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# All the same but different? – Anthropogenic Dark Earth on a global scale

Tous pareils mais pas identiques ? - La terre noire anthropogène à l'échelle mondiale

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## The Problem:



Archaeologists meet Dark Earth in excavations and often do not know what to do with it



**Facing the problem:**  
Meeting of specialists and discussing the phenomenon



**And Doing research:**  
Plant pot trial to determine the real yield potential of Nordic DE

## Resolution:

Writing a multiauthored manual on the topic of Dark Earth  
Target group: field archaeologists

Publication plan:

## Dark Earth Manual

Editors:  
Jens Schneeweiß, Eileen Eckmeier, Paweł Cembrzyński,  
Yannick Devos, Sarah Lo Russo, Christine Pümpin

Planned publication date: 2nd half 2024

Structure:

- 0) Introduction
- 1) History of Dark Earth Research
- 2) Questions
- 3) Methods
- 4) Short case studies with cultural interpretations/implications
- 5) Field guide (description and short graphical version)
- 6) Bibliography, information about the authors and useful addresses

Example

### Chapter 3: Methods

Overview in Tables, short descriptions and graphic illustrations

Table 1: Basic physical, chemical, and biological analysis of Dark Earth and their interpretation.

Analysis	Interpretation
Particle size distribution	Soil texture, parent material similar to surrounding soils, water holding capacity, nutrient holding capacity, water infiltration
Sedimentology	Origin, deposition, transformation of parent material
Munsell colour	Soil characteristics
pH value	Soil reaction, plant growth, Aluminum toxicity, nutrient availability
Total organic carbon	Soil organic matter content, nutrient holding capacity, rooting capability, plant growth and yield, water holding capacity
Total nitrogen	Soil organic matter quality, natural nitrogen availability, plant growth and yield
Phosphorus (fractions)	Past human activities such as bone and excrement deposition
Plant-available nutrients	Soil fertility and plant growth and yield

Table 2: Sophisticated physical, chemical, and biological analysis of Dark Earth and their interpretation.

Analysis	Interpretation
a. Micromorphology	Spatial distribution of human remains such as charcoal, bones etc. Natural soil processes such as clay movement
b. Charcoal / Black carbon	Quantity and quality of charring residues even if not visible as particulate charcoal
c. Biomarkers	Type of vegetation (phenols, terpenoids, cannabinoids), plant- vs. aquatic origin (n-alkanes), plant- vs. microbial origin (sugars), bacterial vs. fungal origin (amino sugars), microbial diversity (phospholipid fatty acids), human vs. animal excrements (steroids and bile acids)
d. Stable isotopes	Type of vegetation (woody vs. grass), meat consumption, fish consumption
e. Urease	Presence of feces or manure
f. Microorganisms	Presence of feces or manure
g. Ancient soil DNA (aDNA)	Presence of humans, animals, plants
h. Archaeobotany	Vegetation history
i. Phytoliths	Vegetation history
j. Radiocarbon	Determination of age / dating
k. OSL	Determination of age / dating

Example

### Chapter 4: Case studies

Each case study: short, catalogue-like, with illustration (DE + Ref. Soil)

1. Specific definition
2. Localization
3. Chronology
4. Characteristics (scientific, but also archaeological attribution),
5. Methods and results
6. Interpretation

1. Ethnographic examples:
  - a. Amazonian Dark Earth
  - b. African Dark Earth
2. Dark Earth Examples and Case Studies:
  - a. Amazonian Dark Earth
  - b. Maya Dark Earth
  - c. Moravian Dark Earth
  - d. North Italy Urban Dark Earth
  - e. Alanic Dark Earth
  - f. Roman Dark Earth
  - g. Western European Urban Dark Earth (different examples/sites)
  - h. Dark Earth in Rozprza, Central Poland
  - i. Urban Dark (Garden) Earth in Eastern Europe
  - j. other Eastern European Examples, e.g. old Rus' towns?
  - k. Vienna Urban Dark Earth
  - l. Lübeck Urban Dark Earth
  - m. Staraya Ladoga
  - o. Nordic Dark Earth
  - p. Viking Dark Earth 1: Hedeby
  - q. Viking Dark Earth 2: "Svarta Jorden" in Birka
  - r. Dark Earth in Denmark
3. Dark Coloured Soils but Non-Dark-Earths
  - a. Chernozem
  - b. Plaggenesch
  - c. Hortisol
  - d. Køkkenmødding/Shell midden/Sambaquí Soils

