

Characterization of soils from the region of Lisbon (Portugal) for forensic purposes

A. PACHECO¹, I. MOREIRA¹, J. GOMES¹, H. RIBEIRO²,
H. SANT'OVAIA^{1,2}, A. ASSIS³, A. GUEDES^{1,2*}

¹Departamento de Geociências, Ambiente e Ordenamento do Território, Faculdade de Ciências, Universidade do Porto, Rua do Campo Alegre 687, Porto, Portugal
(*aguedes@fc.up.pt)

²Instituto de Ciências da Terra (ICT), Pólo da Faculdade de Ciências da Universidade do Porto, Porto, Portugal

³Setor de Físico-Química, Laboratório de Polícia Científica, Polícia Judiciária, Rua Gomes Freire, Lisboa, Portugal

Soil is a very heterogeneous material, therefore it is a great advantage to analyze it and compare it with others. Each soil sample is unique, thus its discrimination is important, namely during a police investigation.

In order to characterize soils from the region of Lisbon and to contribute to future forensic investigations in Portuguese Scientific Police Laboratory, thirty-three soil samples were collected in four areas characterized by high criminality: Guincho, Caxias, Monsanto, and Loures, and analysed using non-destructive portable equipment: colour determined by spectrophotometry; trace elements composition determined by XRF and low-field magnetic susceptibility determined using a susceptibility meter. A hierarchical cluster analysis was applied to ascertain the capacity of the different properties for discrimination between samples from the different studied areas.

This research demonstrated that not only the applied techniques are viable, having numerous advantages, namely non-destructive character; the equipment is portable and therefore easy to transport; easy to use and fast data acquisition but also that the combination of the different techniques used to characterize the soil samples from the Lisbon region enable discrimination of samples collected from the different areas within the region and can contribute to future criminal investigations in the region.

Acknowledgments: The authors would like to thank DGAOT/FCUP and Project UID/GEO/04683/2013 of FCT, Portugal and COMPETE POCI-01-0145-FEDER-007690.