Map-Database of Ancient Culture of the Armenian Highland

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Abstract

The reliability of cultural and historical primary sources depends on the degree of study, prerequisites, and means of research. With such a variety and quantity, it is necessary to conduct a comprehensive and complete study with a multi-element classification. In particular, five distinct stages can be identified in the history of Rock-art study in Armenia: first – the emergence of petroglyphologic thought (V-VII Ce., Movses Khorenatsi, Anania Shirakatsi); second – discovery and descriptive notices (1886 - the first half of the XX Ce.); third: targeted scientific expeditions (1965-1985); fourth: creation of the electronic Map-Database; fifth: 3D modeling of the distribution of petroglyphs and related artifacts in natural-historical environment.

Started in 2000 and continuously updated, an electronic map-catalogue of petroglyphs and archaeological sites has been gradually expanding, transforming into a multifaceted repository of ancient culture. Each of the six main layers represents a constituent unit with sublayers. For example: Topography, Geomorphology, Hydrography, Communication Ways, Biosphere, Historical-cultural units.

Through interdisciplinary research conducted with the help of the Database, built on a complete description of the natural-historical context and artifacts, the connection of various historical and cultural units with the environment and their functions in the past is revealed. As a result, the process of formation of the ancient cultural space becomes more understandable.

Keywords: *Archaeology, Armenian Highland, Astronomy, Catalogue, Culture, Database, Map, Petroglyph, Repository, Rock-art.*

1. Introduction

Armenian Rock-art is distinguished by a huge number of images, stylistic diversity and rich content, and occupies a special place in the cultural heritage of the Ancient World. This sphere is a rich source reflecting the realties of the past, serving as a reliable means to illuminate the millennia-long history of the Armenian people.

A key factor in its comprehensive study is the preservation of these petroglyphs at an informational level. Modern research approaches, methods, and technologies offer new and secure opportunities for the systematization and critical analysis of large and diverse materials, especially based on interdisciplinary studies. This is crucial and urgent in the context of the current geopolitical situation and historical-cultural challenges.

In particular, given the extreme diversity and large number of petroglyphs, it is necessary to conduct a comprehensive study with a multi-faceted classification[1] This approach makes it possible to reveal the semantic connections between Rock-art units, the causal foundation of the overall composition, the necessary and incidental elements, as well as their spatial and temporal characteristics.

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[1]My classification system includes location and conditions of existence, time and phases of development, functions, methods, and level of study. The basic principles are classification by spatiality, condition, execution, level of study, function, and group distribution. Accordingly, each petroglyph is described using approximately 365 data grouped into seven categories, which characterize monument as an archaeological unit, rock-piece, image-bearing surface, groove forming the image, image, grouping of images, and environment (Tokhatyan, 1997, 2009, 2012, 2015a,b, 2017, 2020b, 2024).

2. Stages of Rock-art Research in Armenia

I propose five distinct stages in the study of Armenian Rock-art.

The **first** stage is the emergence of Rock-art thought (Movses Khorenatsi, Anania Shirakatsi). The giants of early medieval Golden Age literature preserved three key pieces of information related to rock inscriptions, confirming the formation of ancient petroglyphology in Armenia (Tokhatyan, 2003, 2009, 2014, 2015b, 2016, 2017, 2020a,b, 2022, 2024).

The existence of rock inscriptions was already known to Movses Khorenatsi. The historian mentioned Torq Angegh's "writing eagles". *They sang that he took in his fist hard stones in which there was no crack, and he would crunch them into large and small pieces at will, polish them with his nails, and form them into tablet shapes, and likewise with his nails inscribe eagles and other such designs on them* (Khorenatsi (1991) II.8, p. 115).

In a marvelous form, he preserved another connection with rock inscriptions and the creation of letters – Mesrop Mashtots' dream: *He saw not a dream in sleep*, nor a vision while awake, but in the depths of his heart, the eyes of his soul beheld a right hand writing on rock: Ա, Ե, Է, Ը, Ի, Ո, Ի . The stone retained the shapes, as tracks are imprinted in snow. *And not only did he have this vision, but all the details were gathered in his mind as in a vessel* (Khorenatsi (1991) III.53, p. 327).

