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Role of Tectonics in Forming of the Kalahrood Cave, North Isfahan, Iran

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Caves are perhaps the most spectacular examples of the combined effects of weathering and erosion by groundwater. As groundwater percolate through carbonate rocks, it dissolves and enlarges fractures and openings to form a complex interconnecting system of crevices, caves, caverns and underground streams. Caves and caverns form as a result of the dissolution of carbonate rocks by weakly acidic groundwater. Groundwater percolating through the zone of aeration slowly dissolves the carbonate rock and enlarges its fractures and bedding planes. During dissolving and deposition of calcite, many various dripstone deposits, stalactite and stalagmite structures form.
There are many caves in Iran that have formed with the above procedure. Opposite of the procedure, the Kalahrood Cave, in the north of Isfahan has another scenario for its forming. The cave located in southwestern boundary of high mountains of the Urumieh-Dokhtar Magmatic Belt of Central Iran. It has formed in Lower Cretaceous grey limestones. There are many NW-SE-trending faults in the study area. The faults have thrust and dextral strike-slip motions. The Kalahrood cave formed in footwall of the Kalahrood thrust. Structural studies and filed observations in the Kalahrood area and in the cave indicated that the Kalahrood cave has formed during thrusting and dropping the cave roof in footwall and littering the floor with fallen debris. We have considered three episodes for forming the Kalahrood cave: 1- Thrusting and motion of hangingwall. There are many traces of faulting on the walls and roofs of the cave. 2- Dropping of crushed rocks and separated blocks of the roof in footwall and creating the cave space. Maximum distance between floor and roof has measured about 15 m. 3- Affect of groundwater on the rock units and increase of disbandment and enlarging the fractures. Some small stalagmite and stalactite structures have formed in internal part of the cave.