



ELSEVIER

Contents lists available at ScienceDirect

Comptes Rendus Palevol

www.sciencedirect.com



Human Palaeontology and Prehistory

Intentional cut marks on bovid from the Quranwala zone, 2.6 Ma, Siwalik Frontal Range, northwestern India



Traces de boucheries intentionnelles sur des bovidés de la zone Quranwala, 2,6 Ma, chaîne frontale de Siwaliks, Inde du Nord-Ouest

Anne Dambricourt Malassé^a, Anne-Marie Moigne^{a,*}, Mukesh Singh^b, Thomas Calligaro^c, Baldev Karir^b, Claire Gaillard^a, Amandeep Kaur^b, Vipnesh Bhardwaj^b, Surinder Pal^b, Salah Abdessadok^a, Cécile Chapon Sao^a, Julien Gargani^d, Alina Tudryn^d, Miguel Garcia Sanz^e

^a Histoire naturelle de l'Homme préhistorique (HNHP, UMR 7194 CNRS), Institut de paléontologie humaine, 1, rue René-Panhard, 75013 Paris, France

^b Society for Archaeological and Anthropological Research, Chandigarh, India

^c Centre de recherche et de restauration des musées de France (C2RMF), palais du Louvre, pavillon de Flore, 75001 Paris, France

^d Géosciences Paris-Sud (GEOPS, UMR 8148 CNRS), université Paris-Sud-11, Orsay, France

^e Plateforme AST-RX (OMSI, UMS 2700), Paris, France

ARTICLE INFO

Article history:

Received 23 June 2015

Accepted after revision 17 September 2015

Available online 28 January 2016

Handled by Anne Dambricourt Malassé

Keywords:

Siwaliks

Sub-Himalayan floodplain

Plio/Pleistocene transitional fauna

Cut marks

Quartzite cobbles

Experimental protocol

ABSTRACT

The Indo-French research program 'Siwaliks' has been surveying the Late Pliocene Formation of the Chandigarh anticline (NW India) since 2008. These sub-Himalayan floodplain deposits are known for their Tertiary-Quaternary transitional fauna, especially those from the Quranwala zone in the Masol Formation, whose basal member is approximately 130 meters below the Gauss/Matuyama paleomagnetic reversal (2.588 Ma). About 1500 fossils have been collected in the inlier of Masol, most often on recently eroded outcrops, and sometimes in association with stone tools (choppers, flakes). Many bones were covered by a variety of marks (animal, bioerosion and tectonics) and among these traces a few were intentional cut marks. Different methods have been applied in Paris (France) to describe their topography on a micron scale, using the 3D Digital Video Microscope Hirox, and completed with binocular microscopy at the Center for Research and Restoration of Museums of France (C2RMF), and X-ray microtomography with the AST-RX platform, at the National Museum of Natural History, Paris. Experiments with quartzite cobbles collected near the fossils were carried out in India and in France. The mineralization of the traces is identical to the bone tissue, and comparison with our experimental cut marks confirms that the profiles are typical of the sharp edge of a flake or cobble in quartzite; their size and spatial organization testify to energetic and intentional gestures from an agile wrist acting with precision, and to a good knowledge of the bovid anatomy.

© 2015 Académie des sciences. Published by Elsevier Masson SAS. This is an open access article under the CC-BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

* Corresponding author at: UMR 7194 CNRS/MNHN/EPCC, avenue Léon-Jean-Grégory, 66720 Tautavel, France.
E-mail address: moigne@mnhn.fr (A.-M. Moigne).

R É S U M É

Mots clés :

Siwaliks
 Plaine inondable sous-himalayenne
 Faune de transition plio/pléistocène
 Traces de boucheries
 Outils en quartzite
 Protocole expérimental

Le programme de recherche franco-indien « Siwaliks » explore le Pliocène final de l'anticlinal de Chandigarh (Nord-Ouest de l'Inde) depuis 2008. Ces dépôts de plaines d'inondation sous-himalayennes sont connus pour leur faune de transition plio/quatérnaire, notamment celle de la zone Quranwala située dans la formation Masol, qui débute environ 130 m au-dessous de l'inversion paléomagnétique Gauss/Matuyama (2,588 Ma). Près de 1500 fossiles ont été recueillis dans la boutonnière géologique de Masol, rarement en stratigraphie, le plus souvent sur les affleurements en cours d'érosion et, dans ce cas, parfois en association avec de l'industrie lithique (choppers, éclats). Parmi les fossiles, certains présentent plusieurs types de marques (animal, bioérosion et tectonique), mais sur trois os de bovidés, celles-ci évoquent fortement des marques anthropiques intentionnelles. Différentes méthodes ont été appliquées pour décrire leur topographie en France, à Paris, avec la vidéo digitale microscopique 3D Hirox complétée par la microscopie binoculaire au C2RMF (palais du Louvre), ainsi qu'avec la microtomographie infra-millimétrique à rayons X de la plateforme AST-RX du Muséum national d'histoire naturelle. Des expérimentations ont été réalisées en Inde et en France avec des quartzites collectés près des fossiles. La minéralisation des marques est identique à celle du tissu osseux, et la comparaison avec les traces de boucherie expérimentales montre que leurs profils sont typiques d'un tranchant intentionnel. Leur taille, leur trajet et leur organisation spatiale témoignent d'une gestuelle intentionnelle et énergique agissant avec précision, en particulier celle d'un poignet agile accompagné d'un regard qui connaissait l'anatomie du bovidé décharné.

