

Vegetation Reconstruction in the „Climate, Landscape, Settlement and Society“ (CLaSS) Project

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Introduction to the CLaSS project

The CLaSS project, funded by an ERC Starting Grant awarded to Dr Dan Lawrence, investigates the relationship between climate fluctuations and settlement history over the last 8000 years in the Near East. As part of the project, anthracological data will be collated for the study area (Fig. 1). Within the project, archaeological settlement data and archaeobotanical data are being collated for the entire Fertile Crescent and will be combined with climate simulations from General Circulation Models (developed by Daniel Hill, University of Leeds). The project aims to investigate the question: What factors have allowed for the differential persistence of societies in the face of changing climatic and environmental conditions?

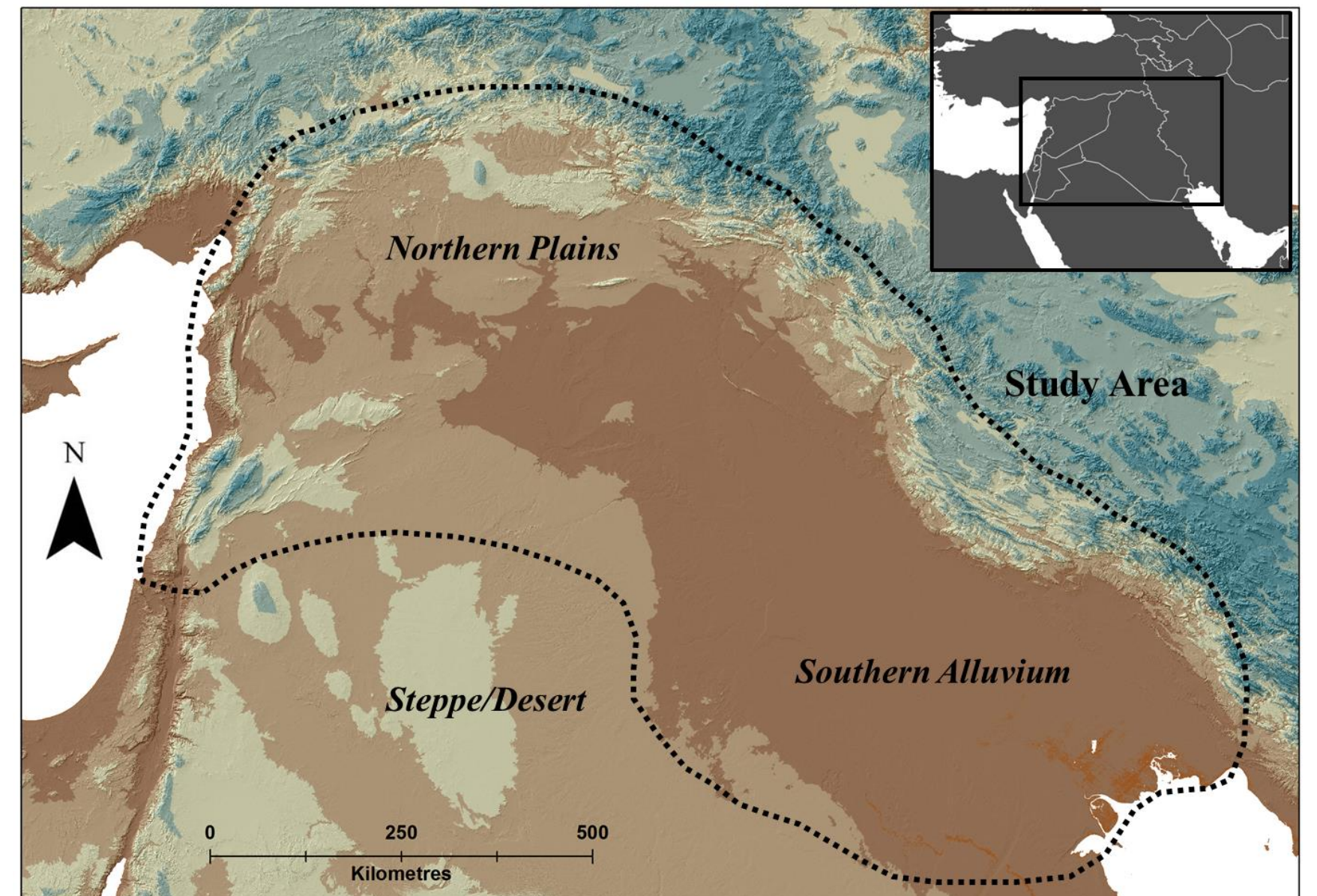


Fig. 1. SRTM Digital Elevation Map with study area indicated

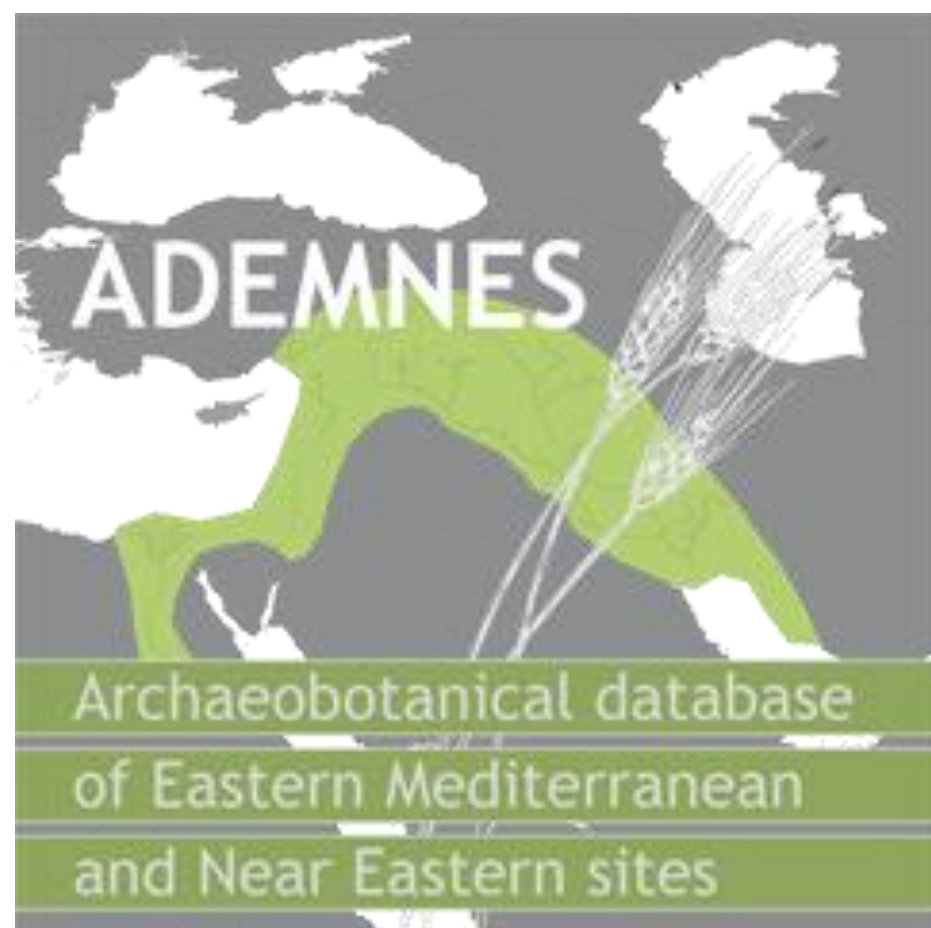


Fig. 2. The ADEMNES database is accessible online at <http://www.ademnes.de/>

Anthracological research questions

- 1) How did the vegetation look at the time of the sites' occupation?
- 2) Did the vegetation change over time? When did it occur and why? What impact did it have on human societies, and how did human societies impact vegetation?
- 3) How did people use and manage woodlands?
- 4) When did intensification of fruit tree cultivation take place and what was its impact on the vegetation and environment?
- 5) What is the role of people and climate on vegetation change?

New identifications

Charcoal samples are identified from more than 20 sites in the Near East. Their results are entered into the ADEMNES database.



