Geophysical Research Abstracts
Vol. 15, EGU2013-11558, 2013
EGU General Assembly 2013


# The Use of Soil in Criminal Investigations

Lorna Dawson (1) and Robert Fitzpatrick (2)

(1) The James Hutton Institute, Cragiebuckler, Aberdeen, Scotland, United Kingdom SCOTLAND, AB15 8QH (lorna.dawson@hutton.ac.uk), (2) Centre for Australian Forensic Soil Science (CAFSS), CSIRO Land and Water/The University of Adelaide, Glen Osmond, AUSTRALIA, 5064 (Rob.Fitzpatrick@csiro.au)

Forensic soil science, as a newly developed discipline of soil science, has matured to the extent that well-defined questions and successful crime scene investigations are being addressed in increasingly refined ways to assist law enforcement agencies. Soils, rocks, regolith, minerals and man-made mineral particles such as bricks (i.e. referred to "human-made" soil materials) are being used in specialised forensic investigations to associate/disassociate a sample taken from an item, such as shoes, clothing, shovel or vehicle, with a specific location. The majority of forensic cases involving soil materials are usually overwhelmingly complex, and the challenges of associating relevant information from one source with another, often requires the use and development of sophisticated field and laboratory methods.

Through examples from case studies, this presentation will demonstrate how advanced field and laboratory approaches have been critical in developing coherent, predictive, soil models, from landscape to microscopic scales, to help contribute to soil-based criminal investigations in both Australia and Scotland. To demonstrate the critical importance of soil materials in forensic investigations, the following 2 case studies, which tackle difficult problems at a range of scales involving highly complex issues, will be presented:

•The use of soil evidence to help solve a double murder case. This investigation used morphological, chemical, physical and mineralogical properties to identify similarities between soil-regolith found on a shovel taken from the suspect's vehicle and wetland soil-regolith subsequently located in the bottom of a quarry (Fitzpatrick and Raven, 2012).

•The use of soil and related material to help search and to provide evidence in a murder case. This investigation used soil mineralogical and organic properties to identify similarities between sand found on a shovel and sand subsequently located at a beach. Results illustrate the benefit of using a complementary approach and consideration of the two way transfer of materials (Dawson and Hillier, 2010).

References

Fitzpatrick R.W. and Raven M.D. (2012) How Pedology and mineralogy helped solve a double murder case: Using forensics to inspire future generations of soil scientists. Soil Horizons. 53 (5) doi:10.2136/sh12-05-0016.

Dawson, L.A. Hillier, S. (2010) Measurement of soil characteristics for forensic applications. Surface and Interface Analysis, 42, 363-377.