



Origin and dust distribution during glacials and interglacials in the Eastern Mediterranean: the speleothems record

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The Eastern Mediterranean (EM) region is located in a zone that receives most of its rainfall from Atlantic-Mediterranean fronts; however the origin of the dust supply is not clear. North and central Israel are located within the Semi-Mediterranean climatic zone but southern Israel is part of the northern Saharo-Arabian Desert. Strontium isotopic records of speleothems from caves located along the present-day climate gradient (from more than 800 mm to less than 50 mm of annual rainfall), at different elevations and distance from the EM Sea, enable us to reconstruct the origin and timing of dust distribution in the EM region.

The range of $^{87}\text{Sr}/^{86}\text{Sr}$ in speleothems is from ~ 0.7076 to ~ 0.7087 . Three main sources for Sr were identified: Sr that originated from weathering of Upper Cretaceous carbonate host rock ($^{87}\text{Sr}/^{86}\text{Sr}$ values ~ 0.7075), Sr of marine origin carried by sea spray (0.7092), and Sr carried by dust, most probably originating from nearby local loess deposits (~ 0.7085).

Rainfall in the EM was dramatically enhanced during periods of sapropel accumulation in the EM Sea and resulted in increased weathering on land. As a result, speleothems in central and northern Israel which formed during MIS 5e, 5c, 5a and at the beginning of the Holocene have the lowest $^{87}\text{Sr}/^{86}\text{Sr}$ values (0.7076-0.7078) similar to those of the host-rock. During the last glacial maximum, the values increased to ~ 0.7085 . This value is typical to speleothems from central and northern Israel, and also to speleothems located in southern Israel. We suggest that due to the sharp sea level drop during glacials, a much wider continental shelf was exposed, mainly in the

south, where the EM coast line changed its direction from N-S to E-W. The spread of aeolian dust reached the central and northern parts of the Israel. In caves that are located in close proximity to the Mediterranean coast line, $^{87}\text{Sr}/^{86}\text{Sr}$ values are even higher (0.7086-0.7087), suggesting major contribution of sea-spray.