Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

HQR23-07 Room:414 Time:May 1 10:30-10:45

Discovery of fresh water diatom from aeolian sediments in the conical pit structure in the Arsanjan area, south Iran

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It is well known that the life of ancient people was greatly influenced by various natural conditions, such as climate, topography, and geology. In particular, geology is not only important as a source of raw material for stone tools and residence construction material, but also as a provider of groundwater and mineral resources. Furthermore, soil is generated from weathered bedrocks, and soil is a key influence on vegetation. Thus, when ancient people considered the natural conditions for first settlement locations, geology would have been a crucial factor in these conditions. The present paper offers a preliminary examination of interaction of the humankind - Iranian Zagros Mountains.

One of the most important discoveries among the humankind studies was the existence of many Middle Paleolithic and Epi-Paleolithic cave sites in the Arsanjan area, south Iran. One of the caves, named A5-3 (Qar-e Tang Sikan), produced a large amount of Middle to Epi-Paleolithic stone implements. Thus the Arsanjan area is one of the most suitable areas for the study of human evolution and cultural transition from the Middle/Late Paleolithic to the Epi-Paleolithic/Neolithic periods. This means that the investigation of this area can possibly provide opportunity for the better understanding of the evolution of modern Homo sapiens and of the interface of geology-archaeology.

We accomplished the trench survey recently. The results of B3 trench survey (4 X 4 m square) at A5-3 (Qar-e Tang Sikan) are as follows (Hisada and Tsuneki, 2013). The culture layers are divided into ten layers. Layers 1 to 3 correspond with Late Paleolithic to Proto Neolithic. Six samples from layers 2 and 3 indicate approximate 36,000 BP. Layers 4 to 10 are included into Middle Paleolithic culture layers. It is noteworthy that structure 3 was discovered from layer 7. Structure 3 presents a circular from on plan, 1 m in long axis and 0.7 m in short axis. In profile, it is conical and depth is about 50 m. Cave limestone bedrock is used as a bottom wall of the conical shape, and concrete-like harden wall with pebbles and clays is used as the other one. The concrete-like wall might be built after cutting soil surface. The filling of the conical shape structure is light orange color clay, 50 cm in thickness. This clay presents a bimodal pattern, 5 phi and 11 phi in grain size analysis, and consists of quarts, muscovite and hydroxylapatite. The color of the clay is characteristics (10YR7/6, 6/6 etc) and conspicuous from other soil. Based on the color and clay-seized sediments, it can be concluded that they are aeolian sediments. This conical structure may be intended to be a water-reserved place keeping water oozed from the limestone wall (Hisada and Tsuneki, 2013). Thus, the clay might be deposited in this conical pit, 50 cm deep. This laying down at the pit seems to be prevented from erosion and transportation because the pit was full of water. Very recently, it is clarified that clay bed yields diatom, Pinnularia spp.. This genus indicates a living in fresh water (Watanabe et al., 2005). The ages for layer 7 are inferred before 51,000 BP, because layer 5 is dated as 50±2Ka and the ages for the boundary between layers 6 and 7 are 51±2Ka based on the photoluminescence measurement (Ito, in pers. comm.).

Keywords: West Asia, Paleolithic ages, Iran, water-reserved place