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# Colonisation, Migration and Marginal Areas

## *A zooarchaeological approach*

Edited by
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and Stephen Wickler



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# 7. Faunal Exploitation Patterns along the Southern Slopes of the Caucasus during the Late Middle and Early Upper Palaeolithic

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*This paper provides preliminary results of our detailed taphonomic and zooarchaeological analysis of the faunal remains from the new excavations at the Middle Palaeolithic and Upper Palaeolithic sites of Ortvale Klde rockshelter and Dzudzuana Cave (1996–2001 seasons). We highlight the foraging behaviors and the depositional histories of the bone assemblages and draw broad conclusions regarding differences and similarities in hunting, butchering, and transport strategies of late Middle Palaeolithic and early Upper Palaeolithic occupants of the foothills of the southwestern Caucasus.*

## Introduction

Occupying an intermediate position between Africa, Europe, and Asia, the southern Caucasus has represented a northern geographic terminus for major expansions and migrations of human populations, both Archaic and Modern, for millennia. As such, the southern Caucasus provides an opportunity to examine human behavioral variability within a marginal area that periodically served as a refuge during the Palaeolithic. However, this stated marginality is only relevant in terms of geographic location, with human mobility being largely thwarted by the combined effects of the Caucasus Mountains to the north, the Black Sea to the west, and the Caspian Sea to the east. In addition, human mobility is limited to some extent by the Lesser Caucasus to the south. Within Western Georgia, the favorable climatic conditions produced and maintained by the Black Sea foster a degree of floral and faunal diversity that is not matched in these surrounding areas, thereby producing a highly productive yet circumscribed region capable of supporting large Palaeolithic populations. It is within this geographically marginal, yet environmentally diverse and resource rich region that we conducted excavations and zooarchaeological analyses as part of our investigation into the subsistence patterns and foraging behaviors of Middle and Upper Palaeolithic groups.

Western Georgia, located between the Caucasus range, the Likhi hills and the Black Sea, is a region known for its wealth of prehistoric sites, most of which are found in the river valleys that drain the Caucasus Mountains. Past research in this region established a cultural and palaeoenvironmental record (Liubin 1989; Adler and Tushabramishvili in press; Meshveliani *et al.* in press). Faunal studies were conducted solely as palaeontological investigations, resulting in presence/absence lists, without any zooarchaeological or taphonomic considerations. A recent Georgian-American-Israeli joint project centers on the excavations of two sites: Ortvale Klde rockshelter (Tushabramishvili *et al.* 1999; Adler 2002; Adler and Tushabramishvili in press) and Dzudzuana Cave (Meshveliani *et al.* 1999). This paper provides preliminary results of our ongoing detailed taphonomic and zooarchaeological analysis of the faunal remains recovered during these new excavations between 1996–2001.

The site of Ortvale Klde rockshelter is located in the Cherula river valley, approximately 5 km west of Dzudzuana Cave, which is located in the Nekressi river valley. Both are tributaries of the Kvirila River, which drains the slopes of the southwestern Caucasus (Figure 1). The two sites are located within the same ecological and geographical setting and provide a continuous cultural sequence. The sequence at Ortvale Klde is composed of five late Middle Palaeolithic layers (*c.* 60–33ka BP) that are capped by three Upper Palaeolithic

