

## Loess-palaeosol sequences along the Rhône Graben (SE France): the potentially missing link between loess archives in central Europe and the Mediterranean region?

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The Rhône Graben in south-eastern France stretches from 45°5' N at the confluence of the Saône River southward to 43°2' N at the Rhône delta on the Mediterranean coast. At present, the climatic conditions along this north-to-south transect represent a gradient from a humid-temperate to a Mediterranean climate. Mean annual temperature (MAT) increases from 12.2 °C to 13.7 °C, and the ratio of mean monthly maximum to mean monthly minimum precipitation  $MMP_{max}/MMP_{min}$  increases from 1.89 to 4.04, thus reflecting a progressive shift towards a typical Mediterranean precipitation pattern.

The aims of our study are (i) to reconstruct, how this climatic and environmental gradient changed over the Late Quaternary, based on a series of loess-palaeosol sections along that transect, and (ii) to correlate these sections with loess-palaeosol sections in central Europe.

At the current stage of the work, we have studied seven loess-palaeosol sections along the Rhône Graben and established a preliminary stratigraphy supported by optically stimulated luminescence (OSL) dating (in progress).

The seven sections from north to south:

- (1) Profile Les Sautons at 45°5.6' N, 4 km NNE of Tournon-sur-Rhône (MAT = 12.2 °C, MAP = 810 mm,  $MMP_{max}/MMP_{min}$  = 1.89);
  - (2) Profile Les Chaux at 45°5.1' N, 3.5 km NE of Tournon-sur-Rhône;
  - (3) Profile Garenne at 44°42.6' N, 18 km NNW of Montélimar (MAT = 12.9 °C, MAP = 840 mm,  $MMP_{max}/MMP_{min}$  = 2.81);
  - (4) Profile St. Julien at 44°17.4' N, 33 km SSW of Montélimar;
- three sections around Collias, 27 km West of Avignon (MAP = 698 mm, MAT = 13.7 °C,  $MMP_{max}/MMP_{min}$  = 4.04), including (5) Profile Collias-North (43°57.4' N), (6) Profile Collias D112-South (43°57.2' N), and (7) Profile Collias-Wood (43°57.2' N).

Based on a multi-proxy analysis of these sections, we reconstruct the changing palaeoenvironmental conditions through time at each site. Finally, a synthesis of the individual reconstructions will elucidate the changes of the environmental gradient over the Late Pleistocene. The next step will extend the transect northwards over the next years. With respect to the correlation of the profiles studied so far, the most crucial stratigraphic unit is a brown palaeosol horizon, marked by large, vertically oriented calcium carbonate rhizoliths at its base in most of the profiles. In the south, the rhizoliths are usually ca. 5-20 cm wide and 20-50 cm long, tending to be smaller in the north. In some profiles, the brown palaeosol horizon shows tree-root channels that are filled with sediment, appearing as brown tongues penetrating down into an underlying lighter coloured C horizon, instead of the rhizoliths. Based on the position of the brown palaeosol horizon, we assume that it formed during MIS 3. It appears to be a marker horizon that is suitable for correlating the palaeosol-loess successions along the transect. However, its chronostratigraphic position still needs to be determined by luminescence dating.