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Les assemblages fauniques associés aux sites à *Homo erectus* du dôme de Sangiran (Pléistocène moyen, Java, Indonésie)

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Résumé

Dans le dôme de Sangiran (Java central), plusieurs gisements de plein air, en contexte fluviatile, ont livré des restes d'*Homo erectus* et de mammifères, associés à de très rares industries lithiques : Tanjung, Sendang Busik, Ngrejeng Plupuh, Grogol Plupuh et Bukuran. Treize taxons de mammifères du Pléistocène moyen ont pu être déterminés. Afin de mieux comprendre le lien homme–animal dans ces sites souvent inédits, l'origine et la mise en place des assemblages fauniques ont été étudiées à l'aide des méthodes taphonomiques habituellement utilisées sur des sites européens ou africains. L'action mécanique de l'eau est principalement à l'origine de ces accumulations et son action chimique a permis leur évolution. ***Pour citer cet article : A. Bouteaux et al., C. R. Palevol 6 (2007).***

Abstract

The faunal assemblages associated with *Homo erectus* sites in the Sangiran dome (Middle Pleistocene, Java, Indonesia). In the Sangiran dome (Central Java), *Homo erectus* and mammal fossils in fluviatile context are found in several open-air localities: Tanjung, Sendang Busik, Ngrejeng Plupuh, Grogol Plupuh, and Bukuran. Thirteen taxa of Middle Pleistocene mammals were determined. Lithic tools are rare at these sites. The origin and setting up of these mainly unpublished faunal assemblages are approached by means of methods usually applied to European and African sites in order to understand better the link between humans and animals. The mechanical action of water is responsible for these accumulations and its chemical action for their evolution. ***To cite this article: A. Bouteaux et al., C. R. Palevol 6 (2007).***

Mots clés : Java ; Pléistocène ; Dôme de Sangiran ; *Homo erectus* ; Faune ; Biostratigraphie ; Taphonomie

Keywords: Java; Pleistocene; Sangiran dome; *Homo erectus*; Fauna; Biostratigraphy; Taphonomy

Abridged English version

Introduction

The first discoveries of *Homo erectus* ('*Pithecanthropus*') in Java have been made by the end of the 19th century at Trinil [10]. Since then, numerous fossils were

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discovered in central Java, most of them in the Sangiran dome, near the town of Solo (Surakarta). This area is therefore of the utmost interest for the study of human evolution (Fig. 1). Numerous faunal and human fossil remains were recovered, mainly from the early Middle Pleistocene Kabuh layers [31]. Most of the remains originate from former surveys and surface finds, with poor stratigraphical control. Since the 1960s, Indonesian scientists have carried out several excavations. Original faunal assemblages were collected, especially in the sites of Tanjung, Sendang Busik, Ngrejeng Plupuh, Grogol Plupuh and Bukuran, in most cases from the Kabuh layers [18,22,27] (Fig. 2). This paper relates the study of these collections from a palaeontological and taphonomical point of view, in order to understand the specific diversity, the origin of the fossil accumulations, and to identify as well the environment of *Homo erectus*. A complementary but important purpose was to estimate the possible relationship between these assemblages and *Homo erectus*.

Location and geological context

The dome of Sangiran is located in central Java, more precisely in the Kalioso–Surakarta plain, about 3 km east of Kalioso and 10 km north of Solo (Fig. 1). It represents an anticline whose stratigraphy is exposed thanks to the erosion of the Cemoro River (Fig. 2). At Sangiran, a complete stratigraphical sequence ranging from the Late Pliocene to the Middle Pleistocene is displayed [29,39] (Figs. 2 and 3). The series begin with blue clays and coastal limestone (the so-called Upper Kalibeng or Puren unit), characterizing shallow marine deposits [28,29,39]. The blue clays are covered by the Pucangan (or Sangiran) Lower Pleistocene black clays, reflecting a mostly palustrine environment. The clays are uncomfortably covered by a conglomerate (called 'Grenzbank'), in which marine and continental elements are mixed. This characteristic layer was deposited between the Jaramillo event and the Matuyama–Brunhes boundary (around 0.9 Myr) [29]. The overlying Kabuh or Bapang unit [39], mostly sands, gravels and tuffs, contains numerous faunal remains and yielded most of the hominid fossils from Sangiran. It was eroded by the much younger Notopuro (or Pohjajar) lahars [39]. The fossil-bearing sites studied here, namely Tanjung, Sendang Busik and Grogol, belong to the Kabuh unit, while Ngrejeng and Bukuran collections are shared between both Pucangan and Kabuh units (Fig. 3). These sites were excavated since the early 1960s by the Gajah Mada University team. Prior to the excavations, several *Homo erectus* remains were discovered at Tanjung [18,27], Sendang Busik [1,21], Ngrejeng [21] and Bukuran. The studied collections are among the few actual palaeontological collections recovered from stratigraphically known horizons in the Sangiran dome, and their analysis is therefore important.

Palaeontological remains

The greatest number of remains was collected at Tanjung 63–64, i.e. 921 items (Table 1). Undetermined flake bones dominate all assemblages. Thirteen mammal taxa could be determined (Table 2). The individuals were determined on few remains, and bovids and cervids are among the best-represented groups. Three different bovids were determined: two large-sized species (*Bubalus palaeokerabau* and *Bibos palaesondaicus*) (Fig. 4a) and one of smaller species (*Duboisia santeng*) [17] (Figs. 4b and c). Cervids are represented by three species of different sizes: *Axis lydekkeri* and *Axis* sp. (small size) [24,41] (Fig. 4d) and *Cervus (Rusa)* sp. (large size) (Fig. 4e). Remains of *Sus brachygnathus* and *Sus* sp. were determined in suids [13]. The occurring hippopotamid species is *Hexaprotodon sivalensis* [15]. Proboscidean tooth material does not allow a specific determination, but, from their location in the stratigraphy, the individuals were attributed to *Stegodon trigonocephalus* (Sendang Busik) and *Elephas hysudrindicus* (Tanjung 82) [16] (Figs. 4f and g). Postcranial material of *Rhinoceros* sp. was identified in both levels of Tanjung [12,14]. Carnivores are very rare, only a single specimen of *Pachycrocuta brevirostris* was discovered at Bukuran [11,34]. Consequently, herbivores, in particular artiodactyls, dominate in the assemblages. Furthermore, associated to mammal fossils, turtle and crocodile remains were found in assemblages [20,32].

Interpretations

The associations were compared with those described by de Vos, Sondaar, and Leinders [23,33,37] in their exhaustive study of Javanese biostratigraphy. The association at Tanjung 63–64 is quite similar to that of Trinil H.K. The Tanjung 82 collected fauna closely resembles the Kedung Brubus association. Taxa collected from Sendang Busik and Grogol occur in both associations described, i.e. Trinil H.K. and Kedung Brubus. As to the collections from Ngrejeng and Bukuran, their stratigraphical distribution prevents from describing them as actual associations.

The Kabuh unit's assemblages reflect a mosaic palaeoenvironment, with open forest areas in the vicinity of rivers. The results obtained from the study of the