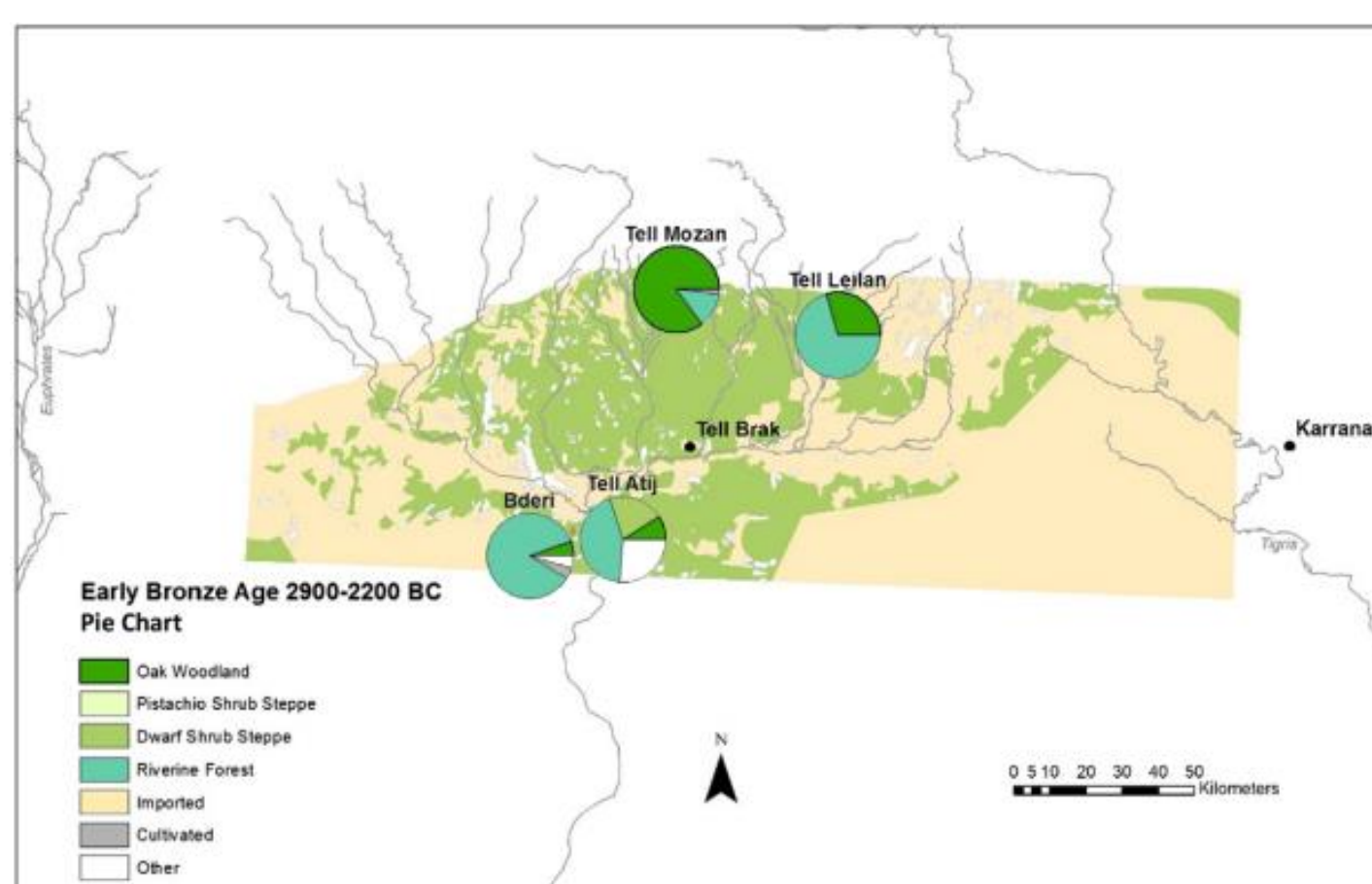
Fig. 3. Map with sites indicated where new anthracological investigations are taking place

Database work

An important part of the project consists of adding all published anthracological studies from within the study area into ADEMNES, the online accessible Archaeobotanical Database of Eastern Mediterranean and Near Eastern sites (Fig. 2), that currently contains mostly seed data and only limited charcoal data. The charcoal data are entered into the database sample by sample and special attention is paid to contextual and chronological information control.

Comparison with seed/fruit results

Using wild plant seed data from the archaeological sites within this region and with the knowledge about their growth properties, potential land cover maps for the different periods will be made within a GIS and will be compared against the anthracological data (see DE GRUCHY et al. 2017). A pilot study has been undertaken already for the Upper Khabur Basin in NE-Syria (Fig. 5)



Diameter measurements in combination with annual ring widths

Almost all published studies have focused on the identification of charcoal, while only very few provide important additional information, such as measurements of charcoal diameters or annual ring width (with some exceptions). Diameter analysis of charcoal fragments provides valuable insight into woodland exploitation and management and could even provide a better understanding of the woodland's original appearance.

