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Speleothem conglomeration in a pliocene lake, nw turkey: an indication of a catastrophic event

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Limestone and dolomitic rock masses are known to host the great majority of karstic caves owing to their large extension as well as their susceptibility to karstification compared to other karstifable rocks. Excluding evaporitic rocks, caves are also known to develop in other carbonate rocks such as marble, conglomerates comprising carbonate gravels and travertine. During an expedition campaigned in summer of 2002, the authors explored an open, palaeo–cave in a *calcareous mass* in a site within the province of Bilecik which is characterized by dissected-relict karst owing to the neotectonic evolution and the coeval palaeogeographic evolution of this part of Turkey. The mass is composed of a lithology which is distinct by its components and texture from all of the above-mentioned common carbonate rocks. It is made of a conglomeration of speleothem of various sizes. This conglomeration takes place within a Pliocene lacustrine marly unit, indicating a paleolake that has a limited extension around Akköy village of Bilecik. Toward northwest of the paleolake, the rock mass changes to have a character of conglomeration of speleothems broken from formerly developed caves and brought and deposited in the paleo-lake. Stalagtites, stalagmites and flowstones can easily be recognized within the conglomeration. The reworked speleothems have built a mass that is suitable for karstification. In addition to the mineralogical properties of the components, conglomeration has a texture that favors karstification. A paleo-cave that has been developed within this conglomeration was identified and surveyed. Within this conglomeration a palaeo-cave was identified and surveyed. A U-shaped valley, with vertical side walls and narrower tributaries with the same shape, suggested the existence of a palaeo-cave system whose roof was broken down and

washed away. Moreover the upstream part of the main palaeo-cave passage ends in a narrow, steep gorge indicating a palaeo-sinkhole. The downstream part of the cave is completely destroyed and removed by later events. In this paper, the authors discuss the formation of the speleothem conglomeration in a paleolake, development and later destruction of the paleocave from the standpoint of changes in paleo-environmental conditions. The authors suggest that it is possible to define at least three major abrupt environmental changes in a period from Late Pliocene to Early Holocene based upon the karst geomorphological indications: The first major change is caused by a flooding triggered most probably by a strong seismic event which destroyed the well-developed pre-Pliocene karst. A significant uplift accompanied by a rapid redirection and incision of the drainage network as the second major change, resulted in drying up of the Pliocene lake. And the last major change was defined as the mass wasting associated with either a further down-cutting or another seismic activity toward the end of Pleistocene or Early Holocene, which destroyed the cave developed within the speleothem conglomeration and turned it into an open valley network.