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Sr-rich Aragonite in eastern Mediterranean Sapropel S1 Sediments

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Increased Sr/Ca ratios occur associated with aragonite in sapropel S1 sediments of a box core transect from ∼650 to 2100 m water depth. The aragonite content and Sr/Ca ratios in the S1 sediments are decreasing with increasing water depth and are on average distinctly higher than the levels observed in the deep basin. SEM observation and electron-microprobe analyses of selected samples from the oxidized and residual S1 of the shallowest and one deeper core show that the particles that are morphologically aragonite and contain the highest Sr/Ca ratio are similar to skeleton fragments of the green alga Halimeda. Thus, these fragments, produced in shallow water depth (to 150 m) are typically biogenic in origin but are thought to be introduced as detritus to the deep sediments. In view of the major amount of aragonite of up to 40%, authigenic precipitation is unlikely to be the major cause for their formation because sulfate reduction under normal marine conditions is not sufficient to produce such amount of calcium carbonate. The general warming trend in combination with enhanced precipitation usually reported associated to sapropel S1 formation might have lead to increased Halimeda growth in the coastal zone being ‘washed’ into more coast-remote areas. Subsequent disintegration and faecal pellet formation has resulted in their deposition into the deeper basin. Consequently, an aragonite content and Sr/Ca ratio distribution in relation to distance to the shelf and to water depth is observed.