitored by applying geological, geophysical, geochemical, and geomatic methods, as well as entomological and botanical characterization of the insects and flora, respectively. The present research is devoted to plan, analyse and monitoring of a simulated experimental field in Malta, where a simulated grave containing a pig carcass will be prepared. The research project is dedicated to geophysical and geomatic surveys to be realized before the excavations and during the project for monitoring the depression development and the shape and dimensions of the leachate plume. Geophysical methods consist of ERT tomographies, seismic and georadar profiles, parallel and orthogonal to the graves. Geological investigations are focused on characterizing the pedogenic profile and the composition, texture, and structure of the soil/sediment. Entomological research is devoted to identifying insect species typically related to body decay. Ideally and in addition to the above, botanical surveys are aimed at defining the main species and differences in the plant growth. The reconstructed evolution of the burial environment may be investigated to better assist criminal investigations into the definition of the PMI in recognition of a burial site and other significant criminological and criminalistic data.

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