



FLOWSTONE IN OPEN FRACTURES WITH REGARD TO THE TECTONICS OF THE DEAD SEA - JORDAN RIVER RIFT VALLEY



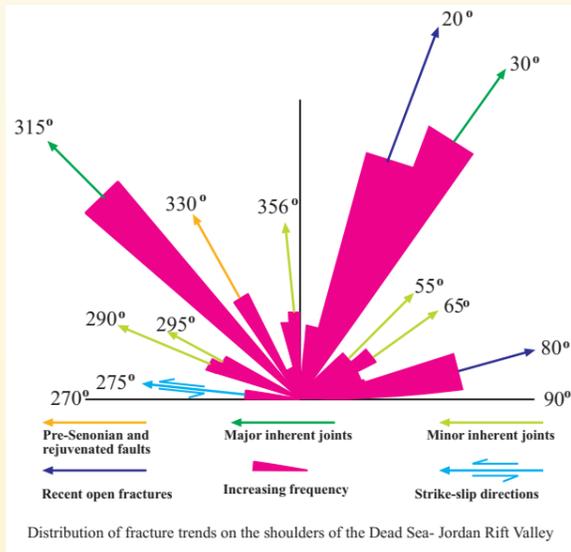
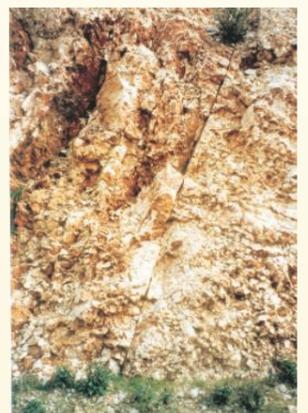
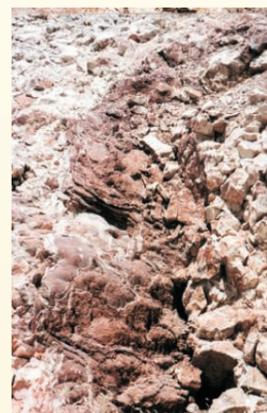
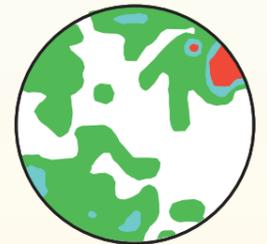
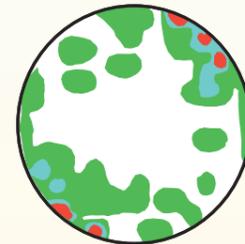
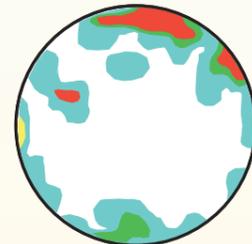
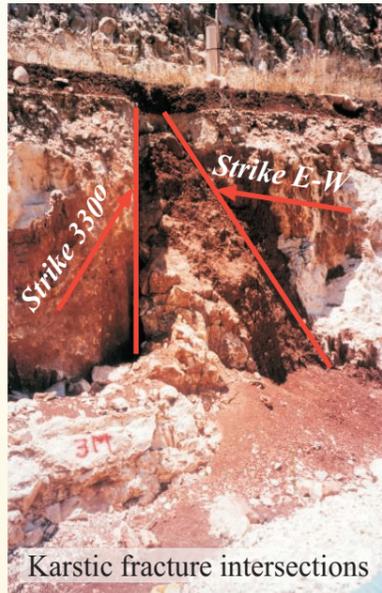
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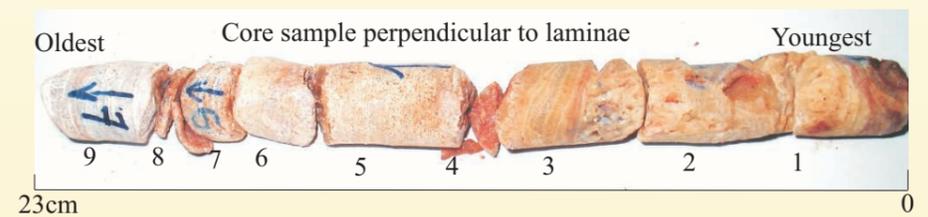
Geological Survey of Israel

Fractures with associated karstic features are common in dolomite and limestone of Eocene and Cretaceous age in Israel. The surface expression of these phenomena is not obvious and often only recognized as morphologically negative linear or circular features. Karst development is seen to proceed along undulating or irregular fractures with solution increasing with depth. The vertical or near vertical fractures tend to form bell-type cavities and caves at intersections at depth. They are generally only exposed in excavations and road cuts.

Fractures in this context are considered to be linear breaks or discontinuities in the rock mass originating from a compressional or tensional regime. The open fractures are indicative of an active tensional stress regime such as that found along the shoulders of the Dead Sea-Jordan River Rift Valley in a zone several kilometers wide. Three main groups of fractures are identified - straight, undulating and irregular. The flowstone also forms stalactites and curtains, of various sizes similar to those found in caves. The most common trend is NNE-SSW with the irregular fractures showing a general NS trend.



The present study is based on examining the flowstone in these open fractures and dating the laminae, to assess the rate of accumulation and relevance to tectonic or climatic events that affected the region. Dating of sampled lamina is carried out using $^{230}\text{Th}/^{234}\text{U}$ a-method and MC-ICP-MS ages. Preliminary ages are: The oldest dates that occur along the footwall of the fractures are greater than 400kyr. Younger laminae towards the center of the fracture are dated as 200kyr and 100kyr.



The formation of calcite lamina by percolating water is dependent on tectonic events, which influence runoff and flow paths. The establishment of a chronological order of deposition of the calcite lamina can shed light on the rate of opening of fractures and the tectonic movements arising from the associated tensional regime.

Calcite lamina appear in cycles extending from the limestone footwall towards the center of the open fracture. Each cycle represents a pulse of calcite deposition that ends with a red staining of Terra Rosa soil washed down the fracture. Lamina cycles differ in thickness representing the length of time of the pulse of flowstone deposition.

