

An aerial perspective on Cyclopean fortresses of the South Caucasus

Nathaniel L. Erb-Satullo | Cranfield University
Dimitri Jachvliani | Georgian National Museum

Three thousand years ago, the highlands of northeastern Turkey and the South Caucasus were dotted with impressive stone fortresses. Many of these were constructed with so-called Cyclopean masonry, a term that underlines the supposedly superhuman effort required to move the giant stones used in their construction. With thick walls (often > 4 m) constructed of large boulders, they remain impressive, prominent features of the landscape. Hundreds of these fortresses are known from surveys across the region, but efforts to understand their role and situate them within their local landscapes have faced significant challenges (Hammer 2014; Lindsay 2022; Smith et al. 2009). Foremost among these are the mechanised earthmoving activities carried out on the flatter ground around these fortresses during the Soviet period, which often obliterated defensive walls and other structures off the main hilltops. For these reasons, it is not always clear whether these fortresses had associated settlements beyond their walls, or whether they were smaller communities with limited occupation beyond the fortress walls. Consequently, efforts to define the nature of potential ‘lower settlements’ and other off-hill occupation (Erb-Satullo et al. 2019; Herrmann, Hammer 2019) have had to glean information from fortuitous, often partial preservation. Ultimately, resolving these questions has major importance for understanding the structure of Late Bronze and Early Iron Age society in the South Caucasus, a period of transition between Middle Bronze Age mobile pastoralist societies and Iron Age states.

Project ARKK (Archaeological Research in Kvemo Kartli) is a collaborative international project exploring the Bronze Age–Iron Age Transition in the Lesser Caucasus borderlands in southern Georgia. With the support of a BIAA Study Grant and a Gerald Averay Wainwright Fund Grant, we carried out a season of archaeological survey in the Dmanisi and Zuraketi Plateaus, with a focus on mapping fortresses and their immediate surroundings. The primary focus of the current season was mapping an unusually large and well-preserved outer enclosure at Dmanisis Gora, which had been noted in previous work but never mapped comprehensively (Narimanishvili 2019). Prior ground-based observation by Project ARKK had located a 1 km-long fortification wall enclosing a ca 56-ha area of plateau, while excavations within the innermost fortified compound (ca 1.5 ha) uncovered well-preserved, multi-phase occupation dating from the late 2nd to early 1st millennium BC (Erb-Satullo, Jachvliani 2022). In the 2022 season, Project ARKK carried out a comprehensive plan of UAV-based photogrammetric mapping using a Phantom 4 RTK system supplemented by a Mavic 3 for rapid reconnaissance and feature assessment. In total, more than 20,000

georeferenced photos were taken for the production of high-quality digital elevation models and orthomosaic photographs. At Dmanisis Gora, we implemented a rigorous process of ground-truthing, allowing us to iteratively assess features using both ground-based and aerial observation. This highly successful approach produced accurate feature maps that distinguish, to the greatest degree possible without excavation, between anthropogenic and natural features. In addition, the more extensive survey explored and mapped other fortresses and sites for comparative purposes, to assess how exceptional the site of Dmanisis Gora was within the wider landscape.

Aerial mapping produced some striking results, as environmental conditions and site formation processes were optimal for this approach. The combination of minimal vegetation during the early autumn and lack of significant sedimentation meant that stone walls and other features were clearly visible. The 56-ha enclosure was filled with structures of various types, including circular and rectilinear walled compounds, probable cromlech burials and other structures. As is typical of highland plateau environments in the South Caucasus, few artefacts were present on the surface, beyond the occasional piece of obsidian, and one or two small non-diagnostic pieces of pottery. In addition, we identified partial stretches of walls beyond the 1 km outer fortification circuit, with similar masonry and construction. A settlement of this size and complexity in association with an LBA–EIA fortress has few parallels in the South Caucasus, though several instances of long defensive walls have been noted near such fortresses (Biscione et al. 2002; Herrmann, Hammer 2019). Interpretation and assessment of the outer settlement at Dmanisis Gora and its significance is ongoing.

Extensive survey on other archaeological sites provided some further context to the finds at Dmanisis Gora. We identified a wide range of sites with materials dating tentatively from the Paleolithic to the 19th century, including several more megalithic fortresses. At none of these other sites, however, did we identify anything like the extensive outer occupation at Dmanisis Gora. It may be that the thin soil and bedrock outcrops across much of the latter made the area unsuitable for agriculture and contributed to its preservation. Of particular interest were a series of village sites with a highly distinctive appearance on Corona, Hexagon and Google Earth Imagery, with clusters of room blocks clearly visible from site topography. Ceramic finds and discussions with present-day inhabitants suggest that they are medieval to post-medieval in date, though at one such site (pictured), located on a gorge promontory well suited for defense, we also identified LBA–EIA pottery as a minor component alongside the



Aerial view of a portion of the outer enclosure at Dmanisis Gora, showing a section of the 1 km-long fortification wall (left).

medieval/post-medieval assemblage. Another intriguing case of site re-use was a medieval church surrounded by a megalithic drystone wall, which itself runs directly over a mounded kurgan with stone cobble facing (pictured). The relative chronology of the church and enclosure is uncertain. If the enclosure predates the church, the latter's construction may reflect the Christianisation of an earlier sacred site. If contemporary, it may be intended to echo earlier megalithic building traditions in the region. Regardless, the kurgan, which clearly pre-dates the enclosure, is likely Bronze Age in date, underlining the millennia-long significance of this hilltop location.

Throughout the survey, aerial drone photography and mapping proved essential for site reconnaissance and interpretation. The tens of thousands of drone photographs processed into digital elevation models and orthomosaic imagery will produce accurate site plans and aid in the further assessment and interpretation of features identified on survey.

References

Biscione, R., Hmayakyan, S., Parmegiani, N. 2002: *The North-Eastern Frontier Urartians and Non-Urartians in the Sevan Lake Basin 1: The Southern Shores*. Rome

- Erb-Satullo, N.L., Jachvliani, D. 2022: 'Fortified communities in the South Caucasus: insights from Mtsvane Gora and Dmanisis Gora' *JFA* 47.5: 305–23
- Erb-Satullo, N.L., Jachvliani, D., Kalayci, T., Puturidze, M., Simon, K. 2019: 'Investigating the spatial organisation of Bronze and Iron Age fortress complexes in the South Caucasus' *Antiquity* 93: 412–31
- Hammer, E. 2014: 'Highland fortress-polities and their settlement systems in the southern Caucasus' *Antiquity* 88: 757–74
- Herrmann, J.T., Hammer, E.L. 2019: 'Archaeo-geophysical survey of Bronze and Iron Age fortress landscapes of the South Caucasus' *JAS: Reports* 24: 663–76.
- Lindsay, I. 2022: 'The Project AsAGATS Kasakh Valley Archaeological Survey: report of the 2014–2017 seasons' *AJA* 126: 261–303
- Narimanishvili, D. 2019: *Sakartvelos tsik'lop'uri simagreebi/Cyclopean Fortresses in Georgia*. Tbilisi
- Smith, A.T., Badalyan, R.S., Avetisyan, P.S. 2009: *The Archaeology and Geography of Ancient Transcaucasian Societies 1: The Foundations of Research and Regional Survey in the Tsaghkahovit Plain, Armenia*. Chicago



Settlement located on a well-defended promontory with densely clustered blocks clearly visible in site topography.



Medieval church surrounded by megalithic enclosure. The Bronze Age kurgan is located under the tree.