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Spatial behaviours of Early Oldowan toolmakers in the Shungura Formation (Lower Omo Valley, Ethiopia): Proposal for an integrated approach

Comportements spatiaux des tailleurs de pierre de l'Oldowayen ancien dans la Formation de Shungura (basse vallée de l'Omo, Éthiopie) : proposition pour une approche spatiale intégrée

Tiphaine Maurin[a,*], Anne Delagnes[a,b], Jean-Renaud Boisserie[c,d]

[a] *Université de Bordeaux, UMR 5199 PACEA, bâtiment B8, allée Geoffroy-Saint-Hilaire, CS 50023, 33615 Pessac cedex, France*
[b] *Evolutionary Studies Institute, University of the Witwatersrand, 1, Jan Smits Avenue, Braamfontein 2000, Johannesburg, South Africa*
[c] *Université de Poitiers, UMR CNRS 7262, UFR SFA, bâtiment B35, TSA 51106, 6, rue Michel-Brunet, 86073 Poitiers cedex 9, France*
[d] *Centre français des études éthiopiennes/French Centre for Ethiopian Studies, CNRS USR 3137, Ambassade de France en Éthiopie, P.O. Box, 5554 Addis Abeba, Ethiopia*

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ABSTRACT

The spatial relationships of the Early Oldowan toolmakers with their environment have been so far addressed through raw material procurement analyses and the characterization of hominid habitat. This paper proposes to integrate these two approaches into a broader spatial analysis encompassing archaeological and environmental data (palaeontological, geological and isotopic data) from Member F and lower Member G of the Shungura Formation (Lower Omo Valley, Ethiopia). Heterogeneity in data resolution induces a multiscale approach with three levels of analysis. The level of occurrence complex allows focusing on the characterization of archaeological occurrences and on their environmental settings. The level of "study area" allows working on hominid habitats and on their raw material procurement behaviours. Finally, at the Shungura Formation scale, we can address temporal issues related to the evolution of spatial behaviours between Member F and the lower part of Member G, ca. 2.3 to 2 million years (Ma).

Mots clés :
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Afrique de l'Est
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Formation de Shungura

RÉSUMÉ

Les relations spatiales des tailleurs de pierre de l'Oldowayen ancien avec leur environnement ont fait jusqu'à présent l'objet de recherches axées sur l'acquisition de la matière première et sur l'habitat des hominidés. Ce papier développe les fondements d'une approche spatiale intégrant ces deux aspects au sein d'un travail croisant les données archéologiques et environnementales (paléontologiques, géologiques et isotopiques) du Membre F et de la partie inférieure du Membre G de la Formation de Shungura (basse vallée de l'Omo, Éthiopie). Ces données se situant à différents niveaux de résolution

* Corresponding author.
E-mail addresses: tiphaine.maurin@u-bordeaux.fr (T. Maurin), anne.delagnes@u-bordeaux.fr (A. Delagnes), jean.renaud.boisserie@univ-poitiers.fr (J.-R. Boisserie).

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spatiale, une approche multi-scalaire est proposée : l'échelle du complexe d'occurrences archéologiques pour la caractérisation des occurrences archéologiques et de leur cadre environnemental, celle de « l'aire d'étude » pour laquelle vont être apportées des précisions sur l'habitat des hominidés et leurs approvisionnements en matière premières, et enfin celle de la Formation de Shungura pour confronter entre elles les données spatiales acquises dans le Membre F et dans la partie inférieure du Membre G, entre environ 2,3 et 2 millions d'années (Ma), dans une optique temporelle.

1. Introduction

Over most of their evolutionary history, the role of hominids within the African Neogene ecosystems remains elusive, because they are documented only by rare and mostly fragmentary remains. With the appearance of the Early Oldowan stone tool record prior to 2 Ma, it becomes possible to track down hominid activities within fossil landscapes, enhancing our capacities in understanding key features of hominid adaptive success, such as behaviours, ecology, responses to environmental changes.

Questions about the taxon (or the taxa) of the Early Oldowan toolmakers are still open. Between 2.3 and 2 Ma, hominid fossils from the Omo-Turkana basin (Howell et al., 1987), whether related to the palaeo-Omo river vicinity (Shunugura Formation) or from the palaeo-Turkana vicinity (Nachukui Formation), correspond to robust *Australopithecus* and early *Homo* (Brown and Feibel, 1988; Coppens, 1970; Prat et al., 2005).

