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## The Acheulean in the South Caucasus (Georgia): Koudaro I and Tsona lithic assemblages

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### ABSTRACT

The Southern Caucasus/Transcaucasia was occupied by human groups throughout the Pleistocene from 1.8 Ma (Dmanisi). A long chronological gap currently separates this earliest assemblage from the first evidence of (Acheulean-type) bifacial technology, as assemblages with bifaces do not seem to be older than 500 ka. Acheulean sites are frequent on the southern edge of the Great Caucasus but are absent on the northern side. Most of these are badly or non-dated open-air sites. There are, however, three cave sites in Georgia with archaeological sequences comprising lithic assemblages related to the Acheulean: Koudaro I, III and Tsona, located on the Great Caucasus. The altitude of these sites ranges from 1500 to 2200 m (a.s.l.) indicating occupations in a high mountainous context. Following a new technological analysis of the lithic series, this paper focuses on the assemblages from Koudaro I and Tsona and describes the strategies implemented for core and bifacial technologies in relation to palaeoenvironmental data and raw material procurement. Koudaro I indicates that both debitage and shaping took place in the cave, whereas only various heavy-duty tools were brought to Tsona, probably for short-term and specialized occupations. Acheulean groups occupied high altitudes during temperate periods and raw material procurement suggests hominin mobility between the low plateaus and the Caucasian valleys. The sites suggest that Acheulean groups extended their available territories into the Great Caucasus when climatic conditions were propitious. Moreover, comparisons between Levantine and Georgian series suggest that the southern flanks of the Great Caucasus mountain range gave rise to a local evolution of Acheulean features after the arrivals of hominin groups with the bifacial technology, likely from the Levant.

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### 1. Introduction

The Southern Caucasus, including Transcaucasia, is situated between the Black and Caspian Seas and bordered by the Great Caucasus range in the north. The great Caucasus is similar to the Alps mountain range, extending over more than 1200 km. In the south of Georgia, at the Armenian border, the Little Caucasus reaches 3054 m (Fig. 1). Between the Great and Little Caucasus, the topography is composed of collapsed basins and plateaus (Colchis, Imereti, Azerbaijan). Hominin mobility was considered to be constrained by the 1200 km long Great Caucasus mountain range transecting the Southern and Northern Caucasus with peaks

reaching 5633 m a.s.l (Elbrouz peak). It has also been postulated that the Greater Caucasus formed a biogeographic barrier dividing the Southern and Northern Caucasus. This hypothesis is supported by the lithic record with Acheulean sites located exclusively in the Southern Caucasus (Liubin, 1959, 2002; Zamiatnine, 1961; Liubin and Levkoskaïa, 1972; Levkoskaïa, 1980; Vereschagin and Barychnikov, 1980; Doronichev, 2008).

The term Acheulean is used here to denote assemblages with bifacial technology including heavy-duty tools such as bifaces, cleavers and others, made on pebbles, slabs or flakes (in this case Large Cutting Tools, LCTs; cf. Kleindienst, 1961). The earliest assemblages with bifacial technology are described in East Africa from 1.8 Ma and arrived in the Levant and India towards 1.5 Ma (e.g. Bar-Yosef and Goren-Inbar, 1993; Goren-Inbar et al., 2002; Torre de la et al., 2008; Lepre et al., 2011; Beyene et al., 2013). In the Levant, the sites of Ubeidiya (1.4–1.2 Ma), the Gesher Benot Yak'ov

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Fig. 1. Location of the sites of Koudaro I-III and Tsona along the Great Caucasus.

(800–900 ka), are considered as evidence of two African waves of expansion. Bifacial technology emerges later in Western Europe from 900 to 700 ka (Moncel et al., 2013; Vallverdu et al., 2014).