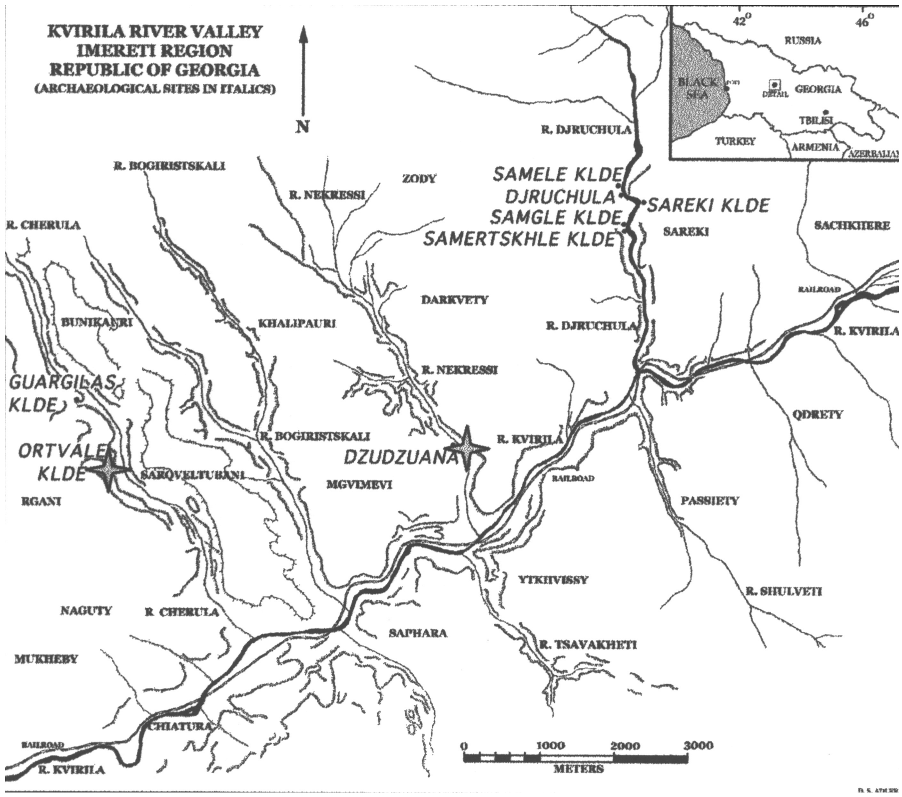


*Fig. 1. Map showing the location of Ortvale Klde and Dzudzuana, Imereti Region, Republic of Georgia.*

horizons (*c.* 33–21 ka BP). The sequence continues at Dzudzuana with two thick Upper Palaeolithic deposits dated to 30–20 ka BP and 13–11 ka BP. The lower deposit at Dzudzuana is contemporary with the Upper Palaeolithic horizons of Ortvale-Klde and the upper deposit resembles Epi-Gravettian manifestations in the region (see Adler and Tushabramishvili in press; Meshveliani *et al.* in press).

Ortvale Klde is situated at approximately 530 m above sea level, roughly 35 m above the gorge, and opens to the east. The new excavations were carried out in six square meters in the southern chamber of the rock-shelter (see Adler 2002; Adler and Tushabramishvili in press for site plan and area of recent excavation). Dzudzuana is situated in a similar environment (560 m above sea level, 12 m above the gorge). The cave is large and elongated, emerging as a tunnel from which a small creek flows. The new excavations were carried out in 16 square meters at the mouth of the cave (Meshveliani *et al.* 1999). All of the excavated sediments from both sites were sieved with 2 mm mesh (wet sieving at Dzudzuana and dry sieving at Ortvale Klde), and were processed according to their spatial and stratigraphic location.

We carried out detailed taphonomic and zooarchaeological analyses at both sites in order to gain a better understanding of the differences and similarities between the late Middle Palaeolithic and the Upper Palaeolithic foraging patterns in the region. Here we focus on the two most abundant species exploited during those periods – the Caucasian goat (*Capra caucasica*) and the extinct steppe bison (*Bison priscus*). These two species provided the economic base for the inhabitants of both sites over the entirety of their occupations. Our principal goal is to examine if and how Middle Palaeolithic populations (presumably Neanderthals) varied in their foraging behaviors and hunting strategies from Upper Palaeolithic populations. Another aim is to reconstruct the depositional history of each site and to document inter-assemblage differences in their formation processes.

## Faunal analysis procedures

Bone fragments were identified in the field to the maximum number of skeletal elements including head fragments, vertebrae, ribs, and shaft fragments; specimens within this last category were identified to size class only. Taxonomic identifications were verified with the assistance of Professor A. Vekua from Georgian State Museum.

The relative abundance of each different taxa was quantified using NISP (number of identified specimens) and MNI (minimum number of individuals). These values were calculated using the assumptions described by Klein and Cruz-Uribe (1984). Since the overwhelming majority of identified specimens were heavily fragmented, our protocol coded bones according to skeletal element, the portion of the element (*i.e.* proximal epiphysis, distal epiphysis, diaphysis, etc.), and what fragment of the bone portion is represented (*e.g.* lateral-medial, dorsal-ventral, caudal-cranial). In addition, each bone element was coded according to its degree of completeness (*i.e.* percent of preservation). When possible**,** shaft fragments were coded according to specific diagnostic zones. All identified elements were then summed to estimate the number of complete bones. In this method MNIs do not depend on the degree of fragmentation (Klein and Cruz-Uribe 1984).

The recorded elements were analyzed for butchery marks, and signs of animal activity (Fisher 1995). In addition, bone surfaces were analyzed for signs of post-depositional bone weathering (Behrensmeyer 1978), abrasion (Shipman and Rose 1988), and fluvial transport (Shipman 1981).