So far two types of approaches have been favoured in the analysis of the spatial relationships of the early hominids to their environment. One of them focuses on the exploitation of raw material sources, mostly in the vicinity of the archaeological occurrences in Early Oldowan contexts (Bishop et al., 2006; Braun et al., 2008; Delagnes et al., 2011; Goldman-Neuman and Hovers, 2012; Harmand, 2005; Plummer et al., 1999; Stout et al., 2005). The other approach aims at characterizing the landscapes inhabited by hominids at larger scales (Aronson et al., 2008; Bonnefille, 2010; Brugal et al., 2003; López-Sáez and Domínguez-Rodrigo, 2009; Plummer et al., 1999, 2009; Quinn et al., 2013; Reynolds et al., 2011). Although these studies deal with spatial behaviours, no spatial approach integrating all data related to resource procurement mobility (i.e. water, food and raw material) and habitat features have been developed so far for this time period. Such a holistic approach can bring significant insights into the relationships between early toolmakers and their environment, and on the evolution of these relationships.

Thanks to the rich corpus of geolocated archaeological and contextual data (palaeontological, geological and isotopic data) available for the Shungura Formation, an original integrated approach is proposed. This article defines the methodology and highlights the perspectives of this new approach. This research is developed as part of the Omo Group Research Expedition (OGRE; Boisserie et al., 2008). It also includes the data brought by earlier field works carried out by the International Omo Research Expedition (IORE) between 1967 and 1976 (Boisserie et al., 2013; Chavaillon, 1976; Coppens, 1970, 1971, 1977; Coppens et al., 1973; de Heinzelin, 1983a; Gautier, 1976; Howell and Coppens, 1985; Howell et al., 1987; Jaeger and Wesselman, 1976; Johanson et al., 1976; Merrick and Merrick, 1976).

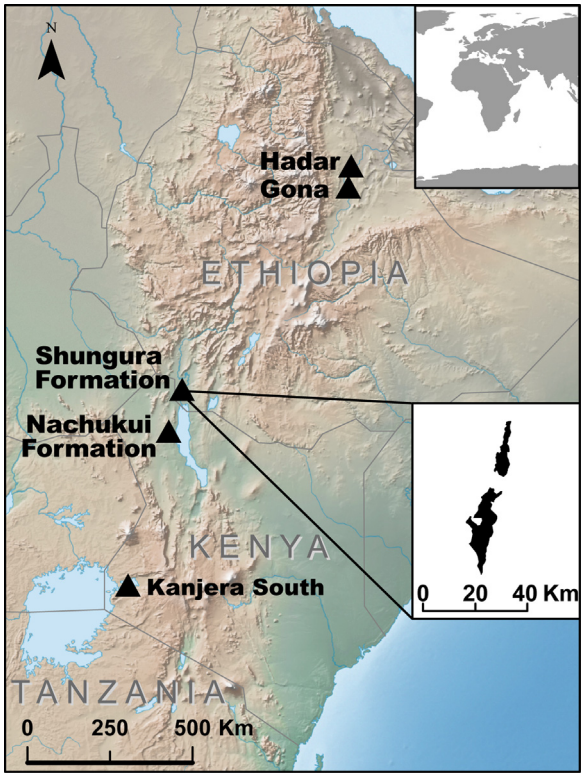

Fig. 1. (Color online.) Early Oldowan site complexes.
Fig. 1. (Couleur en ligne.) Les complexes de sites du début de l'Oldowayen.

2. Brief review of the available spatial data

Only five *in situ* Early Oldowan site complexes have been documented so far in eastern Africa: Gona, Hadar, and Shungura in Ethiopia, Lokalalei and Kanjera in Kenya (Chavaillon, 1976; Harris, 1983; Merrick and Merrick, 1976; Plummer et al., 1999; Roche et al., 2003; Semaw et al., 1997) (Fig. 1), although a large number of Early Pleistocene hominid fossils have been found in many localities from eastern to southern Africa (Reed et al., 2013). The available spatial data are limited to these archaeological complexes.