Anania Shirakatsi's statement is more direct: *The receptors of ancestors were more sensitive than ours, due to which they could notice not only the movement of the Sun but also carve and recognize the movements of all the other luminaries* (Shirakatsi (1940) 59. p. 83-84). This testifies to both the antiquity of rock-carvings and the presence of astronomical images.

The **second** stage is the phase of discoveries and descriptive reports from 1886 to the second half of the XX Ce. Publications were made by Mesrop Smbatyan (1886), Galust Ter-Mkrtchyan (1893), Mesrop Ter-Movsisyan and Komitas (1902), Levon Lisitsian (1913), Grigor Ghapantsyan (1912), Toros Toramanyan (1921), Ashkharbek Kalantar (1924-1934), Smbat Ter-Avetisyan (1927), Sedrak Barkhudaryan (1935), Eugene Pittard (1938), Wilhelm Freh and Muvaffak Uyanik (1957). A total of 23 drawings and 13 photographs were published.

The **third** stage is the phase of targeted scientific expeditions (1960-1985), during which four academic monographs were published (Karakhanyan & Safyan, 1970, Martirosyan, 1981, Martirosyan & Israelyan, 1971, Sardaryan, 2010), two articles (Ayvazyan, 1981, Barseghyan, 1966), and one book-album (Petrosyan, 2005), where the historical-comparative approach dominates. In these seven works, a total of about 2,285 drawings and 55 photographs supporting them were published (Fig. 1).

The **fourth** stage involves the creation of an electronic Map-Database of various monuments in GIS format. Currently, a simpler version operates through the 'Garmin BaseCamp' software (Fig. 2). The Database contains a vast amount of information about approximately 5,000 petroglyphs, hundreds of related archaeological sites, structures, and other cultural heritage elements in the Highland and surrounding areas, which have been photographed, published, located, and researched by me and others. Over time, other key areas of Armenian culture will be included, contributing to the resolution a number of natural science and historical-cultural problems.

The **fifth** stage is the *in situ* digital modeling of the distribution of petroglyphs and related artifacts – 3D representation in historical-environmental context[2]. A product of its time and space, this sphere of pictorial expression of the ancient intellectual field shapes a human-made cultural space, a unique sacred landscape.

Thus, the map-catalogue, created in 2000 only for petroglyphs and archaeological sites, will gradually expand into a multifaceted repository of ancient Armenian culture. As a result, a powerful tool for searching and comparing data will be created.

[2]This will make possible to see on the computer screen the environment, to study each petroglyph and each structure, to view them from all sides, heights, and distances, to take measurements and perform calculations, to plan scientific expeditions, as well as to conduct remote, virtual visits and education.