The Acheulean tradition does not exist on the northern slopes of the mountain range, for instance at Treugol'naya where the bottom of the sequence is dated to  $583 \pm 25$  ka by ESR (levels 6, 7a, 7b) (Golovanova, 2000; Golovanova and Doronichev, 2005; Doronichev, 2008; Doronichev and Golovanova, 2010). Similarly, assemblages with bifacial technology are not present in Central Asian areas (Ranov and Schäfer, 2000). It has been assumed that the Greater Caucasus barrier was never crossed by these hominin populations and that the occupants of the Southern Caucasus accessed this region from the Levant. Sites with an Oldowan assemblage such as Dmanisi, and Bogatyri, located along the Azov Sea and dated to 1.6–1.1 Ma, indicate that hominins probably moved along the Black Sea coast but did not cross the Caucasus (Shchelinsky et al., 2010). It is also assumed that the Lower and Middle Palaeolithic technological series from the Northern Caucasus share clear affinities with those of Central and Eastern Europe (Cohen and Stepanchuk, 1999; Golovanova and Doronichev, 2003; Golovanova et al., 2006; Doronichev and Golovanova, 2010), whereas the Southern Caucasian Lower and Middle Palaeolithic industries are related to those from the Levant (Beliaeva and Liubin, 1998; Tushabramishvili, 2002, 2007). It is most likely that neither Acheulean groups nor Neanderthals crossed the Caucasus, but that modern humans did, at least during milder climatic phases, as techno-typological similarities can be observed in Upper Palaeolithic lithic assemblages from the Southern and Northern Caucasus, possibly indicating more frequent inter-regional human contacts during this period (Golovanova and Doronichev, 2003; Golovanova et al., 2010).

Palaeogeographic conditions varied during the Pleistocene due to glacial/interglacial phases, the tectonic activities of the Great Caucasus, and volcanic events. During the last glacial period, glaciers formed a continuous range and covered the Great Caucasus to an altitude of 600 m. However, glaciers were less extensive than in the Alps, due to continental conditions, and refuges continuously existed (Maruashvili, 1971; Gabunia and Vekua, 1990). The available

territories decreased in surface in the Great Caucasus while they extended along the coasts of the Black Sea and Caspian Sea.

During temperate periods, the available territories increased in the Great Caucasus, allowing hominins to reach high elevations following large, easily accessible valleys. They would then have been stopped by the mountainous barrier during the earliest occupations (Maruashvili, 1978; Liubin, 1984) (Fig. 2).

Intense volcanic eruptions during the Pleistocene also modified the landscape, in particular in Transcaucasia. Lava flows formed plateaus, stopped rivers and created lakes (Mrevlishvili, 1997).

Assemblages with bifacial tools are dispersed throughout Georgia, but most of are from undated open-air sites, suggesting that this (or these) tradition(s) was widespread throughout the South Caucasus. Only three caves, Koudaro I and II, and Tsona, have yielded Acheulean series in stratigraphy (Fig. 1). They are all located along the Great Caucasus. Radiometric dates indicate a large temporal gap between Dmanisi, dated to 1.7–1.8 Ma, and the oldest evidence of the Acheulean tradition in the area (Lordkipanidze et al., 2007; Mgeladze, 2008; Mgeladze et al., 2010, 2011). The earliest Acheulean dates point to an age of 500 ka (bottom of Koudaro III), indicating a chronological gap between the oldest evidence of hominin occupation and the oldest signs of bifacial technology. The Acheulean is clearly attested at 350 ka at Koudaro I even though evidence suggests an earlier arrival at around 600 ka. The whole sequence of Koudaro III seems to be more recent, except for the base which is dated by TL to 580–112 ka (Golovanova and Doronichev, 2003). The paleontological sites of Tsalka and Akalkalaki are the only sites dated to around 1 Ma by biostratigraphy. They fill the temporal gap between Dmanisi and the early evidence of Acheulean (Vekua, 1959; Vekua et al., 1987) but without evidence of hominin occupations. That does not mean that hominins were not present.

New technological studies on Koudaro I and Tsona, and field-work operations conducted over the past decade on raw materials in areas close to the cave sites have focused on the Lower Palaeolithic strategies in order to describe hominin behaviour in the Southern Caucasus, as well as to characterize the relationship

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