

Ashes to ashes, dust to dust: geochemical signals of mortuary areas

Ladislav Smejda, Jan Horak, Jana Alexandrova, and Michal Hejcman

Department of Ecology, Czech University of Life Sciences, Prague, Czech Republic (ladislav.smejda@me.com)

Mortuary areas are important components of historic landscapes. We address the intriguing problem of human-induced chemical change in sediments and soils affected by burial of the deceased. While the decomposition of dead bodies may be seen as a very natural process, cultural customs of most human societies often dictate the establishment of formal mortuary areas where human remains accumulate for decades and centuries. Abandoned cemeteries and other places associated with the dead then turn into other land-use categories (e.g. arable fields, forests, parks, residential areas etc.). What is the long-term ecological legacy of former places of intensive burial has been little studied so far.

Phosphate analysis is the most frequently applied method for geoarchaeological detection of past human impact on soils. It has been used also in research aimed at human graves. To overcome the inherent limits of this method, we focus mainly on a multi-elemental analysis of necrosols based on X-ray fluorescence spectroscopy (XRF).

In this presentation, we discuss selected observations made in typologically and chronologically distinct localities, covering a spectrum of burial customs practiced since prehistory to the recent period, namely inhumation, cremation, and (through animal proxies) also excarnation.

We aim to show that mortuary areas are quite specific and complex class of sedimentary archive. Chemical signals of decomposed human remains can frequently be well distinguished against the natural background values, which means they may remain persistent for a very long time (in timescale of centuries to millennia). From an ecological point of view, mortuary sites (even abandoned ones) represent landscape patches significantly enriched with various nutrients compared to the surrounding region, with necessary impact on local biota.

This emergent research area produces knowledge that can be utilised in ecology, soil science, and landscape management. Serious problems must however be tackled to fully embrace its potential; from ethical concerns towards human remains to methodological aspects of various taphonomic and diagenetic effects on measured data. The work presented in this paper has been partially funded by the project DEEPDEAD: Artefacts and human bodies in socio-cultural transformations (HERA.15.055).