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## **Holocene climate and anthropogenic impact revealed by macrofossils from the Béage volcanic plateau peat stratigraphies (S-E Massif Central, France)**

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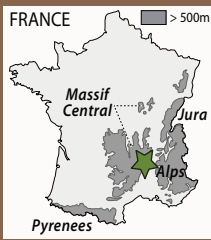
# HOLOCENE CLIMATE & ANTHROPOGENIC IMPACT REVEALED BY MACROFOSSILS

## from the Béage volcanic plateau peat stratigraphies (S-E Massif Central, France)



André-Marie DENDIEVEL<sup>a,b</sup>, Hervé CUBIZOLLE<sup>a</sup>, Jacqueline ARGANT<sup>c</sup>, Benjamin DIETRE<sup>b,d</sup>, Christine OBERLIN<sup>e</sup> & Jean Nicolas HAAS<sup>b</sup>

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### INTRODUCTION

Geoarchaeological and palaeoecological research carried out on the Béage volcanic plateau (Upper Ardèche, South-Eastern Massif Central, France) aimed at reconstructing Holocene palaeoenvironmental changes under anthropogenic and climatic impact [1,2]. Here, we focus on the macrofossil content from the Béage plateau peat sequences.

### STUDIED MIRES

The Béage plateau is well known for its recent volcanic activity [3,4]. Its elevation (900 to 1,500 m a.s.l.) and its location provide a local climate typified by many contrasts, between oceanic and mediterranean influences.

The two main studied sites, situated in the upper catchment area of the river Loire, are:

- The **La Narce du Béage fen** (N44°49'54", E4°05'58", alt. 1,220 m a.s.l.), located in a small granitic basin surrounded by basaltic outcrops and by several open field block streams.
- The **Pialeloup peatbog** (N44°51'03", E4°09'57", alt. 1,220 m a.s.l.), seated on the granitic basement of the Béage plateau.



Fig. 1: La Narce du Béage fen

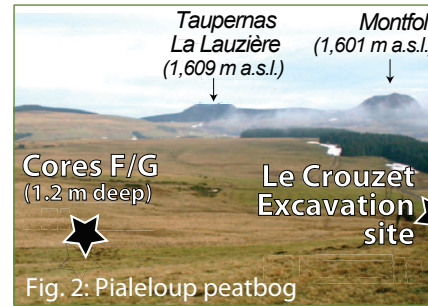


Fig. 2: Pialeloup peatbog

### MATERIALS & METHODS

#### PALAEOECOLOGY:

- Twin cores obtained on each site using a manual peat corer (fig. 1 & 2)

- 40 and 60 samples analysed for macrofossil and palynological content

- Age-depth models based on 17 AMS radiocarbon datings and realised using *R* and its *Clam* package [5]

- Cross comparisons of palaeoecological data with *Tilia* software [6]

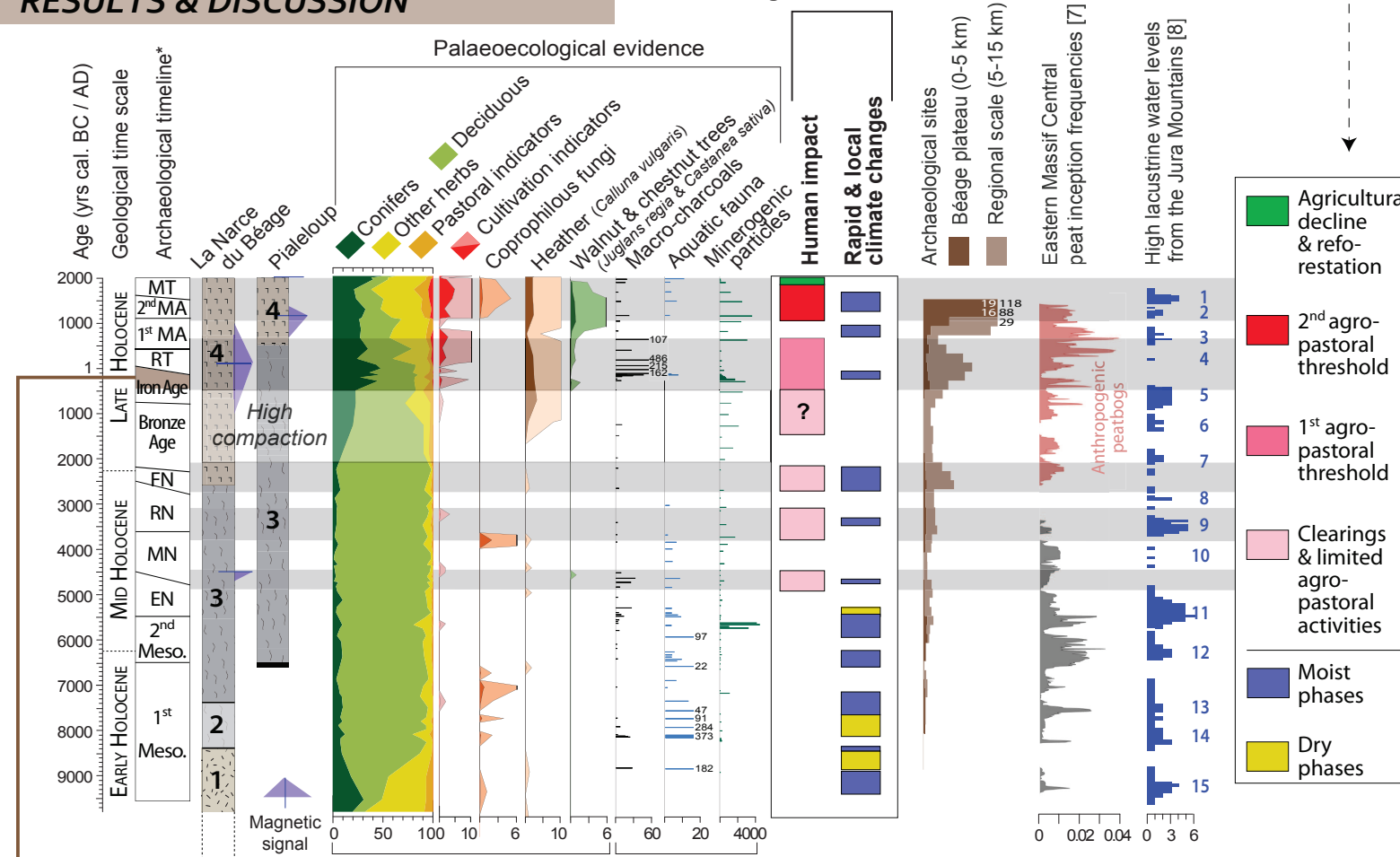
- Constitution of a palaeoecological index describing local and rapid changes

