



Widespread diffusion of technical innovations around 300,000 years ago in Europe as a reflection of anthropological and social transformations? New comparative data from the western Mediterranean sites of Orgnac (France) and Cave dall'Olio (Italy)



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ABSTRACT

During MIS (Marine Isotope Stage) 9 and the transition to MIS 8 – around 350–300,000 years ago – some lithic assemblages in Europe reflect marked transformations in technical behavior. These transformations involved the standardization of products and the development of diversified and elaborated *débitage* methods which are considered to be markers of the transition from the Lower to the Middle Palaeolithic i.e. from Mode 2 to Mode 3. Taking the analysis of the sites of Orgnac 3 (Ardèche, France) and Cave dall'Olio (Emilia Romagna, Italy) as a starting point, this paper discusses the variability of these assemblages in Southern Europe as well as the social and anthropological implications of the emergence of new technical behavior. It also aims to show that common features existed both in Northern and Southern Europe. The development of more complex technical systems on a progressively wider territory and at an increasingly earlier age argues in favor of the hypothesis of a close connection with the process of "Neanderthalisation", possibly accompanied by the transmission of ideas through extensive social networks.

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Introduction

Palaeoanthropological and genetic studies indicate that the first Neanderthal features across Europe appear in *Homo heidelbergensis* populations between 600,000 and 450,000 years ago (Krings et al., 1997; Hublin and Pääbo, 2005; Bischoff et al., 2007; Hublin, 1998, 2009; Orlando et al., 2006; Rightmire, 2008; Endicott et al., 2010; Green et al., 2010; Stringer, 2012). As far as material culture is concerned, evidence of modifications in behavioral strategies is recorded around 400,000 years ago in organized hunting strategies (for instance at Schöningen, Thieme, 1997). At the same time, important transformations are reflected by lithic assemblages, resulting in the implementation of more complex flaking strategies and a higher standardization of products between MIS 9 (Marine Isotope Stage 9) and MIS 7 – starting around 350–300,000 years ago. These transformations took place at different times in diverse areas, either progressively and gradually or by episodic phases among a human population considered to be genetically homoge-

neous (Moncel, 2003a; Monnier, 2006; Premo and Hublin, 2009; Moncel et al., 2012).

These technical changes are considered as the markers of the transition from the Lower to the Middle Palaeolithic, i.e. from Mode 2 to Mode 3 (Clark, 1969), and several lithic assemblages provide the opportunity to examine these transformations in detail. Most of these sites are located in the north-western and central part of the European continent while only a few southern sites dated to the same time range have yielded similar evidence in Spain, Southern France and Italy.

The oldest record of the development of Levallois *débitage* in Europe is currently considered to be related to the site of Cagny-la Garenne in northern France (450 ka, Tuffreau, 1987) and the earliest evidence of laminar reduction is attributed to deposits in north-western Europe (MIS 8, Révillon, 1995). Even the Levant was involved in this extensive wave of technical changes with the development of laminar *débitage* between 400 and 200 ka (Barkai et al., 2005; Verri et al., 2005), while sporadic evidence of blade technology appears in East Africa around 500 ka (Roure Johnson and McBrearty, 2010). At the same time, other deposits across the European continent indicate the persistence of Acheulean features and/or a lack of a clear technical development (Carbognon et al., 2007).

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In this paper, we wish to discuss the contribution of southern Europe to this large-scale technical event and to show that similar technological changes occurred on the whole continent. The assemblages of Orgnac 3 (Ardèche, France) and Cave dall'Olio (Emilia Romagna, Italy) (Fig. 1) (Moncel, 1999, 2003a, 2003b; Fontana et al., 2009) in particular, dated to the transition between MIS 9 and MIS 8, will be the focus of a detailed comparative analysis. These sites currently present the opportunity to examine the emergence of new technological strategies in a geographical area considered to have been continuously inhabited, in contrast to the northern parts of the continent (Soriano, 2005; Hublin and Roebroeks, 2009). By establishing a series of technical criteria for the description of *débitage* – reduction methods, ramification of reduction sequences, preparation/maintenance of convexities and recurrence, standardization of *débitage* objectives and productivity, management of flaking platforms – the transformations reflected by these assemblages are analyzed and a discussion of their social and anthropological implications is developed by attempting a comparison with other coeval European sites. This study mainly focuses on *débitage* systems which appear more diversified and elaborate than during previous phases but it also assesses *façonnage*, although this appears less developed in both analyzed assemblages and tends to assume a secondary role.

Orgnac 3: a cave sequence recording the emergence of Middle Palaeolithic-type behavior

Stratigraphy of the cave site

The site of Orgnac 3 is situated on the Ardèche plateau on the right bank of the Rhône Valley (France) to the south of the Ardèche

River gorges (Fig. 1). It was excavated from 1959 to 1972 by Jean Combier and ten occupation layers were identified (Combier, 1967) (Fig. 2). The site morphology has changed over time. When human groups initially arrived, it was a closed cave (“aven”). As the cave roof slowly receded, humans sought shelter in a depression under the remaining rock escarpment, a sink hole measuring 600 m², oriented S/SW. The sequence consists of an accumulation of layers of stony red clays with no hiatus, mixed with elements from the collapsed ceiling, a typical karstic phenomenon in the region. Over time, exterior elements, such as wind transported sands gradually increased, in relation with the collapse of the ceiling and the opening up of the entrance of the cave. The effects of water run-off resulted in the deposition of carbonates and the desilicification of flint artefacts. The layers at the bottom of the sequence are more or less weathered heterometric gravels, in an abundant brownish-red sandy-clay matrix which filled in the spaces between the fallen blocks, some of which are one cubic meter in size. Layer 1 indicates water run-off and the import of abundant exterior elements due to the opening up of the cave. Spatial distribution does not indicate a change in the organization of activities over time, in spite of the opening up of the cave (Moncel, 1998–1999; Moncel et al., 2005).

Age of the sequence and biostratigraphy

The archaeological sequence is dated from isotopic stage 9 by ESR, U/Th, (layers 5 and 6) and the beginning of stage 8 by volcanic minerals (from Green clinopyroxene from Mont-Dore-Sancy Volcano) (Shen, 1985; Falguères et al., 1988; Debard, 1988; Debard and Pastre, 1988; Laurent, 1989; Khatib, 1989, 1994; Masaoudi,



Fig. 1. Location of Orgnac 3 and Cave dall'Olio and of the main sites quoted in the paper.

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