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Origin of caves and notches observed on the Antalya Tufa Cliffs

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This study aims the investigation of caves and notches observed on the Antalya tufa cliffs from the geological, biological and morphological points of view. Through observations, sampling and measurements on the 13 km long Antalya cliffs, geological and biological definitions have been made. Through topographical surveys morphology of caves have been determined. The caves on Antalya tufa cliffs are of three origin; 1) The sea caves occurred due to wave action on weak parts of the tufa, 2) The flank margin caves occurred due to mixing corrosion, 3) The caves occurred as blind holes behind tufa curtains which deposited on tufa cascade environment of deposition. In this study more attention has been paid on porosity development and related cave formation due to mixing corrosion. The mixing corrosion is a process in which mixed water dissolves calcium carbonate rock where groundwater and sea water interfere. Cavities which occur in this process can join together and form big chambers. When rock load on this chambers exceeds rocks strength, the roof may collapse and fall into the chamber. This fallen block is also subject to further dissolution resulting in enlargement of the cave. The idea that the flank margin caves have been formed on Antalya cliffs due to mixing corrosion have been proven making in-situ water chemistry tests. Entrances of the caves on the cliffs are concentrated between present sea level and 5 m below this level. Similarly, on the sea level caves depth of the caves is around 5 m. Starting from a time of constant sea level, and following sea level rise, mixing corrosion and flank margin cave development should have been continued. Formation of notches on the Antalya tufa cliffs should have been affected by wave direction, wave force, rock strength and bioerosion-bioconstruction. From the biological point of view, rocks on the notches and caves serve as substrate for various organisms. Especially notches are the places where covering organisms live intensely. Bioconstruction/bioerosion effects of organisms that live on tufa substrate cannot be avoided. However, comparing with the other effects this effect is said to be negligible.

Key Words: Antalya tufa, Biology, Cave, Cliff, Geology, Notch.