

Discussion

The historical volcanoes of Armenia and adjacent areas revisited

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Abstract

This discussion paper contains the data about the active volcanoes and thermal springs in the Armenian highland, and has a aim to correct the erroneous information about active volcanism of Armenian highland in two articles by Karakhanian et al. published in previous issues of JVGR.

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The article entitled “Holocene Historical Volcanoes and Active Faults as Natural Risk Factors for Armenia and Adjacent Countries” (Karakhanian et al., 2002) contains interesting results of fieldwork and historical evidence about volcanism in Armenia and adjacent areas. Unfortunately, as a result of certain data cited and, in particular, significant inaccuracies in the analysis of these data, the authors have reached erroneous conclusions that can lead to misunderstanding on the part of the readers. Based on those incorrect conclusions, the same authors published a second article entitled “Volcanic Hazards in the Region of the Armenian Nuclear Power Plant” (Karakhanian et al., 2003), which likewise contains debatable assertions regarding the historical volcanism of the Armenian highland. Recently I saw some incorrect data on the Smithsonian Institution Website about an imaginary eruption of the Nemrut volcano in 1692 and an allegedly pyroclastic flow at the time of the eruption of the Ararat volcano in 1840 that referred to the

article by Karakhanian et al. (2002). In this way, the extent of incorrect information, which remains uncorrected, continues to grow.

Due to space limitations, I shall present below only the most significant of the inaccuracies noticed and their corrections. Inasmuch as doubt is cast without foundation upon certain results of my studies in the article by Karakhanian et al. (2002), I am furnishing the data supporting those results as well.

1. About a subaqueous volcanic eruption in Lake Van in 1650

The following is written on page 341 of Karakhanian et al. (2002): “By the data of R. Haroutiunian (Karakhanian et al., 1997), volcanic activity was observed in the Lake Van region on October 27, 1650 AD, too. However, it would be more correct to attribute the latter event to 1692.” In Appendix 1 (point 11) of this paper: “In the town of Baghesh (Lake Van), on April 13, summer 1692, sunlight dimmed ever since the morning and colored plumbeous; darkness shrouded the earth so that people could not see each other. Till the very evening, red dust had fallen to the ground and there

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was an earthquake, many settlements were ruined and many people died.” Indeed, during the course of the preparation of the 1996 article (Karakhanian et al., 1997), I had informed A. Karakhanian about certain results of my historical-volcanological research, the correspondency of the historic Bamni (Bam) volcano with the Porak volcano, and the subaqueous eruptions that occurred in Lake Van in the winter of 1111 and on October 27, 1650. While the first two conclusions were made on the basis of the reinterpretation of well-known historical evidence, the evidence concerning the 1650 eruption in the historical literature was discovered by me. Until recently (Haroutiunian, 1999, 2001), that source was known only to me and, probably for that reason, my third conclusion did not merit the fate of the previous two and was viewed with skepticism. That evidence, whose author is the writer Militon (Memory Notes, 1985), is as follows: “On Sunday, October 27, 1650, the Feast of the Apparition of the Cross, an amazing thing happened, which nobody had seen or heard before. Amazing noises were heard coming from the lake, which sounded like cannon fire. All those who heard them became uneasy, wondering about the source of those noises. Then, after a certain period of time, a resounding noise, as if emanating from a thousand mouths, was heard, which was audible at a distance of a 20–30-day journey. Then fire appeared in the lake, stones and soil flew up in the air and fell back into the water. The stones were floating on the surface of the lake. Each stone, which was the size of a human being, weighed no more than 1 hokha (about 1.35 kg or 2.75 lbs.). They were floating like mushrooms on the surface of the water. People picked them up and were surprised at how light they were. When the fire burned, a bitter smell spread all around and people held their noses; everybody’s silver ornaments turned black and the lime-covered walls turned black.” In my opinion, this is undoubtedly a description of subaqueous volcanic eruption, which unequivocally attests to the eruption that occurred on October 27, 1650.