The mode of bone fragmentation was analyzed for all bone fragments bearing ancient fractures; fragments with recent fractures caused during excavation were not considered. The outline, edge, and angle of fractured specimens were assessed in order to determine the stage at which they were broken (*i.e.* fresh vs. dry; see Villa and Mahieu 1991 for typological description).

The distribution of various skeletal elements of Caucasian goat and steppe bison, grouped into four carcass part categories (head, trunk, limbs, and toes) was studied in order to determine which body parts were present at the site. The observed values for each body part were calculated based on MNE values, and the expected values were based on MNIs obtained for each species.

The age structure of the major hunted species (Caucasian goat and steppe bison) was analyzed on the basis of tooth wear. We followed Stiner (1994) in distinguishing three broad age classes (juvenile, prime adult**,** and old adult) using the eruption and tooth wear patterns of the deciduous lower fourth premolar (dP4) and lower third molar (M3).

## The bone assemblages of Ortvale Klde and Dzudzuana

Thus far, a total of 2,538 complete and fragmentary bones from Ortvale Klde (MNI=40) and of 1,628 complete and fragmentary bones from Dzudzuana (MNI=28) were identified to species, including elements that were identified only to body size group. The relative frequencies of the main hunted species in each of the assemblages are detailed in Figure 2 (based on NISP). Caucasian goat is the single most common taxon in each of the late Middle and early Upper Palaeolithic layers at Ortvale Klde. Within the Upper Palaeolithic layers of Dzudzuana the proportion of Caucasian goat decreases in favor of steppe bison. It is possible that the taxonomic differences observed between Ortvale Klde and Dzudzuana are reflective of differences in land use, but this theory remains to be tested. At each site these two species constitute more than 90% of the total assemblage (based on NISP). Other prey and non-prey species are represented at each site in small proportions, including aurochs (*Bos primigenius*), red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), wild boar (*Sus scrofa*), equid (possibly *Equus caballus*), fox (*Vulpes vulpes*), and bear (possibly *Ursus spaleaus*).

The abundance of Caucasian goat at Ortvale Klde is remarkable, representing the only documented Middle Palaeolithic site in the Caucasus dominated by this species. The predominance of mountain goat in Middle Palaeolithic contexts has been also observed at Teshik-Tash in Uzbekistan (*Capra sibirica*: >80%; Gromova 1949), at the Spanish sites of Zafarraya and Acklor (Altuna 1989; Straus 1986, 1992; Barrozo-Ruiz and Hublin 1994) and at Hortus and Crousade in southern France (*Capra ibex*; Delumley 1972; Gerber 1972). Barakaevskaïa Cave, located roughly 350 km northwest of Ortvale Klde in Gubs Canyon (Northern Caucasus), contains a faunal assemblage with one of the highest percentages of Caucasian goat (28.2%; Liubin 1998). By and large, though, the Caucasian goat is poorly represented at Middle Palaeolithic sites in the Caucasus (Hoffecker *et al.* 1991; Baryshnikov and Hoffecker 1994; Baryshnikov *et al.* 1996).

Caucasian goat lives along steep rocky slopes at elevations between 800–2400 m and it follows a dramatic seasonal migration that can cover a vertical distance of more than 1500 m. In the early spring they climb high into the mountains, descending into the upper part of the boreal forest in the late fall (Vereshchagin 1967; Heptner *et al.* 1989). Similar seasonal vertical migrations, although less distinct, were followed by recent populations of steppe bison in the southern Caucasus (Vereshchagin 1967; Heptner *et al.* 1989). Thus, on the basis of these observations**,** the high proportions of Caucasian goat and steppe bison within each of the assemblages may reflect hunting activities that occurred during the late fall or winter.

The age distribution of Caucasian goats from the Middle Palaeolithic layers of Ortvale Klde and of steppe bison from the Upper Palaeolithic layers of Dzudzuana cluster into three main age categories, indicating a hunting preference for prime-age adults (Figure 3). The small sample size of steppe bison from Ortvale Klde and Caucasian goat from Dzudzuana did not permit a similar analysis. The mortality pattern clearly shows that both goat and bison culling fall within the 'ambush predator' portion of the triangular diagram, near the median values obtained by Stiner (1994) for the Middle Palaeolithic and late Upper Palaeolithic of Italy and the prey age classes obtained by Speth and Tchernov (1998) for the Middle Palaeolithic layers of Kebara Cave, Israel. Prime-age dominated assemblages are also reported by

