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Mission Statement

The UIS Commission on Volcanic Caves encourages exploration and scientific investigation of volcanic caves, and hosts the International Symposium on Vulcanospeleology about every two years.

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Shemysag Cave, China
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OUTSTANDING PREHISTORIC ARCHAEOLOGICAL VALUE OF LAVA CAVES IN KRONGNO DISTRICT, DAK NONG PROVINCE, VIETNAM

1. Introduction
The year 2007 was considered as the important milestone in the history of lava cave studying in Vietnam, when La The Phuc first time discovered and recognized lava cave in Krongno area as a geological heritage, in the frame of the project “Investigation and research of geological heritage to build a geopark and environmental protection in the Trinh Nu waterfall area, CuJut district, Dak Nong province, Vietnam”, funded by UNESCO (2007-2008) [3;4;5;6;10]. The results of scientific research cooperation projects between Vietnamese scientists – leading by La The Phuc - and the members of the NPO Volcano Speleological Society of Japan – leading by H. Tachiha and T. Honda - have discovered and surveyed 48 lava caves, in which 20 caves have been mapped. The Krongno lava cave system has been evaluated and recognized as the largest and most unique volcanic cave system in Southeast Asia. The initial research results on the volcanic caves in the studied area show that their heritage potential is very large in three fields: geology, biology and culture – archaeology [2;8;13;14;15;16].

Geologically, all of the volcanic caves have endogenous origin, meanwhile almost cave entrances are secondary formations, created by their roof collapse. The interior formations of the volcanic caves are rich and diverse in types. They are scientific evidences for the cave formation mechanism, reflect the processes of lava flowing in the tube caves, interaction between different lava flows, between earlier lava flows and the later ones, between lava flows and lava cave environment as well [8].
Several animals, such as bats, snakes, frogs, scorpions, spiders and snails, including new and endemic species, have been found in lava caves in Krongno. Source: TN17/T06 project.

Biologically, there are many species of bat, snake, frog, insect and microorganism found living in these caves. Of these, some new and endemic species are only found in the Krongno volcanic cave system.
2. Outstanding prehistoric archaeological value of lava cave in Krongno area

In terms of culture - archaeology, the Krongno volcanic caves were investigated in 2017, in the frame of the Institution-level scientific projects of the Vietnam National Museum of Nature and urgent task of Vietnam Academy of Science and Technology. It was the first time, many valuable prehistoric archaeological remains have been revealed in the lava caves in Krongno. The artefacts collected from the cave floor and in a shallow and small pit in C6.1 are quite plenty and diverse, including: stone tools, pottery, animal bones and teeth, shells of different mollusc types, but human bone/skeleton and marine mollusc shells have not been discovered yet [7:9;11;12].

Pottery pieces and stone tools collected in C6.1 lava cave floor and in the excavated test pit in 2017. Source: TN17/T06 project

In the beginning of 2018, also in the frame of the TN17/T06 project, the Vietnam National Museum of Nature’s scientists - leading by La The Phuc - in collaboration with Vietnamese archaeologists - leading by Nguyen Khac Su - have successfully excavated the prehistoric archaeological sites at C6’ and C6-1 caves.
The results of the excavations have revealed many unique archaeological structures such as kitchen, kitchen waste pit, rounded stone structure, etc. Also, dozens of thousands of artefacts have been collected, including stone tools, bones and teeth of many different animal species. Especially, three skeletons of prehistoric men have been excavated at the NE entrance of the C6.1 lava cave. The new discovery makes most scientists feel surprised and shocked because animal bones and human skeletons haven’t ever been found in hundreds of the archaeological sites, those excavated before due to very thick weathering layer in The Central Highlands [1;17].

Preliminary excavation results were successful beyond expectation: the culture layer in the excavation pit (1.85m deep) is thickest of all archaeological sites excavated in The Central Highlands. Dozens of thousands of artefacts in the diverse archaeological relics have been collected, reflecting the long-term residence and temporary hunting sites of prehistoric people there. The three human skeletons in the C6.1 lava cave excavation pit have proved the burial relics (the way of burying the dead) of prehistoric people. Five ground marine mollusc shells have been collected, proved the interaction between local prehistoric people with the prehistoric marine ones. The results of the radiocarbon dating of the 14 charcoal samples collected from the excavation pit in the C6.1 lava cave show around 7,000 to 3,000 BP, equivalent to the Early Neolithic to the Early Metal [9;17].

In the most recent excavation of the project TN17/T06, conducted in March 2019, the earlier C6.1 excavation pit has been expanded wider and deeper. Besides many other important artefacts, another two ancient human skeletons have been excavated. They all are continuing to be researched in many fields, with traditional as well as modern methods to clarify the relationship between prehistoric residents in the past and modern people in the Central Highlands, Vietnam and Southeast Asia as well.
Lava shelf suspended on the wall of the NW entrance of the C6.1 lava cave. Photo: Luong Thi Tuat

The C6.1 excavation pit in the NE entrance of the C6.1 lava cave. Source: TN17/T06 project

Fresh-water snail shells in the C6.1 excavation pit in 2018. Source: TN17/T06 project

Five ground marine snail shells have been found in the C6.1 excavation pit in 2018. Source: TN17/T06 project.

Biface hand axe in the C6.1 excavation pit in 2018. Source: TN17/T06

Fish backbone in the excavation pit in the C6.1 lava cave in 2018. Source: TN17/T06 project

Bivalve shells in the C6.1 excavation pit in 2018. Source: TN17/T06 project.
3. Conclusion

As the most important and key/pillar heritage of Krongno Volcano Geopark, that now has been renamed Dak Nong Geopark, lava caves in Krongno area contain both natural and cultural heritage values: geological heritage, biological diversity as well as archaeological values.

Archaeological sites in the Krongno lava caves contain residence evidences of prehistoric people lived there. Especially, their skeletons firstly have been discovered in right the lava cave. The important discovery has recognized a new form of residence and ways of adaptation of the ancient people in The Central Highlands of Vietnam. The results of the C6.1 excavation clearly show the living of people, who occupied and owned the Krongno volcanic region, dated back to around 7,000 – 4,000 BP. These results make great contributions to understanding of regional history, exhibitions, conservation and tourism. In order to use these values efficiently, excavation and in-situ conservation should be considered as the best possible/optimal method, which might be applied to other sites as well.

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References


The Jingpohu Global Geopark in Heilongjiang province is formed by volcanic rocks and is situated about 110 km south of Mudanjiang city. The volcanic zone is situated along the important NE-striking Dunhua-Mishan fault at the eastern margin of the Eurasian Plate. Approximately 500 km² of lava were emitted in several Pliocene-Holocene eruptive phases between 780,000 and 2,500 years ago by 16 local craters, 4 of which are accessible to visitors in the Crater National Forest Park at an elevation of about 1,070 m a.s.l. in the NW corner of the park, also known as the “Underground Forest”. The latter craters are the source of the lava that has travelled down a 60 km long tributary valley towards the Mudanjiang river in the SE and has finally blocked the river forming the famous Diaosuiliou waterfall, now being part of the touristic attractions of the Geopark.