

## ARCHON courses: Geoarchaeology 2018-2019



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27-29 March 2019, location Vrije Universiteit Amsterdam,

**Geoarchaeology: theories and practices.** Developing a toolbox for geoarchaeology in archaeological field projects (3 days; 3 ects)

*Developing a toolbox for geoarchaeology in archaeological field projects\**

**Day 1: Research problems, maps, stratigraphies and lacquer peels NW European and North Atlantic areas**

**Day 2: Fieldwork in NW European area: Wekeromse Zand (Pleistocene) and Amstelveen (Holocene)**

**Day 3: Micromorphology North-Atlantic, student presentations and synthesis**

\*In this course students will have access to iPads4G assisting in accessing recording and presenting data.

Geoarchaeology as a research field continues to grow as analyses and techniques more typically used in earth and environmental sciences are shown to have use in interpreting the archaeological record (Diskin et al, 2013). Geoarchaeology is ‘the science that studies geo-bio-archives in an archaeological context by also considering historical and archaeological data sources in its syntheses’; it emphasizes a multidisciplinary role, as a sub discipline of geomorphology, between the geosciences and cultural sciences (Engel & Brückner, 2014). Geoarchaeology provides insights into landscape reconstructions, human behaviours, and cultural processes that are a backdrop to landscape change (Kluiving et al, 2015). In this course a toolbox is presented to study geoarchaeological research problems and which methods are used from Northwest European and North Atlantic case study areas.

## **Objectives:**

This course gives theoretical and practical frameworks for interpreting soils, sediments and landscapes as records of the past and provides theoretical training in field and laboratory methods that identify, quantify and evaluate early human activities and environmental imprints. These understandings and skills contribute new landscape histories for Northwest European and North Atlantic regions, while these techniques can also be applied elsewhere. This work offers important and challenging perspectives on how interpretations of soils and sediments contribute to how people lived with and adapted to environmental change and has resonance with contemporary debates on sustainability, resilience and heritage management.

## **Learning outcomes:**

- Understanding the principles of interpreting landscapes and sediment stratigraphies as records of the past.
- Understanding the contributions of landscape studies and sediment analyses in the interpretation of key aspects of landscape history including multi-scale and multi-topical cartographic analysis, sediment description (from outcrop, core and lacquer peel), coring practice, as well as micro-morphological observations.
- Ability to integrate landscape histories and sedimentary evidence with inter-disciplinary sources, including documentary, archaeological and environmental information, to address broader issues of society – environment change interactions.
- The module provides a foundation for research-based field and laboratory Dissertation topics in Geoarchaeology and landscape history.

## **Acquired skills:**

- Competence in the application of science based methods to answer archaeological research questions.
- Competence in the description, analyses and interpretation of soils and sediments from archaeological landscape contexts.
- Competence in cross-disciplinary approaches applied to questions of society-environment interactions.

## **Seminar Programme:**

### ***Developing a toolbox for geoarchaeology in archaeological field projects***

The 3-day course is entirely research led and focused on two live, current, research projects. Files with seminar materials as well as the reading will be available beforehand.

- NW European area: Establishing the landscape history of a focusing on the problem of determining age of humic podzols, micro-podzols and plaggic soils, opposed to drift sands from Neolithic / Bronze Age, through Iron Age to the medieval period
- North Atlantic. Establishing transitions in land management from Neolithic / Bronze Age, through Iron Age to the medieval period as expressed in the formation of North Atlantic anthrosols.

Wednesday 27 March, room HG-14A36 (14<sup>th</sup> floor Main Building)

9.15-9.30 hours: Opening; welcome, instructions iPad4G, blogposts

**Research problems, maps, stratigraphies and lacquer peels NW European and North Atlantic areas**

9.30- 11.00 session 1: Topographic, geomorphological and soil maps of central –Netherlands showing Holocene and Pleistocene sediments and soils. Lacquer peels of higher sandy soils as well as lower clayey soils.