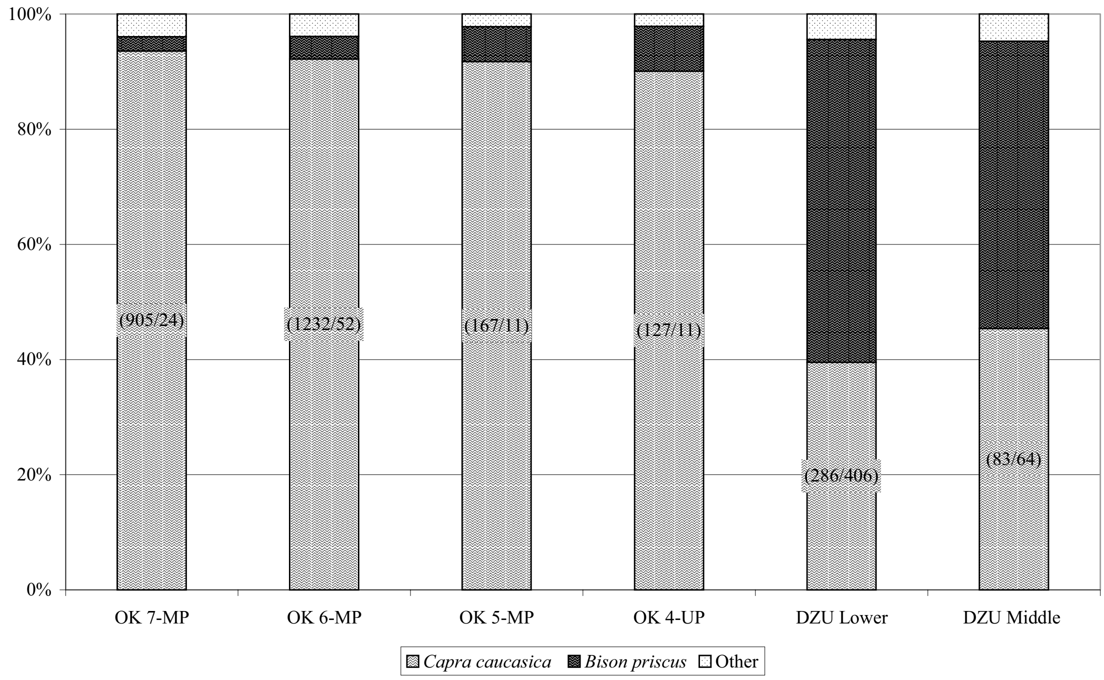


*Fig. 2. Relative frequencies of the main hunted species from the Middle Palaeolithic levels of Ortvale Klde (Layers 7–5) and the Upper Palaeolithic levels of Ortvale Klde (Layer 4) and Dzudzuana (lower and middle layers). Other species include mainly aurochs, red deer, fox, and bear (NISP's in parentheses are given for each level for Caucasian goat and bison, respectively).*

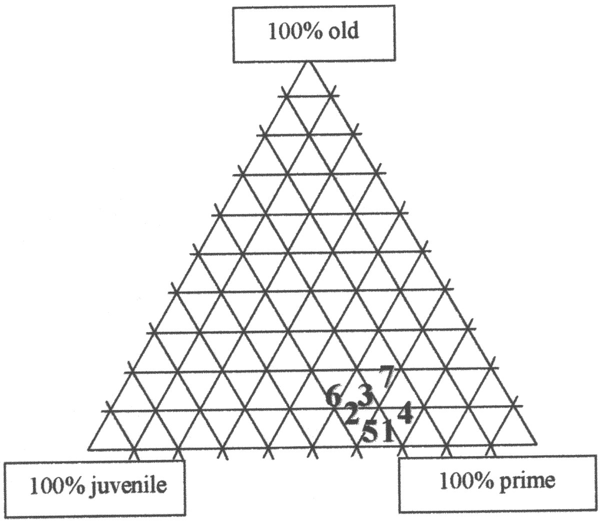


*Fig. 3. Mortality patterns of Caucasian goat in the Middle Palaeolithic levels of Ortvale Klde (1) and steppe bison in Dzudzuana (2) in comparison to the median values obtained by Stiner (1994) for the Middle Palaeolithic (3) and the late Upper Palaeolithic (4) sites from Italy, and in comparison to mortality patterns of gazelle (*Gazella gazella*) (5), fallow deer (*Dama mesopotamica*) (6), and red deer (7) in the combined Middle Palaeolithic of Kebara Cave, Israel (Speth and Tchernov 1998) .*

Gaudzinski (1995) for Middle Palaeolithic bison kill sites from Europe.