The phenomenon that occurred in Baghesh on April 13, 1692, which Karakhanian et al. (2002) propose to substitute for the 1650 eruption, is mentioned in Appendix 1 (point 11): “In the town of Baghesh (Lake Van), on April 13, summer 1692, sunlight dimmed ever since the morning and colored plumbeous; darkness shrouded the earth so that people could not see each other. Till the very evening, red dust had fallen to the ground and there was an earthquake, many settlements were ruined and many people died.” In all probability, this does not refer to the gases and ashes that spewed forth from the Nemrut volcano located 50 km north of Baghesh, as the

authors of the article in question think. If that were the case, the dense long-lasting spilling of ashes had to be preceded by a powerful explosive eruption, about which there would have been accounts in the colophons of that time, similar to what was written concerning the eruption at Nemrut in 1441. In my opinion, the reference in the aforementioned account pertains to two events which occurred in close proximity to each other. First, the town of Baghesh (present-day Bitlis) is located on the southern slope of the Armenian (Eastern) Taurus. The darkness that enveloped the city on April 13, 1692 must have been the result of a powerful sandstorm, which had occurred in the vast Syrian–Arabian deserts located southward of the Armenian highland. Numerous such events are known to have occurred, both in the past and in the present. For example (Encyclopedia, 1958): “In March 1901, the storm that rose in the Sahara covered the city of Tunis in dust. It became dark in the city, like the night. The next day, the cyclone drove the dust to Italy, Germany and Denmark, and subsequently reddish dust reached Russia.” It should be pointed out that reddish-colored rain was observed in Armenia in the summer of last year. Second, the second event — a powerful earthquake — had taken place in the subsequent days, as a result of which many villages were destroyed and lives were lost.

2. About the Porak volcano and the imaginary tectonic earthquake

The only historical evidence concerning the natural phenomenon which occurred in 782–773 BC is contained in an excerpt from the cuneiform inscription of the Urartian King Argishti I, which is given in full in Karakhanian et al. (2002): “... when I again (for the second time) laid the siege of the town of Behoura, Mount Bamni in the area of Behoura Town was destroyed.. . smoke and soot now rise from it to the sun. When Mount Bamni was destroyed, I took the town of Behoura.” In my opinion, which was known to A. Karakhanian, the eruption of the Bamni volcano is described here, which Argishti I used to date the siege of the town of Behoura. However, as late as the mid-1990s, Karakhanian has interpreted this account as providing evidence of the destruction of the town of Behoura as a result of an earthquake with a magnitude of 7.0 (Karakhanian and Balasanian, 1994; Karakhanian et al., 1997). Accepting the fact of the eruption of the Porak volcano, he adheres to this incorrect opinion on p. 328 of Karakhanian et al. (2002): “The eruption was accompanied by the destruction of Behoura (?!-R.H.) and the death of the people who tried to escape on Mount Bamni.

In the first part of this sentence, the account of the destruction of the town of Bamni is baselessly attributed to Argishti I (see the aforementioned text). Insofar as the second part of the sentence is concerned, which is based on the cuneiform inscription of Sardouri II, it is evident that the authors of Karakhanian et al. (2002) are not familiar with the primary historical sources, since they interpret the accounts of Argishti I and Sardouri II jointly as being contemporaries. In fact, Sardouri II invaded the basin of Lake Sevan in 742–739 BC, 40 years after the invasion of Argishti I (Melikashvili, 1960). It is strange that the erroneous opinion, according to which a powerful tectonic earthquake, whose magnitude has already been re-estimated at 7.3 (p. 329 of Karakhanian et al. (2002)), had occurred in 782–773 BC, “is confirmed” by the results of the radiocarbon research done on the paleosol taken from the vicinity of the Porak volcano. I should point out that all the ^{14}C estimates in Karakhanian et al. (2002) are given with faulty time frames, which are equal to tens or hundreds of years (pp. 326, 328 and 329): 3200 ± 40 BP (GIN-9913), 6640 ± 90 BP (UPS, V/3A) or 6270 ± 110 BP (MSU-215). And only the time of the imaginary historical earthquake “is determined” with incredible absolute accuracy according with dating of the cuneiform inscription of Argishti I (p. 329 of this paper): “*It was between 782 and 773 BC*”?! The excerpt about the Bamni volcano from the cuneiform inscription of the Urartian King Sardouri II is given in full on p. 328 of Karakhanian et al. (2002): “. . . *the people who ran away frightened of the arms and climbed Mount Ishkiani and Bamni; I encircled them and killed, others who escaped were burned by Teishebah the God.*” In my opinion, which likewise was known to A. Karakhanian, this statement refers to the eruption of the Bamni volcano, as a result of which those people who had climbed its slopes lost their lives (Haroutiunian, 1999, 2001). Although the authors of Karakhanian et al. (2002) were familiar with this opinion, they nevertheless erroneously assert that Teisheba constituted the deity of an underground kingdom (p. 320), not knowing either the time of that eruption or the details of the basis for that opinion, as was revealed above. In actuality, Teisheba constitutes a deity of celestial forces (god of lightning and thunder) (Melikashvili, 1960; Hmayakian, 1990). For that reason, it seems at first glance that the cuneiform inscription describes people having been struck by a thunderbolt. However, based on my historical-volcanological studies, I have reached the conclusion that Teisheba was also the god of volcanism for the Urartians (Haroutiunian, 1999, 2001). For that very reason, I consider the aforemen-

tioned account by Sardouri II to be evidence of the second eruption of the Bamni (Bam) volcano, which occurred in 742–739 BC. Unfortunately, Karakhanian et al. (2002) have used the results of my research without delving into their essence.

