

Soil, charcoal, vegetation dynamics and agro-pastoral activities since Neolithic in the medium mountain of Mont Lozère (France)

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Summary: *Pedoanthracological and pedological analyses on soils of *Nardus stricta* area of the Mont Lozère (France) have been carried out in order to understand the origin of this plant community, which develops in the uppermost part of the Mont Lozère, just above the beech forest. A palaeoenvironmental multi-disciplinary approach (palynology, archaeological and sedimentary charcoal analysis, dendrology, geochemistry, geoarchaeology) combined with landscape, pastoral and mining archaeological evidence demonstrate the impact of different human activities in this landscape. Soil and soil charcoal study carried out at a high resolution permits to determine the evolution of the Ranker soil and the relationships between this type of soil and the vegetation dynamics since the Neolithic. What is the role of fire (natural or anthropogenic fire) in the construction of this open landscape?*

Key words: *soil, charcoal, *Nardus stricta* grassland, geochemical analyses, agro-pastoral activities*

INTRODUCTION

The study area is the Mont Lozère, located in the Massif Central (France). This medium mountain, which has revealed a lot of human ancient activities (metallurgy, farming, pastoral activities and forest exploitation), can be considered as a reference model to understand the relationship between human practices and vegetation dynamics since the Neolithic period.

We present the first results from soil charcoal analyses and pedological descriptions applied in the same pits on the uppermost part of the Mont Lozère. The study site, characterized by an open landscape composed by *Nardus stricta*, *Ericaceae*, *Vaccinium myrtillus*, etc., is situated above the remains of beech forest located in the lower part of the north slope (maximum altitude at 1350 m), and shows a sporadic re-colonization of conifers. A combined study of the charcoal-burning platforms (Allée and Paradis, in press) located in the west part of the Mont Lozère and palynological analysis of the peat bog “Amourous” (Servera Vives, oral communication) located near the pedoanthracological pits demonstrates the presence of beech forest at 1450 m altitude during the High Middle Ages. Today, beech tree is absent from the study area.

The aim of the study is to shed light on the dynamic of the *Nardus stricta* grassland, which has been considered as natural for a long time. In addition, the evolution of the Ranker soil (AFES 2009) located in a pastoral landscape will be taken into account in its relationship with past forest and agro-pastoral practices. Another objective of this research is to

determine the maximum elevation reached by treeline as well as its evolution since the Neolithic.

METHODOLOGY

A test-pit performed in September 2010 has revealed the presence of charcoal fragments in all soil horizons. After this first survey, 10 pits were dug along an altitudinal transect from 1350 m asl up to 1560 m asl in the northern slope with a high altitudinal resolution of about 25 m.

The identification of charcoal from soil and the radiocarbon dates from charcoal fragments permit to reconstruct the dynamic of the vegetation over a long time. Pedoanthracological samples have been taken every 5-10 cm, from the bedrock towards the surface of the pit, after having made pedological descriptions of the soil horizons (Baize and Jabiol, 1995; Carcaillet and Thinon, 1996; Bal *et al.*, 2010; Talon, 2010). Any colluviums or bioturbation traces have also been noted.

RESULTS AND DISCUSSION

The pedological profile of “La Bourassade” shows 3 horizons. The upper one is a humiferous A horizon (15 cm deep). The second one is 60 cm deep and presents a silty sand texture and some granules. Both of them have a crumb macro-structure. The third one (between 75 and 105 cm deep) is also a silty sand horizon and contains medium and large stones. This succession could correspond to a rankosol, but the profile is deep and the second horizon does not contain numerous stones. So, the classification of this soil and

a better characterization of the horizons could be clarified thanks to the different chemical analysis and the micromorphological study.

The test-pit conducted in September 2010 (Fig. 1) has revealed the presence of charcoal in all soil horizons. The medium size of the charcoal is 0.8 mm and some of them present altered anatomical structure, which makes difficult the identification. The 35 charcoal samples identified are all *Genista* genus (Schweingruber, 1990). For this test it was impossible to date the charcoal according to the size and the height of the fragment. These first results reveal an open landscape in the entire sampled sequence and suggest that human management of these grasslands included repeated burnings.

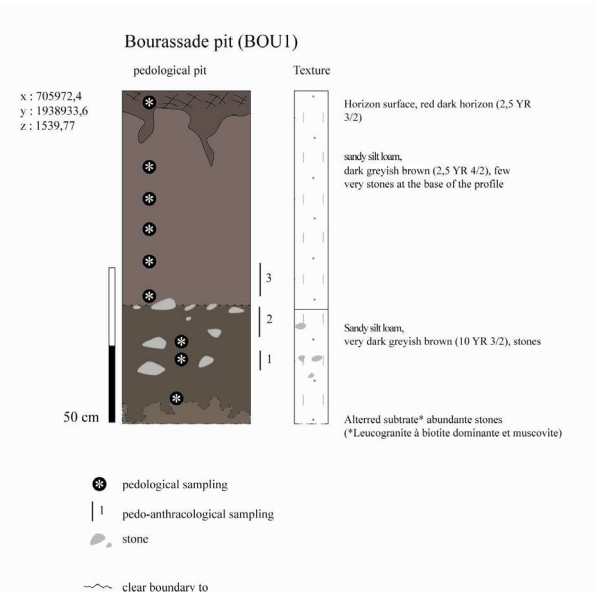


FIGURE 1. Pedological description of the pit in the Amourous area (M. Liard)

CONCLUSION

This pedoanthracological study is part of a multi-disciplinary project including archaeological survey

and a multi-proxy palaeoenvironmental approach with the aim of studying the interactions between agro-pastoral activities and cultural landscape shaping.

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