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Geomorphic context of two acheulian sites in semi-arid peninsular India: Inferring palaeoenvironment and chronology

Sushama G. Deo^{*}, Jayendra J. Joglekar, S.N. Rajaguru

Department of Archaeology, Deccan College, Pune, India

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ABSTRACT

Over the last 30 years, research in Acheulian culture in India has undergone drastic changes to incorporate an understanding of chronological and environmental aspects. This is largely attributed to the increasing role of multi-disciplinary approaches at excavated sites like Singi Talav, Didwana in Thar desert, Morgaon in Western Upland Maharashtra, Isampur in Northern Karnataka, and Attirampakkam in coastal Tamilnadu. Of these, Attirampakkam is the only site firmly dated to 1.5Ma. Despite attempts to date these sites to the early Pleistocene (older than 0.8 Ma), the application of absolute dating techniques in the Indian sub-continent has proved challenging due to inherent technical problems. Climatically, the early Pleistocene appears to be wetter than the middle Pleistocene, while the late Pleistocene was distinctly arid. Against this chronological and palaeoclimatic backdrop, an attempt has been made to reinvestigate Acheulian sites at Gangapur, in Upland Maharashtra (Deccan Trap formation) and Anagwadi in northern Karnataka (Kaladgi formation) by using two important geomorphic proxies namely ferricrete and calcrete associated with Acheulian artefacts. These studies show that both sites are connected with palaeochannels, flowing close to modern channels of the Godavari and the Ghataprabha. Ferricritised Acheulian artefact-bearing conglomerate is totally relict in the present semi-arid climate which has prevailed since the early middle Pleistocene in peninsular India. The Acheulian site at Anagwadi, therefore, appears to belong to the early Pleistocene. The site of Gangapur is in conformity with a semi-arid climate and therefore belongs to the middle Pleistocene. These sites represent an adaptation of Acheulian hominin groups to humid (at Anagwadi) and semi-arid environments (at Gangapur) during the early and middle Pleistocene age. The Acheulian artefacts are made on locally available quartzite at Anagwadi, and basalt at Gangapur.

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1. Introduction

The progress in the application of dating techniques like Potassium–Argon, Argon–Argon, Thermo-Luminescence, Optically Stimulated Luminescence, Electron Spin Resonance and Cosmogenic ¹⁰Be methods supported by palaeomagnetic studies of exposed continental sedimentary sequences in different parts of the Indian sub-continent have added new information to chronology, and palaeoenvironment of prehistoric cultures of the Pleistocene.

Absolute dating of the Early Acheulian site of Attirampakkam in northern Tamilnadu to 1.5 Ma has opened a new page in prehistoric research in the Indian sub-continent (Pappu et al., 2011). This has transformed views concerning the origin of Acheulian culture in

South Asia. A few other Acheulian sites like Isampur, Morgaon, and Chirki-Nevasa in northern Deccan present a strong case for inclusion in the early Pleistocene (>0.79 Ma) period (Paddayya et al., 2002; Sangode et al., 2007; Westway et al., 2011). Initial attempts at dating these sites by methods like ESR, ³⁹Ar–⁴⁰Ar, Th–U series, and palaeomagnetism are encouraging, yet inconclusive.

Palaeoenvironmental reconstruction is an essential component of any archaeological research project. For the reconstruction of palaeoenvironment, various parameters are used such as the range of biological and sedimentary proxies. These proxies provide a means by which landscapes, ecosystems and environments of different time periods can be reconstructed. Such studies are well supported by oxygen and carbon isotope studies. In the present paper, however, an attempt has been made to understand the relict nature of Acheulian landscapes by using field-based geomorphological studies. The authors recognize and acknowledge the limitations of such studies.

^{*} Corresponding author.

E-mail address: sushamadeo@yahoo.co.in (S.G. Deo).

Relict landform is a geomorphological feature which formed under past processes and climatic regimes but still exists as an anomaly within changed, present-day conditions. According to Widdowson (1997), palaeolandscapes may incorporate a collection of genetically unrelated landforms often of differing ages and origins. He further remarks that “determining the absolute ages of geomorphological elements has seemed, by contrast, notoriously difficult. This is no failure of scientific ingenuity, but rather the fact that most exposed landscapes are often subject to continued modification through dynamic factors and variation in rates resulting from climatic and tectonic environment. This makes it very difficult to give precise ages to features of ancient origin which may yet remain in the modern dynamic landscape and thus be subject to more recent modification” (Widdowson, 1997:5).

Keeping this view in mind, the present study attempts to comprehend the palaeo-landscape of some Acheulian sites in the Indian peninsula.

2. Peninsular India (9° N to 24° N and 69° E to 92° E)

Peninsular India (Fig. 1) consists of triangular landmass surrounded by the Arabian Sea on the west, and the Bay of Bengal on the east. Primarily it was a part of Gondwana landmass till the early Mesozoic. It acquired its present configuration sometime during the late Tertiary as a result of plate movement towards the north-east, and also due to climatic changes of the Cenozoic. The peninsula mainly comprises gneissic complex rocks of Precambrian age, and basaltic rocks of Cretaceous–Eocene age. Proterozoic and



Fig. 1. Location of Acheulian sites of Gangapur and Anagwadi in peninsular India.

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