3. About the Ararat volcano

Karakhanian et al. (2002) have made a greater number of mistakes in the course of their analysis of the data concerning the degree of activity of the Ararat volcano in antiquity. The following is written on p. 337: “. . . *There are some obscure indications of possible volcanic activity on Ararat in the first half of the 2nd century AD and late 3rd-early 4th century AD by Armenian chroniclers and historians (Movses Khorenatsi, 1990; Aghatangelos, 1983; Alishan, 1890).*” Indeed, there is a legend mentioned in History of Armenia by Khorenatsi (Movses Khorenatsi, 1990), which describes the birth of the god Vahagn from the erupting fire and smoke; Aghatangelos, in turn, (Aghatangelos, 1983) gives information on the first Christian traditions (p. 240, Appendix 1, point 3 of Karakhanian et al. (2002)). As the 19th-century Armenian historian Ghevond Alishan (Appendix 1, point 4 of Karakhanian et al. (2002)) has correctly interpreted, these topics merely attest to the fact that the pagan ancestors of the Armenians saw volcanic eruptions and their legends concerning those eruptions were later reflected in the traditions of the early Christians. It is absolutely incomprehensible as to why Karakhanian et al. (2002) date these undated and vague mentions “*the first half of the 2nd century AD and late 3rd-early 4th century AD*” and attribute them to Ararat volcano (p. 242, Appendix 2, point 6 of Karakhanian et al. (2002))?!

As a result of the incorrect analysis of the data concerning the eruption of the Ararat volcano having occurred on July 2, 1840, which is presented in Karakhanian et al. (2002), that event is presented in a very distorted manner. Moreover, the determination of the location of the northeastern slope of Ararat, as well as the volcanic process and its consequences, particularly the formation of mudslides down the volcano’s slope and a allegedly pyroclastic flow, have also been distorted. I have examined all these distortions in detail in a separate article (Haroutiunian, 2005).

4. About the connection between tectonic earthquakes and volcanic eruptions

Karakhanian et al. (2002) assert, “*In many cases, historical volcanic activity coincided with strong*

earthquakes in time and place.” Furthermore, in Appendix 2, they present data that allegedly confirm this supposition of theirs. It has been known for a long time that there is no connection between tectonic earthquakes and volcanic eruptions, except for isolated occurrences (Verhoogen et al., 1974). The eruption of the Ararat volcano on July 2, 1840 constitutes one of those singular occurrences (Haroutiunian, 1999, 2001, 2005). In order to accept the thesis that any volcanic eruption is caused by tectonic earthquakes, irrefutable proofs are required that a definite time connection exists between those events (Tazieff, 1962). On this basis, no statement about a “volcanic eruption–tectonic earthquake” combination having occurred in historic times (Appendix 1, also mentioned in Appendix 2) (with the exception of the eruption of Ararat in 1840) can be considered accurate. In this instance, discussion is superfluous of events having occurred prior to the advent of written history, which likewise are mentioned in Appendix 2 and for which time is estimated approximately at best, accurate only within a few dozen years or even centuries?!

5. About the temperature of the thermal springs in Armenia

Without any references, it is written on page 320 of Karakhanian et al. (2002): “Many thermal springs with surface temperature of 60–80 °C are found within a radius of 40–40 km (Vorotan, Jermouk, Histissou).” On page 325, in turn, it is asserted, “Thermal sources of Jermouk and Histissou (65 °C).” One may conclude from the facts cited that the temperature of the waters of the thermal springs of Jermouk and Histissou at natural exits reaches 65 °C, while that of Vorotan reaches 80 °C. In actuality, there is no thermal spring in the present-day territory of Armenia whose surface temperature exceeds 60 °C. Histissou’s is 59 °C; that of Jermouk is 51 °C, while Vorotan’s is only 22 °C (Barabanov, 1961). The temperature of the waters measure higher than 60 °C only in the boreholes.

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