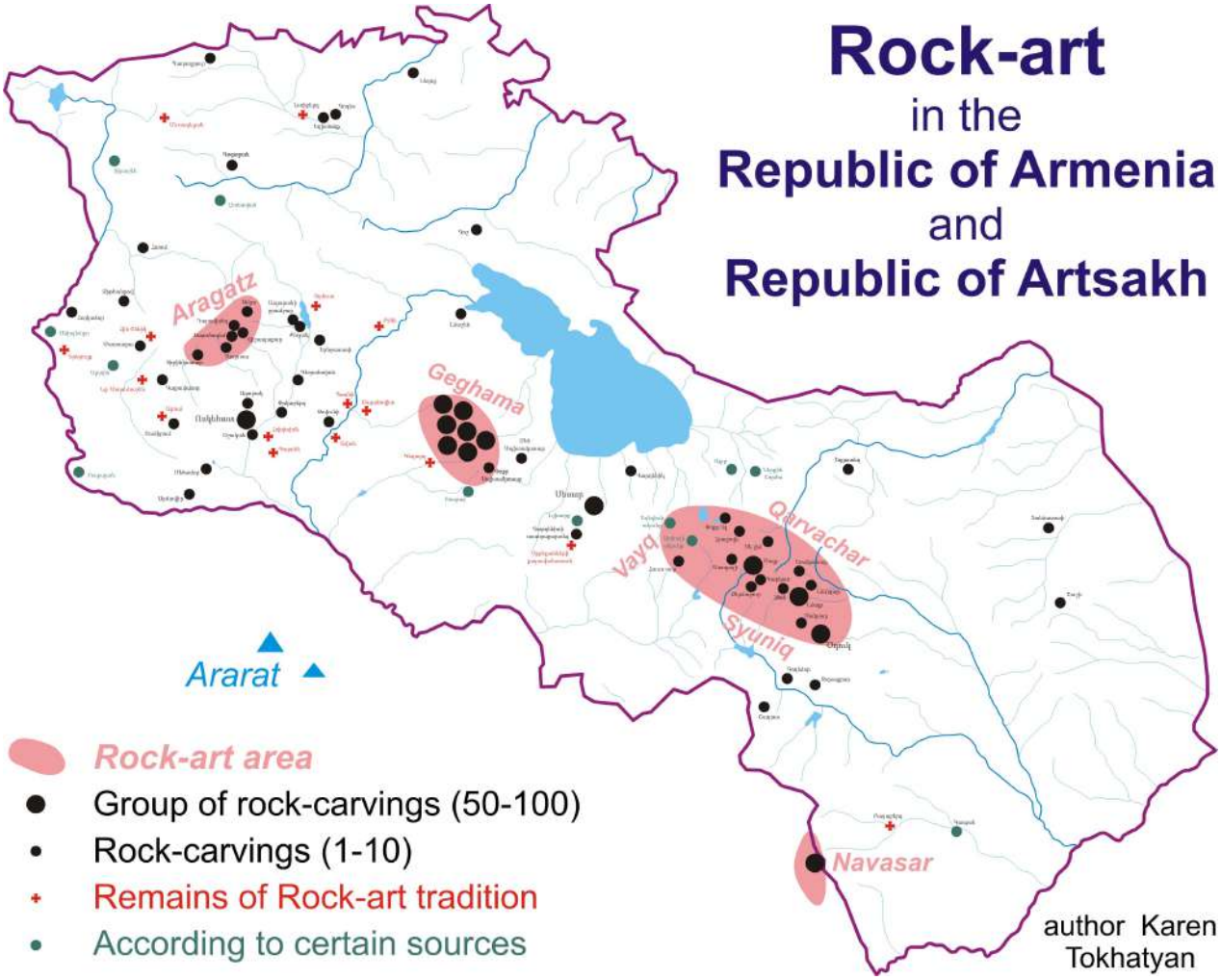

Figure 1. Map of Rock-art of the Republic of Armenia and Artsakh.

3. Map-Database Structure

Initially, it is necessary to develop a unified digital map base with an active coordinate network and a flexible scale. This map will include only the main modern orientation points: mountains, rivers, lakes, seas, settlements, borders, and administrative units. To facilitate work, it will also feature roads, mountain passes, bridges, canals, and reservoirs.

Each specialist places the exact locations and names (multilingual and of different periods)[3] of his specific sphere units on the map, attaches their photos and characteristics, indicating available reliable references. As a result, a given thematic map is formed. At first it is sufficient to have 10 map-layers: springs, mines, inhabited caves, ancient sites, fortresses, dragon-stelae, petroglyphs, religious buildings, astronomical structures, cuneiforms, etc.

Below are six main layers with their sublayers:

Topography – state, country, locality mentioned by foreign and Armenian historians and researchers, province of Greater Armenia, district, administrative unit during foreign rule, region of the Republic of Armenia, district of the Artsakh Republic, natural historical and ethno-historical region, national composition of the area and settlement, occupied part, Red Book habitats, protected area.

Geomorphology – mountain, volcano, hill, gorge, valley, glacier, large cliff, cave, lava tongue, stratigraphic section, fault, landslide, mine, powerful natural factors.

Hydrography – river, creek, brook, waterfall, spring, lake, pond, canal.

[3]Toponymes are presented in several languages: Armenian, ancient languages, Russian, English, as well as foreign language in which they were renamed or distorted. For example, Hoghaberd became Toprakkale, Navasar – Gamigaya, Gomshut – Jamushlu, Artamet – Edremit, Tandzatap – Khojalu, and so on.

Communication ways – road, mountain pass, caravanserai, bridge.