## The taphonomic history of Ortvale Klde and Dzudzuana

The taphonomic history of Ortvale Klde and Dzudzuana reveal that different depositional processes shaped each of the assemblages. While the faunal remains from Ortvale Klde span the full range of bone densities, including porous parts such as the central portion of the atlas (0.07 g/cc; Lyman 1994; based on *Ovis aries* bone densities) and the caudal ischium (0.11 g/cc), the Dzudzuana assemblage is dominated by very dense bones, and contains mainly shaft fragments (over 0.4 g/cc) and teeth. This observation suggests differential rates of bone preservation at Dzudzuana owing to attritional processes that could have occurred during or following occupation.

Analysis of the breakage patterns on long bone epiphyses and near-epiphyses shaft fragments provided results that varied considerably between four layers of Ortvale Klde and the two layers of Dzudzuana (Figure 4). High proportions of dry bone fractures (*i.e.* right angle, transverse outline, and smooth edge) characterize Dzudzuana, while high proportions of fresh bone fractures (*i.e.* oblique angle, V-shaped outline, and jagged edge)

| | | Fracture angle | | | Fracture outline | | | Fracture edge | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site** | **Layer** | **Oblique (fresh)** | **Right (dry)** | **Intermediate** | **V shaped (fresh)** | **Transverse (dry)** | **Intermediate** | **Jagged (fresh)** | **Smoothed (dry)** | **Intermediate** |
| **Ortvale Klde** | 7 (MP) | 76 (74%) | 12 (12%) | 15 (14%) | 17 (70%) | 11 (11%) | 19 (19%) | 70 (70%) | 7 (7%) | 23 (23%) |
| | 6 (MP) | 153 (74%) | 18 (9%) | 36 (17%) | 135 (64%) | 19 (9%) | 58 (27%) | 153 (72%) | 25 (12%) | 34 (16%) |
| | 5 (MP) | 12 (80%) | 1 (7%) | 2 (13%) | 11 (74%) | 2 (13%) | 2 (13%) | 13 (87%) | 0 (0%) | 2 (13%) |
| | 4 (UP) | 23 (88%) | 2 (8%) | 1 (4%) | 22 (84%) | 2 (8%) | 2 (8%) | 24 (92%) | 1 (4%) | 1 (4%) |
| **Dzudzuana** | Early (UP) | 57 (48%) | 53 (45%) | 8 (7%) | 51 (44%) | 48 (41%) | 18 (15%) | 54 (47%) | 48 (41%) | 14 (12%) |
| | Middle (UP) | 75 (57%) | 35 (26%) | 22 (17%) | 62 (47%) | 27 (20%) | 43 (33%) | 44 (33%) | 46 (35%) | 42 (31%) |

*Fig. 4. Relative frequencies of fracture angle, fracture outline, and fracture edge from Ortvale Klde (Layers 7–4) and Dzudzuana (lower and middle layers).*

characterize Ortvale Klde. A tree diagram designed to measure the degree of similarity in fresh bone fracture ratios from the different levels at the two sites places the Dzudzuana assemblage distinctively apart from the four layers of Ortvale Klde (Figure 5). These results suggest that the fracturing of bone at Dzudzuana most probably resulted from trampling, weathering, and/or sediment compaction, while the bones from Ortvale Klde were fractured in a fresh condition.

Results of the taphonomic analyses reveal that the high frequency of dry bone fractures found at Dzudzuana can be related to post-depositional physical erosion processes as evidenced by the high rates of abraded bones and the relatively wide distribution of bleached and eroded bones. In addition, the Dzudzuana bone assemblage bears evidence of advanced stages of bone weathering (stages 3–5 based on Behrensmeyer 1978). Figure 6 summarizes the results of each of the attritional processes considered. These results suggest that skeletal elements at Dzudzuana were probably exposed to more aerial weathering and were buried in less favorable sedimentological conditions in comparison to the bone assemblages from all levels of Ortvale Klde. The adequate representation (Voorhies Group I-III; Voorhies 1969) of bone elements according to their surface-volume ratio at both Dzudzuana and Ortvale Klde, suggests that the loss of bones owing to fluvial transport was minimal.

In addition, chewing, gnawing, and scratch marks (see Fisher 1995) are infrequent on all identified and unidentified elements from both assemblages (Figure 6), suggesting that the destruction of bone elements by carnivores and rodents was insignificant. It is possible that the absence of carnivore modifications in the Dzudzuana assemblage relates to the poor preservation of the bone surfaces. The presence of two carnivore marks on the inner parts of an occipital fragment of Caucasian goat from Ortvale Klde further supports the claim that carnivore activity at the site is associated with post-depositional processes.

