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Is the Soanian techno-complex a Mode 1 or Mode 3 phenomenon? A morphometric assessment

Stephen J. Lycett*

Leverhulme Centre for Human Evolutionary Studies, University of Cambridge, Fitzwilliam Street, Cambridge, CB2 1QH, United Kingdom

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Abstract

The Soanian is traditionally seen as one of the major (non-Acheulean) Palaeolithic techno-complexes of the Indian subcontinent. Over several decades comparisons of Soanian assemblages have been made with the non-bifacial industries of East Asia and north-west Europe. The chronological status and typo-technological relationship(s) of the Soanian to other Palaeolithic industries have been the subject of much debate. When first named and described the Soanian was considered to contain evidence of Mode 3 Levallois-style core reduction. However, in recent years, the potential Mode 3 component of the Soanian has largely been ignored, and the techno-complex is described under various guises as a core/flake or 'Mode 1' techno-complex. Here, a comparative morphometric assessment of selected Soanian cores and other Palaeolithic nuclei is undertaken, to test the hypothesis that this industry contains a definite Mode 3 Levallois element. Discriminant Function Analyses (DFA) of morphometric variables provide robust evidence that at least part of the Soanian techno-complex contains Mode 3 Levallois cores. The implications of these analyses for the relationship between the Soanian and the Acheulean, and the relevance of the Soanian in considerations of the Movius Line are also discussed.

Keywords: Lithics; Soan Valley; Soanian; Levallois; Morphometrics; Movius Line

1. Introduction

The Soanian (sometimes also spelt Sohanian) is traditionally seen as one of the major Palaeolithic techno-complexes from the Indian subcontinent (Kennedy, 2000; Movius, 1948, 1969; Sankalia, 1974), and yet has seen only limited empirical research in recent decades, further plagued by a dearth of primary context sites (Chauhan, 2003, 2004, 2005). Comparison with the Mode 1 industries of East Asia and non-bifacial industries of north-west Europe (such as the Clactonian) are common (Chauhan, 2003; Dennell and Hurcombe, 1989; Kennedy, 2000; Movius, 1948). The chronological status and typo-technological relationship(s) of the Soanian to other Palaeolithic industries has been the subject of much debate. When first named and described (de Terra and Paterson, 1939), the Soanian was considered to contain evidence of Mode 3 Levallois-style core reduction. However, in recent years, the potential Mode 3 component to the Soanian has largely been ignored, and this techno-complex is variously described as a chopper tool industry, a pebble tool and flake industry, a cobble tool industry, a core/flake industry, or simply as 'Mode 1' (e.g. Chauhan, 2003, 2005; Davis, 1987; Gaillard, 1995; Ghosh, 1974; Misra, 2001; Petraglia, 1998, 2001, 2007). Here, a comparative morphometric assessment of the presence of a Mode 3 Levallois component to the Soanian type material is undertaken.

2. The Soanian and the Siwaliks

The Palaeolithic sites in the Soan Valley, Pakistan, form the type-sites of the Soanian lithic techno-complex (de Terra and Paterson, 1939; Movius, 1948; Paterson and Drummond,

* Corresponding author. Tel.: +44 779 11 33 593.
E-mail address: s.lycett@human-evol.cam.ac.uk

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1962), an industry found in several regions of the Siwalik Hills (Fig. 1). The Siwaliks run from Bhutan and Bangladesh in the east through southern Nepal, northern India and northern Pakistan at their western extremities, roughly parallel to the Himalayan range. Sediments forming the Siwaliks were laid down as fluvial deposits by rivers flowing south of the Himalayas during a time range spanning the Middle Miocene to Middle Pleistocene (Gill, 1951, 1983; Rendell et al., 1989). Fluvial sedimentation ceased during the late Middle Pleistocene when tectonic uplift raised the hills to their current elevation (Gill, 1983; Rendell et al., 1989). A formation known as the Boulder Conglomerate Formation (BCF) comprises some of the youngest fluvial sediments (*ca*. 1.7–0.7 Myr) in the Siwaliks and contains the quartzite boulders, cobbles and pebbles that subsequently became the primary source of raw material for lithic artefacts (Chauhan, 2003; Rendell et al., 1989; Sangode and Kumar, 2003). Subsequent aeolian and fluvial sedimentation (the latter associated with monsoon rains) and further tectonic activity has led to the formation of 'post-Siwalik' deposits in some regions (Stiles, 1978). Recent fieldwork (Allchin, 1995; Dennell and Rendell, 1991; Rendell et al., 1989) has overturned the geological interpretations of de Terra and Paterson (1939), who mistakenly identified a series of fluvial terraces in the Siwaliks. This more recent work has demonstrated that the supposed 'terraces' are actually erosional features (Rendell et al., 1989) and, hence that existing chronological divisions and scenarios of technological evolution within the Soanian were inaccurate (Dennell and Hurcombe, 1989). Although Mode 1 assemblages have been claimed from early (i.e. $\geq$0.7 Myr) Siwalik sediments in Pakistan (Dennell, 2004; Rendell et al., 1989), the Soanian lithic techno-complex (*sensu stricto*) derives from the post-Siwalk sediments, and there is no evidence of a cultural continuum between the claimed early Mode 1 artefacts and Soanian industries from later sediments (Chauhan, 2004, 2005, p. 319).