Biosphere – tree, forest, fossil, habitats of some important plants and animals (species also in Latin), animal tracks, archaeological and anthropological material.

Cultural-historical units – archaeological and ancient sites, settlement, dwelling, inhabited cave, rock-carving, religious structure (temple, church, sanctuary), cromlech, tomb, stone circle and alignment, menhir, dragon-stela, fortress, wall, cuneiform inscription, boundary stone, irrigation network, well, astronomical structure, sacred path, khachkar, tombstone, ruin, event (military campaign, march, battle), recording place of epic, folklore works, and rituals, activity area of great Armenians, hoard site, mint, lapidary inscription, treveller's way, medieval university, scriptorium, museum, etc.

4. Applications and Research Potential

Naturally, the Repository expands, encompassing the entire Armenian Highland as well as the adjacent historical and cultural territories. This will greatly contribute to shedding light on the semantic, functional, and genealogical connections, as well as potential interactions, between different eras and distant and nearby entities. The place and role of Armenian heritage in the regional context becomes even more valuable.

Any queries – searching for objects and their parameters, counting, comparing, collating, grouping – can be presented in the form of tables, diagrams, graphs, and maps, within the required time period, different spatial coverage and scales. Visualizing temporal changes in any unit will serve scientific, educational, and political purposes. For example, this can illustrate the transformation or distortion of Armenia's borders, demographic composition, and toponymes, as well as the establishment and survival of structures in any given area or over time[4].

The multi-layered map will allow for the observation of the monuments and their environment, archaeological sites, and other human-made structures, both simultaneously and through various combinations and exclusions. For example, by combining five map layers, one can see the distribution of petroglyphs and nearby ancient settlements, tombs, dragon-stelae, and water networks.

The Map-Database will also feature separate auxiliary programs. One of them will present astronomical periodic phenomena (such as sunrise, sunset, eclipses, phases of the moon, and meteor showers), along with random and rare events from the past (such as supernovae, meteorite falls, and volcanic eruptions), as well as the positions of celestial bodies in the distant past. For example, it will show which celestial body could have been observed from a given point, mountain peak, or standing stone in the past.

The diverse cultural and historical units, the products of the earliest intellectual sphere, are closely tied to the surrounding natural environment, in which they simultaneously formed human-created cultural spaces – unique sacred landscapes. The detailed recording and description of all natural and man-made elements, their presentation in a natural-historical context, and the inclusion of these data in the research process are key factors in ensuring the completeness and accuracy of the results.

5. Conclusion and Future Prospects

Modern realities and scientific advances have made the application of the latest tools and informational methods a priority. The wide application of the Database's toolkit significantly reduces the mechanical and repetitive tasks of data search and processing. Through instantaneous retrieval, calculation, statistics, grouping, and, at last, simple comparison of data, the scientist's focus is directed

[4]We can see Armenia's major archaeological sites over the past 40,000 years: a query can be made to the Map-Database to display them on the map according to settlement foundation dates. Human habitation has begun in caves, such as Aghitu-3 (39^{th} mill. BC), Kalavan-2 (35^{th} mill. BC), Getahovit (21^{st} mill. BC). By the 10^{th} – 9^{th} mill. BC, Portablur was built. In the 7^{th} – 6^{th} mill. BC, settlements Lernagog, Aratashen, Aknashen, and Masis Blur appeared in the Ararat Plain and on the slopes of the Aragats. By the 4^{th} mill. BC, sites like Gegharot and Tsaghkahovit emerged, followed by Agarak, Metsamor, and Kaqavadzor in the 3^{rd} – 2^{nd} mill. BC, while in Syunik, the settlement of Godedzor dates back to the 4^{th} mill. BC. This visualization clearly illustrates the gradual habitation of the Armenian Highland. It becomes a valuable scientific and educational tool, providing a chronological sequence that demonstrates cultural development. The same approach can be applied to track the emergence of cities, churches, roads, and other landmarks.

toward higher levels of expertise, experience, and knowledge. This, in turn, sharply increases the effectiveness of their scientific work.

