The Narmada Basin Palaeoanthropology Project in central India

Parth R. Chauhan & Rajeev Patnaik

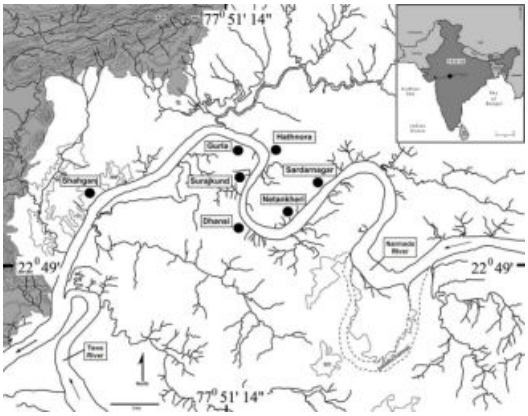


Figure 1. *Location map of the sites discussed in the study area.*

Background objectives

The Narmada River in central India originates at Amarkantak and flows westward for *c.* 1200km to the Gulf of Cambay. Quaternary investigations have been conducted here since the nineteenth century. The only early hominin fossil in the subcontinent comes from Hathnora and is represented by a calvarium or upper portion of the skull without the lower jaw and face (Sonakia & Biswas 1998). However, it has been variably attributed to different species of *Homo* and its age remains uncertain. Our knowledge of the occupational history of the basin during the Pleistocene also remains poor.

The authors, together with team members S. Athreya, B.A.B. Blackwell, M.R. Rao, V. Sathe, M. Sisk and A. Skinner, initiated the Narmada Basin Palaeoanthropology Project in 2004 because multiple large dams will eventually submerge promising exposures. Our initial goal was to define more tightly the age of the 'hominin-horizon' at Hathnora and this was later expanded to study Quaternary type-sections (Tiwari & Bhai 1997) and associated paleoanthropological evidence (Patnaik *et al.* forthcoming) (Figure 1).



Figure 2. *A herbivore tooth from the hominin-level collected for ESR.*

Preliminary results

Our project includes systematic surveys, documentation and collection of various types of specimens for

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geological, palynological and lithic analyses. A long-term objective is to map localities using GIS for reference purpose and predictive modelling. It is clear that habitation probably occurred along the peripheral zones, closer to the Vindhyan Hills rather than in the vicinity of the main channel of the Narmada River. Lithic assemblages comprise cores, bifaces, flakes, thinning-flakes, blades, scrapers, burins, denticulates, microliths, angular fragments and micro-debitage. A change in the use or preference of raw material type is broadly observed: Lower and Middle Palaeolithic assemblages are made on quartzite while younger assemblages use chert, chalcedony or quartz. Key palaeoanthropological occurrences include Netankheri, Sardarnagar, Shahganj, Ramnagar, Mahadeo-Piparia, Baneta, Devakachar, Khirighat, and Gurla Beach. The most important data come from Hathnora, Surajkund, Pilikarar and Dhansi - briefly described below.

