

D1: Analysis of Migration Processes due to Environmental Conditions between 40,000 and 14,000 a BP in the Rhine-Meuse-Area, Sedimentology and Geochemistry – Provenience analyses of loess-paleosol sequences

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1. Introduction

During the Aurignacian (35,000 – 30,000 BP) Homo sapiens arrived for the first time in the Rhineland and recolonized the region after the Last Glacial Maximum (LGM) in the Magdalenian (20,000 – 14,000 BP).

The D1 Project is part of the "Collaborative Research Centre 806 (CRC 806) – Our Way To Europe – Culture-Environment Interaction and Human Mobility in the Late Quaternary" (see Fig.1) and focuses on reconstructing environmental conditions during the last glacial cycle (40,000 - 14,000 BP) in connection with archaeological research on migration processes of Homo sapiens in Western and Central Europe. For that purpose loess-paleosol sequences serve as investigation objects in this PhD Project, as they are important terrestrial geoarchives of paleoclimatic and paleoenvironmental conditions during the Quaternary. One of the questions in this project is the origin of the loess material.



Fig.1 Within the CRC 806 research on Homo sapiens in connection with natural settings, origins (source), corridors of diffusion (trajectory), peripheries (sink), and key areas are defined

2. Area of interest

Regional focus lies on the Rhine-Meuse-Area (Alsace, Belgium, Rhine region in Germany), the Upper Danube area as well as the Northern Harz foreland in Germany (see Fig. 2). So far, two sites (Achenheim, France and Romont, Belgium) have been sampled in spring 2014. Those samples are currently analysed in the laboratory. In the second half of 2014 other sites in the Northern Harz foreland and the Upper Danube area will be sampled. Additional sites along the Lower Rhine region will be visited and their potential for further investigations evaluated.

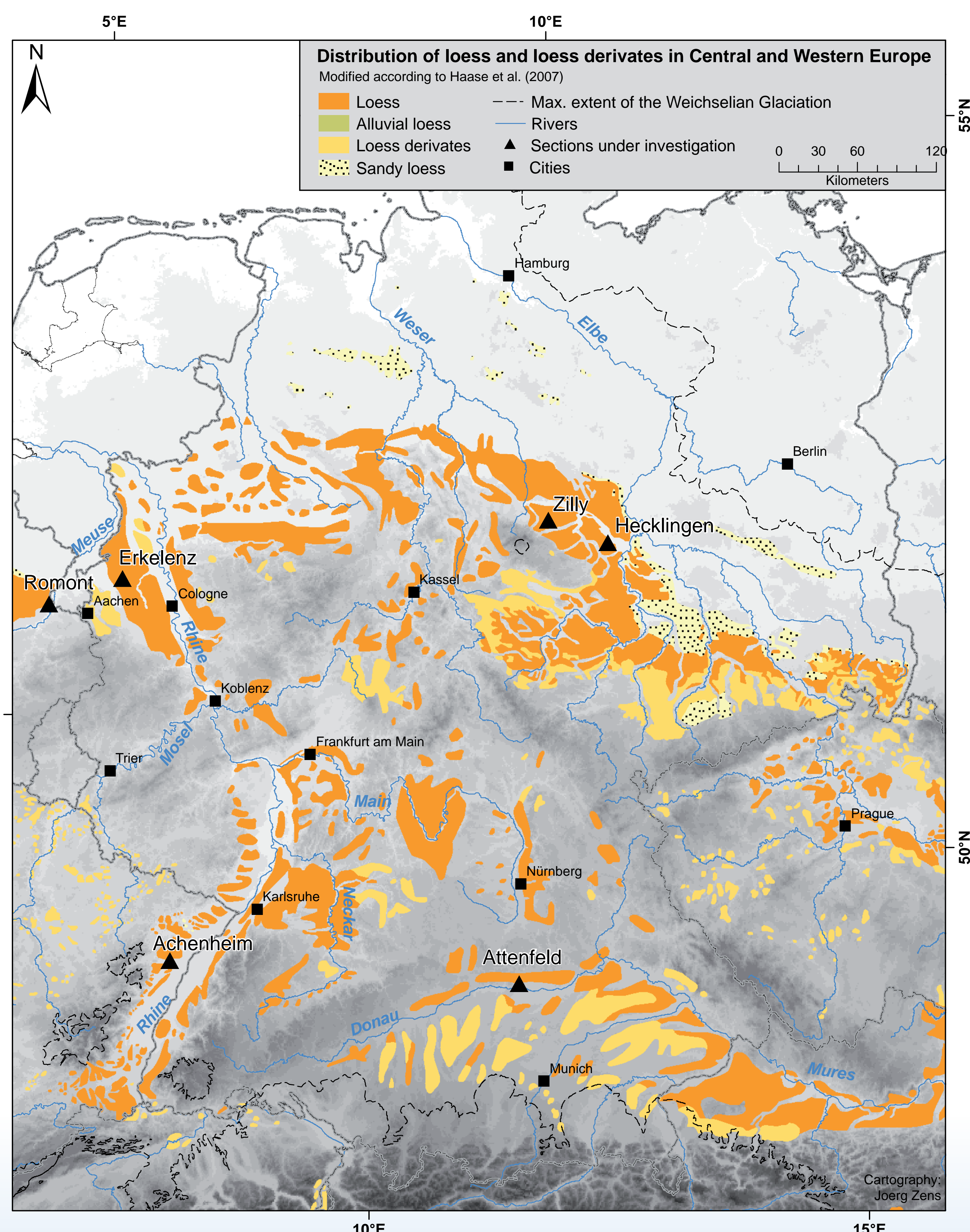


Fig.2 Distribution of loess and loess derivatives in South Eastern Europe (modified after Haase et al. 2007)

4. Goals

Another PhD project focuses on the optically simulated luminescence dating (OSL) of the sampled loess-paleosol-sequences and a third is concentrating on the archeological research. All three projects follow the same goal: providing new important insights to fill fundamental gaps in knowledge of the interaction of humans and environment during the last glacial cycle in Western and Central Europe.



Fig.3 Quarry in Romont (Belgium): sampling for luminescence (red) and high resolution sampling for sedimentology and geochemistry (black); oriented sampling for AMS (small picture on the left)

3. Methods

Additional to the sampling processes in the field (see Fig. 3 & Fig. 4) paleopedological, sedimentological, and geochemical investigations take place with a methodological focus on multiple element analyses (XRF), color spectroscopy, grain size analyses, rock magnetics, and possibly heavy mineral determination within the scope of this PhD project.

For determining the origin of loess material, provenience analyses will take place. For that, the material of different time slices in different loess-paleosol sequences will be compared. Measurements of the anisotropy of the magnetic susceptibility (AMS) are performed with the aim to reconstruct the main wind direction, or the direction of the loess accumulation (see Fig. 3).



Fig. 4 a) Quarry in Achenheim (France) view to the southeast, b) loess-paleosol sequence on same wall, and c) high resolution sampling for sedimentology and geochemistry

Reference

D. HAASE, J. FINK, G. HAASE, R. RUSKE, M. PÉCSI, H. RICHTER, M. ALTERMANN & K.-D. JÄGER (2007): Loess in Europe—its spatial distribution based on a European Loess Map, scale 1:2,500,000. In: Quaternary Science Reviews 26, p. 1301–1312.