© 2015 Académie des sciences. Publié par Elsevier Masson SAS. Cet article est publié en Open Access sous licence CC-BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Given the current state of knowledge, the oldest known traces of lithic activity visible on bone are from the Afar depression in Ethiopia (Middle Awash Valley). Deep incisions have been described on two bones from Dikika, a basal member of the Hadar Formation from the Middle Pliocene, dating to 3.39 Ma (McPherron et al., 2010, 2011). Taphonomists have attempted to attribute them to crocodile teeth and weathering (Domínguez-Rodrigo et al., 2010, 2012) due to the lack of tools and the predominant paradigm wherein *Homo* is considered the only genus of Homininae able to create sophisticated operational sequences. Nevertheless, the recent discovery of a debitage workshop in stratigraphy dated to 3.3 Ma at Lomekwi 3 (West Turkana, Kenya) (Harmand et al., 2015) and recent experimental procedures to test the Dikika cut marks (Thompson et al., 2015), confirm such abilities far before the Tertiary–Quaternary boundary (2.58 Ma). Before the Dikika and Lomekwi 3 finds, the oldest cut marks associated to lithic industry in situ were found at Kada Gona (Ethiopia), and dated to the early Lower Pleistocene (2.53 Ma) (Semaw, 2000; Semaw et al., 2003), other cut marks were found near Kada Gona at Bouri (2.5 Ma) but without stone tools (de Heinzelin et al., 1999). In West Turkana (Kenya), lithic industries are associated with the *Homo* genus between 2.5 Ma and 2.34 Ma (Prat et al., 2005; Roche et al., 1999, 2003). They are contemporary with Asian tools recently dated to 2.48 Ma in Longgupo, Southwest China (Han et al., 2015), and a similar age has been envisaged for tools from Renzidong, Southeast China (Hou and Zhao, 2010; Jin et al., 2000; Zhang et al., 2000). Tools collected in Hadar (Ethiopia), are dated to 2.3 Ma and associated with *Homo* (Kimbel et al., 1996) and in the Upper Indus Basin at Riwayat (Pakistan) artifacts were found in a conglomer-

ate folded between 2.1 and 1.9 Ma; the polarity measured is positive. This polarity corresponds either to the upper limit of the Reunion Subchron, nearly 2.14–2.15 Ma ago (Dennell et al., 1988), or to the upper limit of the Gauss Chron, possibly close to 2.58 Ma (Dennell, 1998). Traces of butchery activities and lithic tools in association with *Homo* genus are then visible in Eurasia in South Europe (Dmanissi, Georgia) c.a. 1.9 Ma (de Lumley and Lordkipadnize, 2006).

The archeozoological assemblages of crocodiles, *Homo* genus, marks on bones and lithic industries are a recurring debate (Braun et al., 2010; Westaway et al., 2011). Detailed arguments are essential when confusion is possible between marks of the Oldowayan industry and those of crocodile teeth (Njau and Blumenshine, 2006). The distinction between these two marks benefits from advances in sub-millimeter imaging (e.g. Bello and Soligo, 2008; Bello et al., 2009) and experimental protocols (e.g. Milan et al., 2010; Baquedano et al., 2012; Drumheller and Brochu, 2014).

2. The context

The bones with cut marks were recorded between 2009 and 2011, in the Masol Formation of the Siwalik Frontal Range, to the north of Chandigarh, N 30° 50' E 76° 50' (Fig. 1) during the research program 'Siwaliks' (Coppens, 2016; Dambricourt Malassé, 2016; Dambricourt Malassé et al., 2016). This sector is an inlier of 80 to 100 hectares dug into the summit axis of an anticline formed by floodplain deposits, with a thick fossiliferous sequence of 60 meters, beginning approximately 130 meters below the Gauss/Matuyama paleomagnetic reversal. The fossiliferous layers, called the 'Quranwala zone', were identified in the 1960s during the geological mapping of the Chandigarh anticline (Sahni and Khan, 1964, 1968); stratigraphically

Download English Version:

<https://daneshyari.com/en/article/6448068>

Download Persian Version:

<https://daneshyari.com/article/6448068>

[Daneshyari.com](https://daneshyari.com)