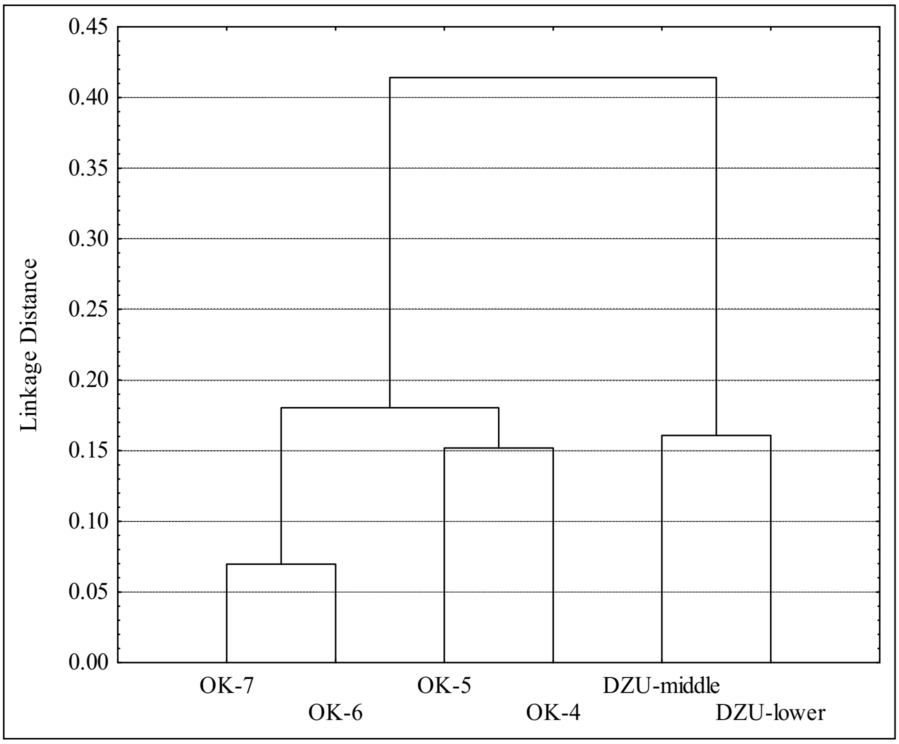


*Fig. 5. Tree diagram (based on cluster analysis) measuring the similarity of fresh bone fractures from Ortvale Klde (Layers 7–4) and Dzudzuana (lower and middle layers), based on proportional frequency of fracture angle, outline and edge.*

| Site | Layer | % Abraded | % Bleached | % Weathered (>stage 2) | Fluvial transport | % Carnivore marks | % Rodent marks |
|---|---|---|---|---|---|---|---|
| Ortvale Klde | 7 (MP) | 0 | 0 | 5 | Not significant | 5 | 3 |
| | 6 (MP) | 0 | 0 | 0 | Not significant | 7 | 3 |
| | 5 (MP) | 0 | 0 | 0 | Not significant | 7 | 2 |
| | 4 (UP) | 0 | 0 | 8 | Not significant | 8 | 2 |
| Dzudzuana | Lower (UP) | 12 | 2 | 35 | Not significant | 1 | 1 |
| | Middle (UP) | 20 | 9 | 76 | Not significant | 4 | 3 |

*Fig. 6. Measured values (%NISP) of specific attritional processes from Ortvale Klde (Layers 7–4) and Dzudzuana (lower and middle layers).*

### Food transport and processing at Ortvale Klde and Dzudzuana

The Caucasian goat remains from Ortvale Klde exhibit marks from all stages of preparation (n=42); only three cut marks were found on unidentified shaft fragments of bison from the site. The majority of the butchery marks on the goat remains can be associated with carcass dismemberment (71%; following Binford 1981). Butchery marks indicative of skinning (5%) and filleting (24%) were also observed. Cut marks produced during dismemberment are often deeper and more pronounced than those produced during filleting, and are more abundant than skinning cut marks that are scattered, almost exclusively, along distal metapodia and horn cores (Noe-Nygaard 1989). The Dzudzuana assemblage contains a small number of cut marks on the goat (n=9) and bison remains (n=11), an observation that is most likely linked to the poor preservation of bone surfaces.

