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## EARLY PLEISTOCENE OF NORTH-WEST ARMENIA: STRATIGRAPHY, ARCHAEOLOGY AND TECTONICS

*Keywords: Gelasian, Calabrian, K-Ar dating, residual magnetic polarity, mammal fossils, pollen analysis, Early and Middle Acheulian, volcanism, tectonic uplift*

The Quaternary stratigraphy and tectonic development of the southern Javakheti Upland and the adjacent Upper Akhurian and Lori uplifted basins in NW Armenia (Lesser Caucasus) as well as geological position of the early and middle Acheulian lithic industries within the Lower Pleistocene deposits are under consideration. The studies of sedimentary sections and their relationships, the petrological and geochemical correlation of volcanic lavas and tuffs, the K-Ar dating of volcanic rocks and the SIMS U-Pb dating of tuffs, the examination of obtained fossils and the pollen analysis, and the determination of residual magnetic polarity of volcanic rocks and clastic sediments have been used to compile the stratigraphic scheme and to estimate the age of volcanic and sedimentary units.

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The low-mountain topography was differentiated in low ridges and basins by the beginning of Quaternary. The eruptions of moderately alkaline basalts and basaltic andesites evened the topography of the Upper Akhurian and Lori basins in the Gelasian. The lava flows spread along major river valleys for tens of kilometers. At the late Gelasian, the eruptions of basaltic trachyandesites, trachyandesites, and trachydacites supplemented and later replaced the basaltic eruptions (Lebedev et al., 2008). The latter dammed the Akhurian River flowing to the south to the Shirak Basin and the upper Akhurian River found the new outlet to the east via the valley-like depression of the Karakhach Pass to the Dzoraghet-Debed valley. The relatively coarse-grained tuffaceous-clastic Karakhach unit was deposited in the basins during the Olduvai subchron (not earlier than 1.9–1.85 Ma) and the earliest Calabrian. The unit consists mostly of poorly sorted and semi-rounded alluvium of temporary streams. The water transit between the Upper Akhurian and Lori basins was interrupted later because of starting uplift of the Karakhach Pass. Volcanic activity renewed in the southern Javakheti Upland and the Upper Akhurian Basin surroundings for a short time in the early Calabrian (~1.7 Ma). The pulse of acid tuff explosions was expressed in the southern Lori Basin in the middle Calabrian (1.5–1.4 Ma). The terminal Calabrian and earliest Middle Pleistocene sedimentation (~1–0.5 Ma) occurred in stagnant waters, partly lacustrine conditions. This was expressed by the formation of a relatively fine-grained Kurtan unit. During the last ~0.5 Ma, the region underwent the flexure-fault deformation and tectonic uplift at 350–800 m. The climate became more continental.

The epoch of formation of the Karakhach unit was characterized by medium height mountain topography and humid climate. At that epoch, not later than 1.85 Ma, the region was occupied by the earliest hominines producing lithic industries of the Early Acheulian aspect (Belyaeva, Lyubin, 2013). They contained handaxes and other macro-tools, made of local trachydacite and basalt (sites of Karakhach, Muradovo, and Agvorik). Early appearance and special features of these industries may suggest their autochthonous origin. This might be caused by specific features of the local rocks, namely natural plating of trachydacite and basalt to tabulated fragments that gave a possibility to make such macro-tools. The Middle Acheulian artifacts were found in the Kurtan I section of the Kurtan unit. They are also made of local volcanic rocks and generally demonstrate technological and morphological features succeeding to the local Early Acheulian tradition, but have also some similarities to the simultaneous Middle Acheulian industry of the Latamna site in Syria.

Apart from Armenia, the archaeological records of early hominine habitation in the Arabian-Caucasus region at the end of the Olduvai subchron and during the earliest Calabrian were found in Syria (the Orontes and Euphrates river valleys) (Trifonov et al., 2013), the south-eastern Turkey (the Euphrates valley), and the southern Georgia (Dmanisi site in the Mashavera River valley). All these areas were similar with the East African motherland of the

earliest hominines by two specific landscape features. They are, first, tectonic valley-like depressions with lakes, streams and other water sources and, second, volcanic manifestations that preceded or were approximately synchronous with the early hominines. Presence of water and fertile soils that were enriched by volcanic products backed the vegetation favourable for herbivorous mammals. The abundant resources of mammalian herbivores attracted predators, including the hominines.

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#### THE SCHÖNINGEN MIDDLE PLEISTOCENE SEQUENCE: PALAEOENVIRONMENT AND DATING

*Key words: late Middle Pleistocene, biostratigraphy, Holsteinian Interglacial, Reinsdorf Interglacial, Schöningen*

The long-term archaeological excavations in the Schöningen open-cast mine (Lower Saxony, Germany (Thieme, 1997)) have been accompanied by various geo-biological investigations since 1983. A biostratigraphical framework for the subdivision of the Quaternary deposits from the glaciated part of North Western Germany, ranging from the Younger Middle Pleistocene to the