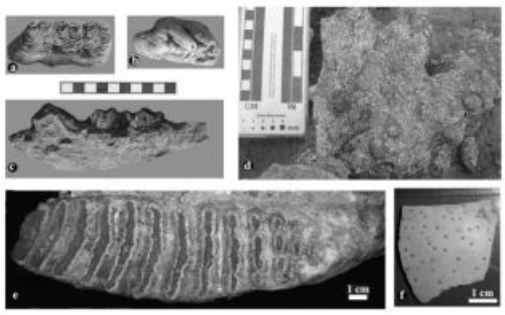


Figure 3. *Examples of collected faunal specimens.*

At Hathnora, the stratigraphy comprises a basal conglomerate and gravel layer, both overlain by the Baneta Formation. The conglomerate yielded the hominin fossils and associated faunal and lithic specimens. However, such deposits are neither a formation nor spatially widespread in the valley and collected artefacts appear to be typologically 'later' Palaeolithic rather than Lower Palaeolithic. The absence of large artefacts is notable; *in situ* lithic and faunal specimens are found both rolled and fresh and occur in isolated contexts. This illustrates that the conglomerate is reworked or re-lithified and material found in association cannot be viewed as contemporaneous. In addition to TL dating, mammalian teeth from Hathnora and other locations are being processed using ESR (electron spin resonance) and U-series methods (Figure 2). The resulting dates will have significant chronological bearing on the Hathnora hominin fossils and artefacts. At Hathnora we also recovered fossils of cattle (*Bos*), elephant (*Elephas hysudricus*) and an ostrich (*Struthio camelus*) eggshell fragment - the first stratified occurrence of ostrich evidence in the Narmada Basin (Figure 3). Across the river and south-east of Hathnora, the Surajkund locality has yielded abundant Late Acheulean and Middle Palaeolithic bifaces, gastropods, bivalves and vertebrate fossils in stratified and surface contexts. The Acheulean bifaces here are recovered consistently between lithified layers and well-developed palaeosols (Figure 4).

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Figure 4. *A cleaver from Surajkund in situ.*



Figure 5. *Part of the Pilikarar site and examples of lithics.*

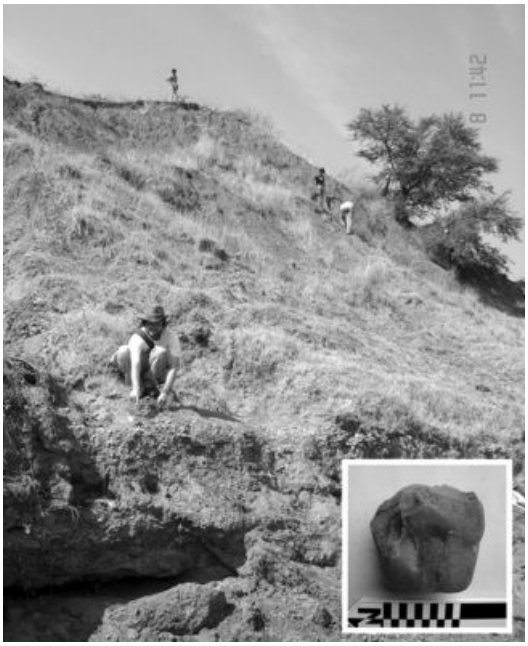


Figure 6. *Location of the artefact horizon at the bottom of the Dhansi type-section. The inset image illustrates a core/chopper from this horizon.*

Our observations at Pilikarar indicate that the Quaternary deposits here are too restricted and poorly dated

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to be identified as diagnostic parts of any formations. Located 2km away from the river and at the foot of the Vindhyan Hills, we recovered a typologically Early Acheulean assemblage comprising asymmetrical bifaces, large cleavers with minimal working, trihedral picks, large cores, core axes, Kombewa flakes and flake tools (Figure 5). This material occurs as surface finds as well as in buried context at the base of the hills (with bedrock as a raw material source); it is also found on and within a boulder horizon that is part of a large alluvial fan. Based on typological evidence from other dated Acheulean sites in India, the Pilikarar evidence is tentatively thought to be at least 350 000 years old. The Levallois technique is not prominent here and younger lithic industries appear to be absent (except for occasional microliths found on the surface). Previous paleomagnetic analyses of sediments at Dhansi have revealed that the entire Dhansi Formation is within the Matuyama Chron (Late Pliocene to Early Pleistocene). One of the most surprising discoveries by us was the recovery of several *in situ* Palaeolithic artefacts (most in fresh condition) and a highly-weathered fossil herbivore tooth from a thin rubble horizon at the bottom of this type-section (Figure 6). If these results are corroborated by our excavations and re-dating, Dhansi may represent the first unequivocal example of human presence in India prior to the Middle Pleistocene.

Prospects

The Narmada Basin offers scientists well-preserved bodies of multidisciplinary evidence to understand human evolution and behaviour in relation to changing environments. Our goals in the near future include a comprehensive survey of the main channel of the Narmada River and its tributaries, GIS mapping and documentation of all palaeoanthropological localities and excavations and geochronology at Dhansi, Pilikarar, Surajkund, Hathnora, Durkadi and other key sites.

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