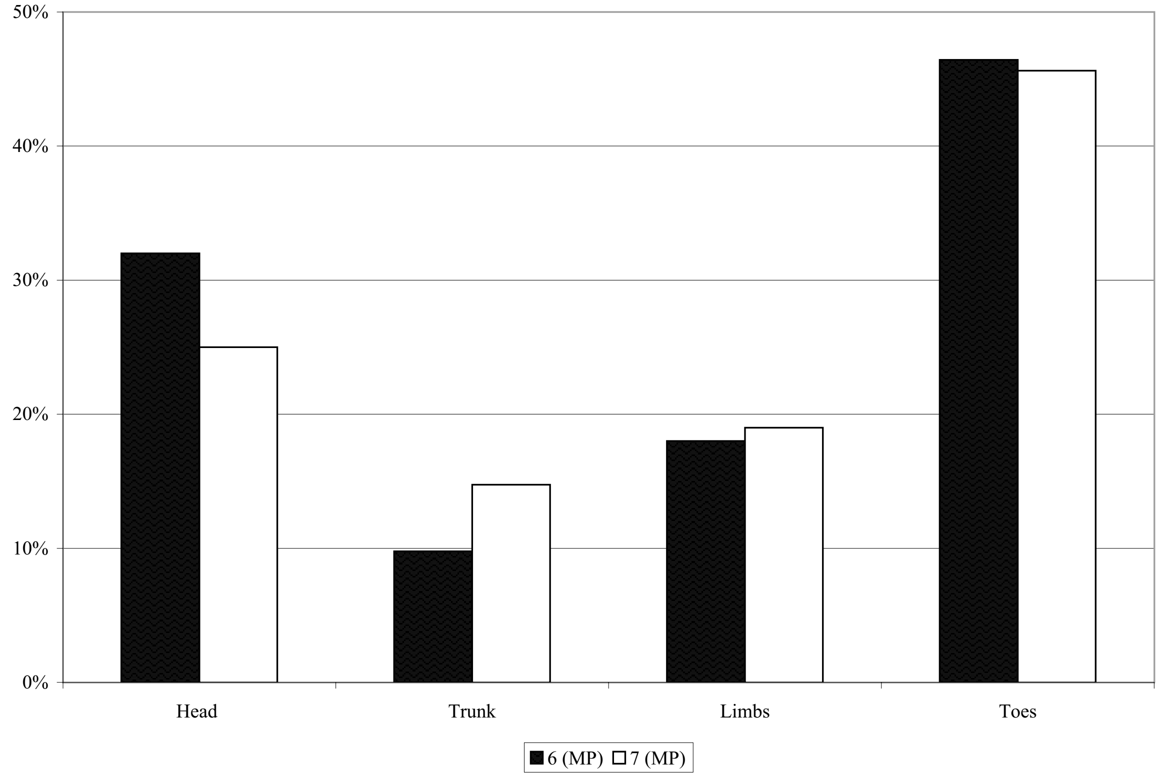


*Fig. 7. Body part representation of Caucasian goat from the Middle Palaeolithic layers of Ortvale Klde (Layers 7–6) pooled into four carcass part categories.*