#### ARCHAEOLOGY (within a regional project):

- Literature review, pedestrian prospections and excavations

### RESULTS & DISCUSSION

#### Béage Plateau Phases



\*Meso. = Mesolithic; EN = Early Neolithic; MN = Mid-Neolithic; RN = Recent Neolithic; FN = Final Neolithic; RT = Roman Times; MA = Middle Ages; MT = Modern Times (XVI-XX<sup>e</sup> s.)  
Stratigraphies: 1) Lacustrine deposits (*gyttja*); 2) peat-*gyttja* transition; 3) peat; 4) mineralised peat (*KTH* layer)

Fig. 3: Synoptic diagram of human impact evidence on the Béage plateau during the Holocene

### MAJOR FINDINGS

- Eleven episodes of local humidity during the Holocene associating minerogenic inputs, remains of aquatic fauna and flora, findings of terrestrial fungi, etc. Among these, several events reveal local changes as a response to global oscillations.

- Limited agro-pastoral impact of Neolithic groups, with cyclic clearings around 4,950 - 4,500 (end of the EN), 3,750 - 3,050 (MN2-RN transition) and at 2,850 - 2,150 years cal. BC (FN).

- Continued human presence from the mid-La Tène period (2<sup>nd</sup> Iron Age) to the Early Middle Ages, including clearings of beech forests and local cereal cultivation.

- Increasing anthropogenic impact after AD 1,000. It leads to massive erosion due to food-producing agriculture and livestock grazing, in particular after the XIII<sup>th</sup> c. AD.

- Recent increase of coniferous forests (national reforestation plan - R.T.M. & F.F.N.), end of cultivation due to a regional demographic loss, but cattle breeding specialisation.

### CASE STUDY: SECOND IRON AGE LANDSCAPE

#### Archaeological background



Fig. 4: Archaeological windows at Le Crouzet-La Veysse (Mid-La Tène site)

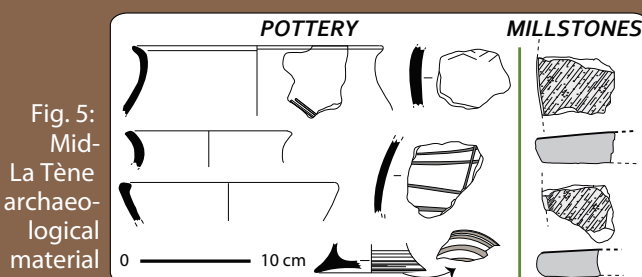


Fig. 5: Mid-La Tène archaeological material

#### Palaeoecological data from La Narce & Pialeloup

Willow and birch groves, acidophilous alder forest with *Sphagnum* mosses, bog-sedges or heaths  
Rush beds around peatbogs  
Damp meadows  
Clearings of beech and fir forests for agro-pastoral purposes (local wheat farming and livestock grazing)

### SOME MACROFOSSILS

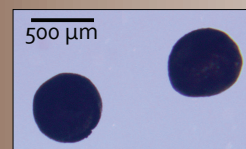


Fig. 6: *Coenococcum geophilum* sclerotia



Fig. 7: *Juncus effusus* / *conglomeratus* type seeds

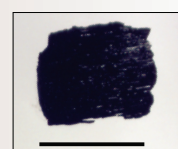


Fig. 8: Macro-charcoal

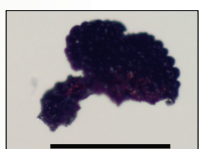


Fig. 9: Caryophyllaceae seed fragment



Fig. 10A: *Molinia caerulea* seed  
Fig. 10B: *Glyceria fluitans* seed

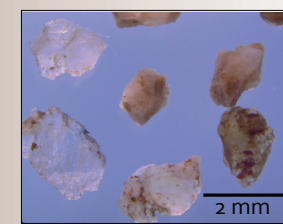


Fig. 11: Minerogenic particles

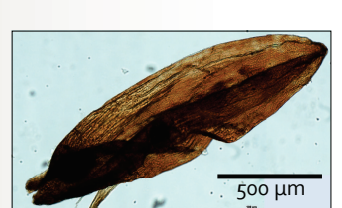


Fig. 12: *Poa palustris* seed

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