11. 00 – 12.30 session 2: Mapping exercise NW Europe and discussion

12.30-13.30 Lunch break

13.30- 15.00 session 3: Lacquer peel description exercise and discussion NW Europe

15.00 - 17.00 session 4: Stratigraphy exercise and discussion North-Atlantic

Thursday 28 May, start from inner parking place VU campus terrain

**Fieldwork in NW European area: Wekeromse Zand (Pleistocene) and Amstelveen (Holocene)**

9.00-10.30 travel time Amsterdam-Wekeromse Zand, preparing for fieldwork

10.30- 13.30 session 5: Coring, observing, soil profile description on recording sheets

14.00-15.30 travel time Wekeromse Zand-Amstelveen

15.30-17.00 Session 6: Coring, observing, soil profile description on recording sheets

Geological and stratigraphical description of Holocene sedimentary sequence in the Western Netherlands (Amstelveen).

17.00-17.15 Return to Vrije Universiteit Amsterdam

Friday 29 March 9.00-12.00 room tba, 13.00-17.00 room HG-14A36 (14th floor Main Building)

**Micromorphology North-Atlantic; student presentations and synthesis**

9.00-12.00 session 7. Semi-quantitative assessment on recording sheets and construction of a micro morphological assessment.

12.00-13.00 Lunch break; *deadline for blogpost 13.00 hours!*

13.00-16.30 session 8: Student presentations

16.30-17.00 session 9: Synthesis of toolbox methods

## Reading:

Reading for this unit is found as general text books on geoarchaeology and environmental history giving context to the module, digital mapping resources and research papers from the case study research projects. It is **strongly recommended** that the references are read prior to the lecture / seminar session as a foundation for discussion.

### 1. Environmental History contexts:

Anderson, D.E., Goudie, A.S. and Parker, A.G. (2013). *Global Environments through the Quaternary*. 2nd Edition, ISBN: 978-0-19-969726-7. Oxford University Press.

Goldberg, P. and Macphail, R. I., (2006). *Practical and Theoretical Geoarchaeology*. ISBN: 978-0-632-06044-3. Blackwell.

Roberts, N., (2014). *The Holocene: An Environmental History*. 3rd Edition, ISBN: 978-1-4051-5521-2 Wiley-Blackwell.

Waters, C.N., Zalasiewicz, J.A., Williams, M., Ellis, M.A., and Snelling, A.M. (Eds.) (2014). *A Stratigraphic basis for the Anthropocene*. Geological Society, London, Special Publication 395. <http://sp.lyellcollection.org/content/395/1/1.full>

### 2. Geoarchaeology, contexts

Kluiwing, S.J., Engel, M., Heyvaert, V.M., Howard, A.J., 2015. Where earth scientists meet Cleopatra: Geoarchaeology and geoprospection of ancient landscapes. *Quaternary International*, 1-3.

Butzer, K.W., 2008. Challenges for a cross-disciplinary geoarchaeology: the intersection between environmental history and geomorphology. *Geomorphology* 101, 402-411.

Diskin, S., Heyvaert, V., Pavlopoulos, K., Schütt, B., 2013. Geoarchaeology: a toolbox of approaches applied in a multidisciplinary research discipline. *Quaternary International*, 1-3.

Engel, M., Brückner, H., 2014. Late Quaternary environments and societies: progress in geoarchaeology. *Zeitschrift für Geomorphologie, Supplementbände* 58, 1-6.

### 3. Toolbox Geoarchaeology papers

#### *a. NW Europe landscape history*

Doorenbosch, M & Van Mourik, J.M (2016). The impact of ancestral heath management on soils and landscapes: a reconstruction based on paleoecological analyses of soil records in the middle and southeast Netherlands. *SOIL Discuss.*, doi:10.5194/soil-2015-83, 2016

Kaplan, J.O., Krumhardt, K.M., Zimmermann, N. (2009). The prehistoric and preindustrial deforestation of Europe. *Quatern. Sci. Rev.* 28 (27–28), 3016–3034.

Kluiwing, S. J., M.E. Bekkema, and N.G.A.M. Roymans (2015). Mass migration through soil exhaustion: Transformation of habitation patterns in the southern Netherlands (1000 BC–500 AD). *CATENA* 132: 139-150.

Van Mourik, J.M., Seijmonsbergen, A.C., Slotboom, R.T., Wallinga, J. (2012). The impact of human land use on soils and landforms in cultural landscapes on aeolian sandy substrates (Maashorst, SE Netherlands). *Quat. Int.* 265, 74–89.