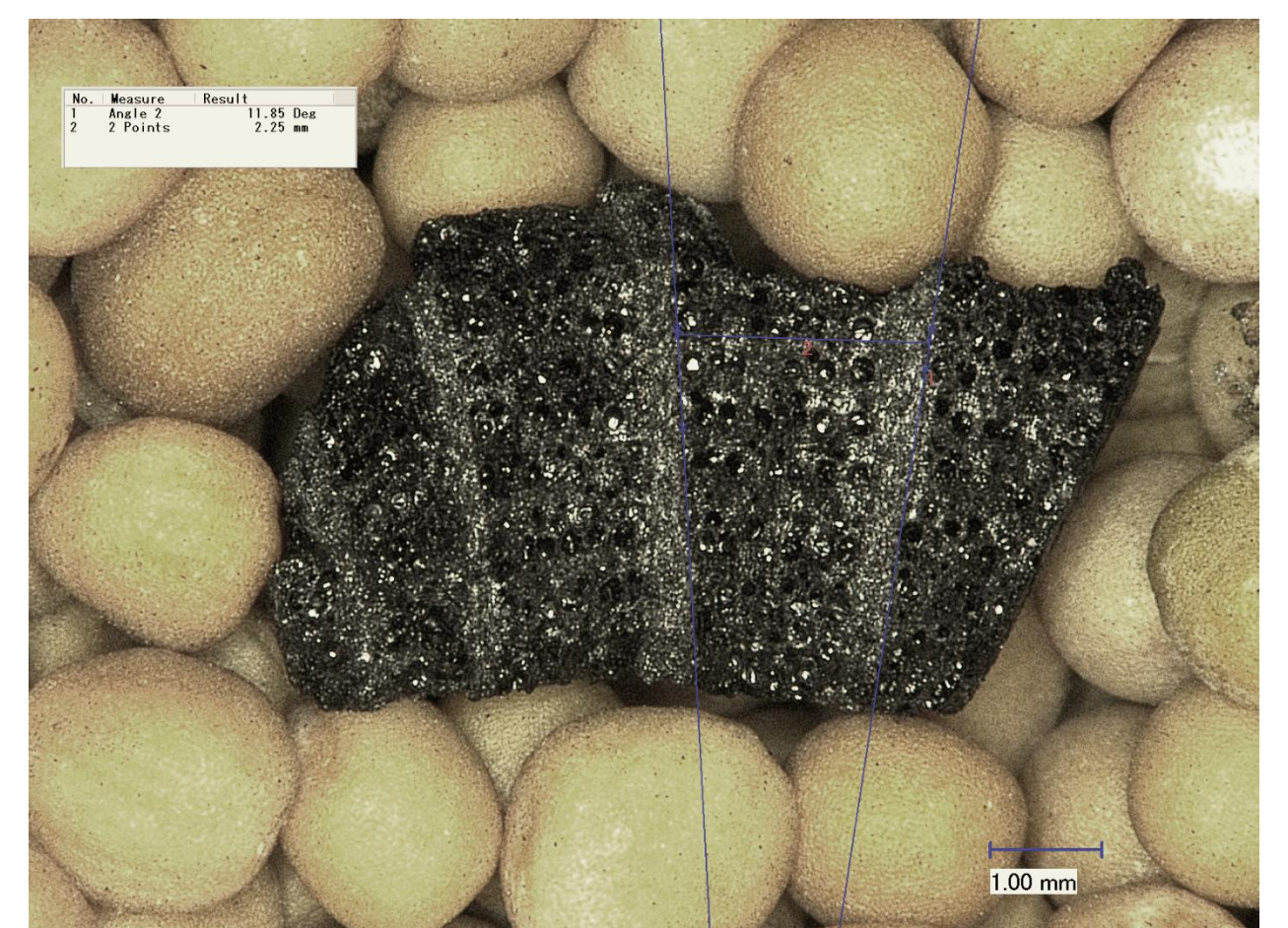


Fig. 4. Example of a diameter measurement on an oak sample by applying the trigonometry in a right-angled triangle method.
Fig. 5. Example of comparison of data from seed and charcoal for the Upper Khabur Basin. Potential vegetation reconstruction map based on Ninevite V period seed and fruit data with pie chart diagrams of the charcoal evidence for the third millennium BC. The seed/grain data shows areas of desert steppe (light brown) with large areas of shrub steppe (darker green).