

80,000-60,000 BP aeolian sediments and raw materials for stone tools from A5-3 limestone cave at Arsanjan, South Iran

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Six layers were confirmed through the E5 trench survey (4 X 4 m square), Arsanjan, south Iran. Layers 1 to 3 yielded more than 6,000 pieces of chipped stone, whose majority are flint. They may belong to culture layers of Late Paleolithic to Proto-Neolithic periods. Addition to these, more than 1000 pieces of animal bones in smaller size were found. Layer 4 yielded more than 100 and several tens pieces of flint chipped stones and more than 300 and several tens pieces of animal bones. Among them, Middle Paleolithic artifacts including Levallois flakes were also discovered, and layer 4 belongs to Middle Paleolithic culture layer. Five hearths, nearly located each other, were excavated from layer 4, each hearth ranges from 0.3 m to 0.5 m in diameters. Middle Paleolithic flint chipped stones were found from layers 5 and 6. The 14C of five samples from layer 2 indicates approximate 26,000 BP. Samples from below layer 2 exceeds limit of 14C age determination and dated as earlier than 43,000 BP.

The results of B3 trench survey (4 X 4 m square) are now reviewing. The culture layers are divided into ten layers. Layers 1 to 3 correspond with layers 1 to 3 at E5 trench and belong to 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 structures 1 and 3 were discovered from layers 6 and 7, respectively. Structure 3 presents a circular form on plan, 1 m in long axis and 0.7 m in short axis. In profile, it is conical and depth is about 50 cm. 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 phai and 11 phai 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 sediments attain to approximate 30 cm in thickness in structure 3. The use aim is unsettled as far. This conical structure may be intended to be a water-reserved place keeping water oozed from the limestone wall. Thus, the clay might be deposited in this 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. On the other hand, structure 1 presents oval shape on plan, 1.25 m in long axis and 0.75 m in short axis, and 0.15 m in depth. The same clay, a few centimeters thick, was also found at the basal part in structure 1. This clay bed is similar to the grain size and color as those of structure 3, and is probably aeolian in origin. It, however, is unsolved whether this structure was used as a watering place or not. The ages for these layers 6 and 7 are inferred 60,000 to 80,000 BP based on the artifact study.

The major lithology of chipped stones from both trenches is radiolarite. It proves from our geological mapping that radiolarite is widely distributed in the Dalnesin valley where A5-3 cave is located. In addition, the outcrop presenting the similar lithology and color to an artifact from A5-3 site was confirmed in the Dalnesin valley. The distance between A5-3 cave and the outcrop is about 4 km. The radiolarite is making a gentle topography, and the access to there is so easy. Thus, the exposure of radiolarite could be an appropriate place for collecting raw materials for artifacts. In conclusion, Arsanjan is gifted with supply of excellent raw materials.

Keywords: Iran, artifact, radiolarite, watering place, aeolian, cave