

Developing a chronological and environmental framework of Early Pleistocene hominin expansions in the southern Caucasus: Current research in northern Armenia

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Understanding the timing and environmental context of the earliest hominin expansions into Eurasia is of considerable interest in palaeoanthropology, however our current knowledge is based on a handful of sites. Dated to 1.85–1.78 Ma, Dmanisi (southern Georgia) is not only the locus of the earliest *Homo* fossils in Eurasia, but has also yielded stone tools and rich assemblages of vertebrate fossils [1,2]. Whilst Dmanisi has fundamentally changed our views on the morphology of early Eurasian *Homo* and their technological capabilities, it represents a single site, and little is known about the broader regional environment.

The Debed river valley (located in the Lori Depression, northern Armenia) represents a key area in which to improve our understanding of this early hominin expansion. The area lies at the south east margins of the Javakheti Plateau, a large volcanic province spanning both southern Georgia and northern Armenia. Current chronological study of the Javakheti-derived lavas places the interval of volcanic activity between 2.1 and 1.6 Ma [3,4]. The lavas are exposed along the Debed river valley and trap sediment sequences below, within and atop the flows.

Here, we present the first results of our ongoing geoarchaeological investigations in the Debed valley. We present a model of landscape evolution during the Early Pleistocene based on detailed geologic and geomorphic mapping in the valley. We then describe preliminary results from two of the key sequences in the valley. First, we focus on preliminary results from combined chronological, stratigraphic, and archaeological study of the open-air site of Haghtanak 3. Here, the lower part of the sequence has yielded a Mode 1 artefact assemblage and rests atop a basaltic lava flow ⁴⁰Ar/³⁹Ar dated to 1.95 Ma. Second, we present the initial stratigraphic and chronological results from Dzoragyugh 1 palaeolake, a 30m thick fluvial-lacustrine sequence that is sandwiched between two basaltic lava flows ⁴⁰Ar/³⁹Ar dated to 2.07 Ma and 1.68 Ma. We discuss the environmental and archaeological significance of both sites, and place them in the context of Early Pleistocene landscape evolution in the Debed valley and wider Javakheti Plateau area. Through this, we highlight potential linkages between these sites and Dmanisi, located ~60km to the NW, and discuss the importance of northern Armenia for understanding the nature and environmental context of early hominin expansions into Eurasia.

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