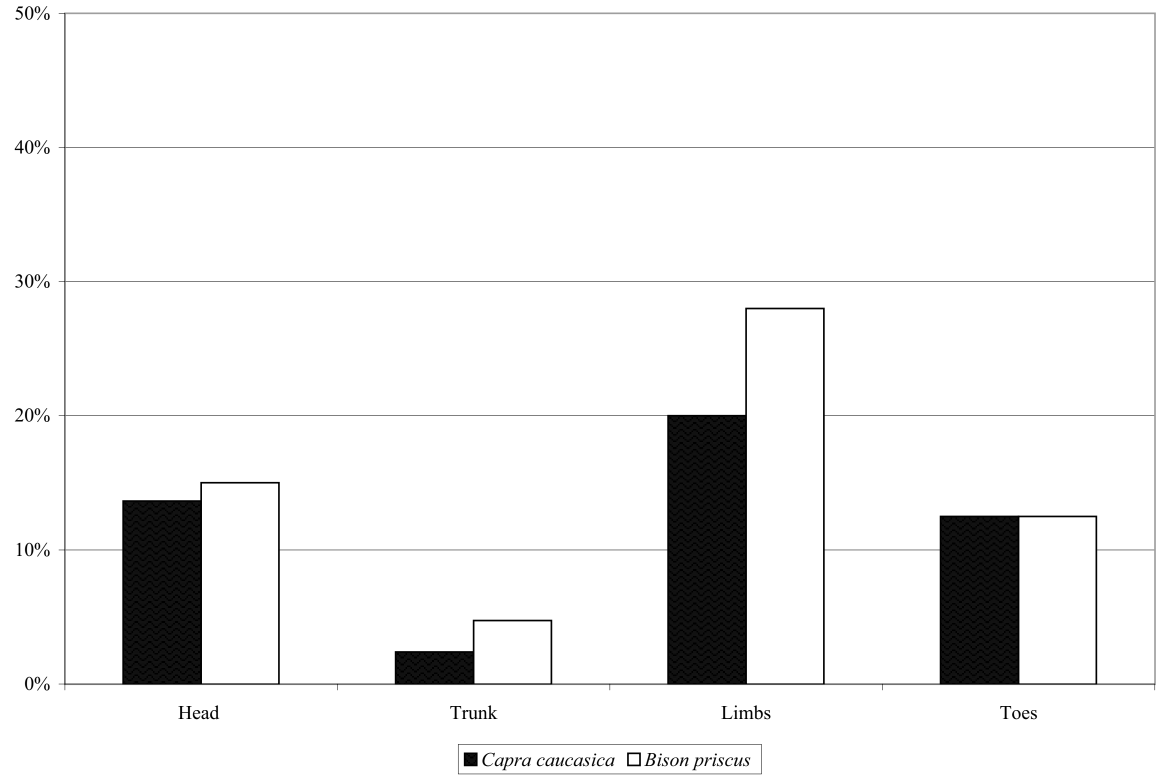


*Fig. 8. Body part representation of Caucasian goat and steppe bison from Dzudzuana (lower and middle layers combined) pooled into four carcass part categories.*

The distribution of Caucasian goat skeletal elements within the two main Middle Palaeolithic layers of Ortvale Klde (Layers 6 and 7), grouped into four carcass part categories (Figure 7; Bar-Oz n.d.), reveals a different representation pattern from that expected. The observed values are based on MNE and the expected values were calculated based on MNI. The ratio of the observed to the expected shows a low representation of trunk and limb elements, a moderate representation of heads, and a high representation of toes. An under-representation of vertebrae is common in many zooarchaeological assemblages (*e.g.* Brain 1981; Stiner 1994) and may result from various cooking and processing techniques. Likewise, the transportation of intensively processed carcasses to a site can also decrease the likelihood of encountering vertebrae within an assemblage. In addition, we found a relatively high proportion of scapulae and pelves, suggesting that certain axial elements were present at Ortvale Klde. The high frequency of toes in comparison to limb elements observed for class 2 bovids (*i.e.* those species equivalent in size to Caucasian goat) at Hadza base camps has been attributed to the butchery of the carcasses at the kill site and the transport of filleted meat from the heavier limb bones within the skins to which the phalanges remain attached (Monahan 1998).

It could be that the low rate of limb bones, in comparison to head parts, may be related to the season of the site occupation. Ethno-zoological observations demonstrate a preference for crania and toes during lean seasons, when the amount of fat and the quality of the meat in the limbs decreases (Speth 1987, 1989; Lupo 1998). Thus, the skeletal parts profile found at Ortvale Klde may reflect hunting activities that occurred during the winter, when the physical condition, and therefore nutritional potential of Caucasian goats had begun to decline. The skeletal part distribution for both steppe bison and Caucasian goat from Dzudzuana, apart from the problematic counts of the vertebral elements, display profiles that approximate anatomical completeness (Figure 8; Bar-Oz n.d.).

## Concluding remarks

In this study we have attempted to highlight the foraging behaviors and the depositional histories represented at Ortvale Klde and Dzudzuana. These preliminary results enable to draw several broad conclusions regarding hunting, butchering, and transport strategies during the late Middle Palaeolithic and the early Upper Palaeolithic of the southwestern Caucasus.

- The scant evidence for carnivore activity may imply that human occupations at Ortvale Klde were frequent and lasted for prolonged periods of time.
- The presence of cut marks relating to all stages of processing among the remains of Caucasian goat from Ortvale Klde suggests that some degree of on-site butchering was carried out.
- The dominance of Caucasian goat at Ortvale Klde suggests that the specialized hunting of predictable, migratory herds, was a major component of Late Middle Palaeolithic food-management strategies in the foothills of the southwestern Caucasus. The abundance of goat remains at both sites and the skeletal parts profile of goat at Ortvale Klde, coupled with the abundance of bison at Dzudzuana may indicate that hunting activities were conducted during late fall or winter.
- The analysis of prey age classes of Caucasian goat and bison demonstrates that the Late Middle Palaeolithic inhabitants of Ortvale Klde and the Upper Palaeolithic inhabitants of Dzudzuana were capable hunters who preferentially targeted prime adult prey.

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