Traditionally the Soanian has been seen as distinct from Mode 2 (Acheulean) traditions, and there is a long history of contrasting Soanian technology with the Acheulean of the Indian subcontinent (Chauhan, 2003; Gaillard, 1995; Misra, 2001; Mohapatra, 1990; Movius, 1969; Paterson and Drummond, 1962; Sankalia, 1967, 1974). Some, however, have suggested that the Soanian–Acheulean distinction may simply represent the ends of a technological continuum or highly variable lithic facies (e.g. Gaillard, 1995; Petraglia, 1998, 2007). Although Soanian material has frequently been seen as contemporary with or preceding the Acheulean in India and Pakistan (e.g. de Terra and Paterson, 1939; Graziosi, 1964; Mohapatra, 1990), it has also been argued that the Soanian may actually post-date the Acheulean (Chauhan, 2003). Indeed, Suresh et al. (2002) have recently dated (via optically stimulated luminescence) the deposition of an alluvial surface fan in the Pinjore-Nalagarh Dun, India to as young as 20 Kyrs. This implies that Soanian material associated with this feature should be seen as Late Pleistocene in age rather than Middle Pleistocene or older (Chauhan, 2003; Singh Soni and Singh Soni, 2005).

Although isolated occurrences of Acheulean technology are known in the Siwaliks (e.g. Corvinus, 2007; de Terra and Paterson, 1939; Graziosi, 1964; Mohapatra, 1981), the Soanian techno-complex is more frequently compared with biface-free or Mode 1 Palaeolithic industries. It is particularly interesting to note that Movius (1948, p.376) saw the Soan material as ''one manifestation of a great complex of chopper-chopping tool found in Southern and Eastern Asia''. Hence, the chronological and techno-typological status of the Soanian is potentially of great importance in understanding the nature and significance of the so-called 'Movius Line', which is traditionally held to represent a geographic demarcation between the Mode 1 industries of East Asia and the Mode 2 (Acheulean) industries of western Eurasia and Africa (Keates, 2002; Petraglia, 2001; Schick, 1994). The Soanian has also drawn

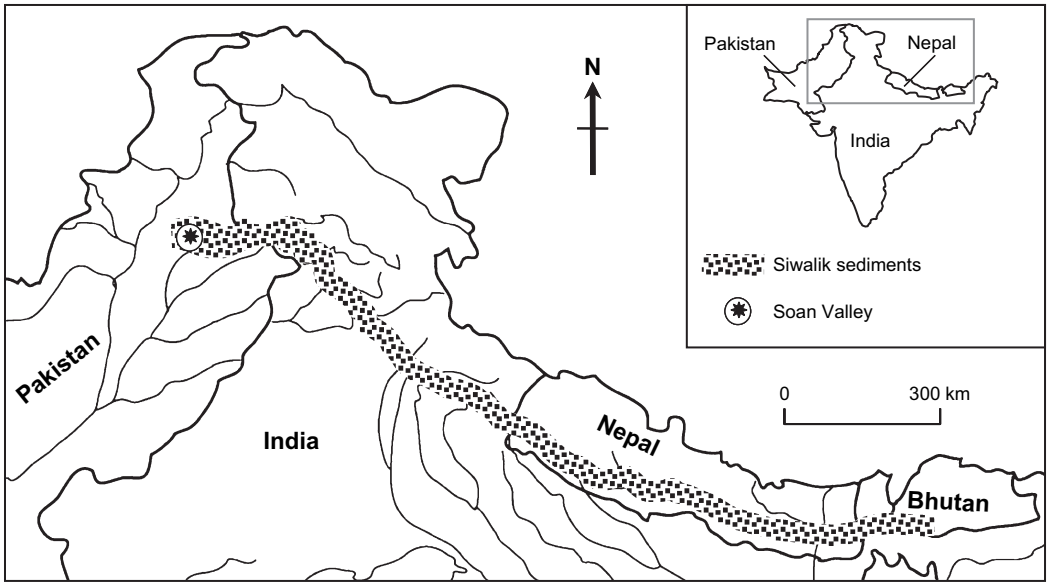

Fig. 1. Location map showing distribution of Siwalik sediments and position of Soan Valley, Pakistan.