*b. North Atlantic anthrosols*

Golding, K.A., Simpson, I.A., Wilson, C.A., Lowe, E.C., Schofield, J.E. and Edwards, K.J. (2015). Europeanization of sub-Arctic environments: Perspectives from Norse Greenland’s outer fjords. *Human Ecology* 43, 61-77.

Guttmann, E.B., Simpson, I.A., Nielsen, N. and Dockrill, S.J. (2008). Anthrosols in Iron Age Shetland: Implications for arable and economic activity. *Geoarchaeology* 23, 799-823.

Simpson, I.A., Dockrill, S.J., Bull, I.D. and Evershed, R.P. (1998). Early anthropogenic soil formation at Tofts Ness, Sanday, Orkney. *Journal of Archaeological Science* 25, 729-746.

Simpson, I.A. (1997). Relict properties of anthropogenic deep top soils as indicators of infield management in Marwick, West Mainland, Orkney. *Journal of Archaeological Science* 24, 365-380.

4. Maps and internet tools

<b>Mapping system</b>	<b>Scale/Type</b>
Soil classification The Netherlands <a href="http://geoplaza.vu.nl/cms/">http://geoplaza.vu.nl/cms/</a>	1:50,000
Geomorphology The Netherlands <a href="http://geoplaza.vu.nl/cms/">http://geoplaza.vu.nl/cms/</a>	1:50,000
Topography The Netherlands <a href="http://geoplaza.vu.nl/cms/">http://geoplaza.vu.nl/cms/</a>	1: 50,000
Geology data of the subsurface in The Netherlands <a href="https://www.dinoloket.nl/en">https://www.dinoloket.nl/en</a>	Data and models
Solid geology UK <a href="http://mapapps.bgs.ac.uk/geologyofbritain/home.html">http://mapapps.bgs.ac.uk/geologyofbritain/home.html</a>	1:50,000
Superficial geology UK <a href="http://mapapps.bgs.ac.uk/geologyofbritain/home.html">http://mapapps.bgs.ac.uk/geologyofbritain/home.html</a>	1:50,000
Soil classification Scotland <a href="http://www.soils-scotland.gov.uk/">http://www.soils-scotland.gov.uk/</a>	1:250,000
Soil classification Scotland <a href="http://www.soils-scotland.gov.uk/">http://www.soils-scotland.gov.uk/</a>	1:25,000
World Reference Base (WRB) and app download	1:250,000

<a href="http://www.fao.org/soils-portal/soil-survey/soil-classification/world-reference-base/en/">http://www.fao.org/soils-portal/soil-survey/soil-classification/world-reference-base/en/</a>	
Agricultural Land Classification Scotland <a href="http://www.soils-scotland.gov.uk/">http://www.soils-scotland.gov.uk/</a>	1:50,000
Archaeological Sites and Landscapes Scotland <a href="https://canmore.org.uk/">https://canmore.org.uk/</a>	1:25,000
Collector app for storing data during fieldwork <a href="http://doc.arcgis.com/en/collector/">http://doc.arcgis.com/en/collector/</a>	App
Extra information about publishing to ArcGIS online <a href="https://doc.arcgis.com/en/arcgis-online/share-maps/publish-features.htm">https://doc.arcgis.com/en/arcgis-online/share-maps/publish-features.htm</a>	Info

### **Assessment:**

Presentation: oral (20%), blogpost (20%), Research report (3000 words, excl. figures, images, photos and references) (60%). The research report is due Friday 11 March 2016. The minimum grade to obtain a pass for a module is a 60% score.

### **Admission, logistics:**

Students can register for this course by contacting the ARCHON office at [secretary@archonline.nl](mailto:secretary@archonline.nl).

Any questions relating to the content of the course can be sent to Sjoerd Kluiving, [s.j.kluiving@vu.nl](mailto:s.j.kluiving@vu.nl).

The course will finish with a research report to be completed in due time after the course. The location of the course is in the W&N Building on Wednesday, outside in the field on Thursday, and in the W&N Building on Friday and in at the VU University Amsterdam, De Boelelaan 1079-1085, 1081 HV Amsterdam, see for room details the Program and for route and travel descriptions <http://www.vu.nl/en/about-vu-amsterdam/contact-info-and-route/route-description/index.asp>