The Map-Database of Ancient Culture of the Armenian Highland as a scientific research tool, which sheds light on the origins and meanings of cultural manifestations and helps uncover their connections, will make a significant contribution to solving many issues in the field of Armenian studies (for more details, see Tokhatyan (2024)).

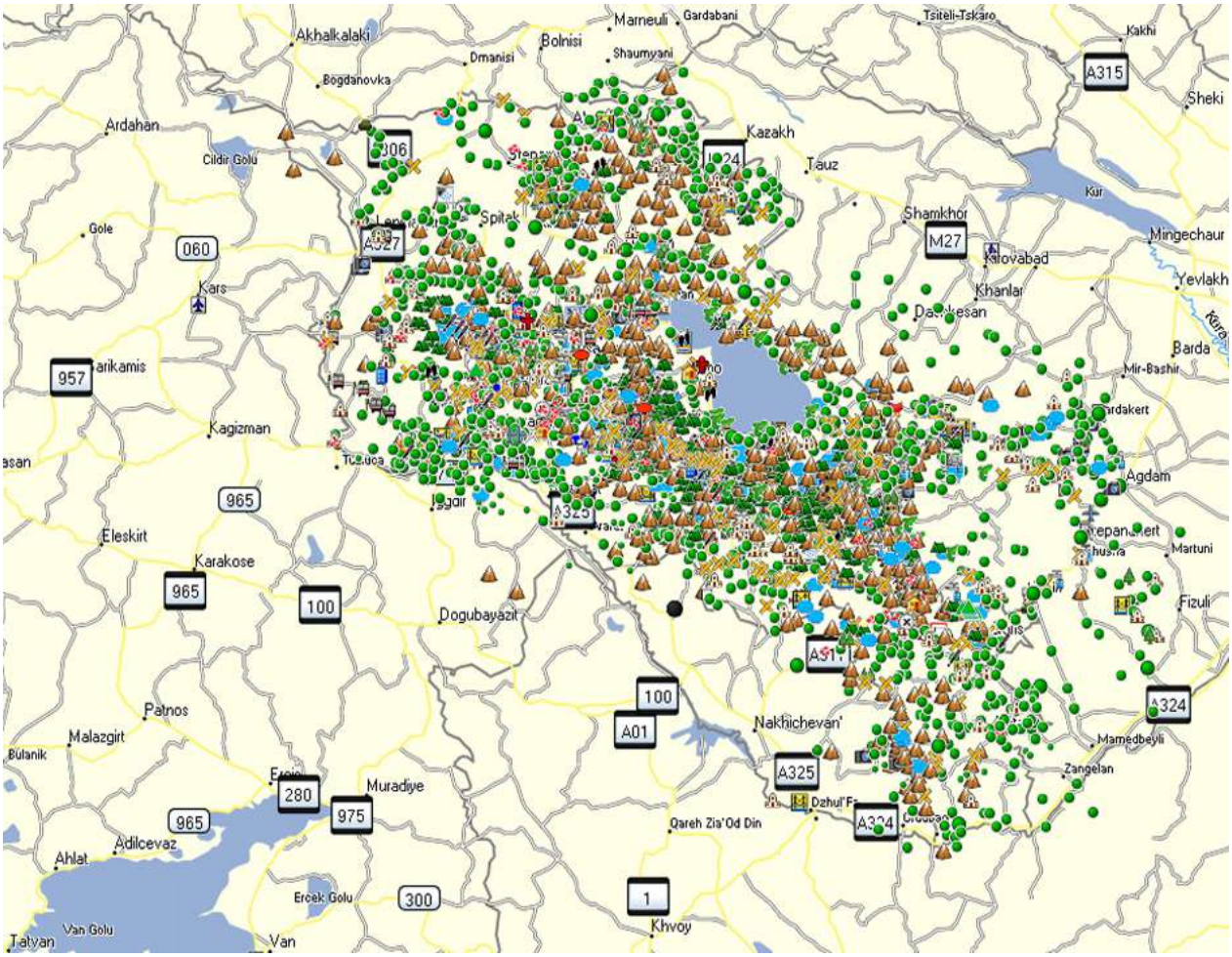

Figure 2. Map of natural and cultural-historical units of the Republic of Armenia and Artsakh.

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