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Aragonite Sea II-Calcite Sea II transition: insights from geochemical characterization of post-end-Triassic Mass Extinction oolites at Wadi Milaha, Musandam Peninsula, United Arab Emirates.

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The deposition of ooids is atypically high in the direct aftermath of major extinction events, including the ETME (end-Triassic Mass Extinction). Ooids are nowadays considered a powerful tool to investigate the original chemical composition of the oceans where they formed, along the margins of carbonate platforms. Here we present geochemical aspects for post-ETME ooids and other kinds of coated grains as part of a mid-Norian-Hettangian section from the Emirates and two shorter coeval sections that span through the ETME interval. We traced different assemblages of post-extinction ooids and coated grains. The ooids show high variability in size, development and crystal arrangement of the cortex. Bulk isotopic analyses for $\delta^{13}C_{carb}$ and $\delta^{18}O_{carb}$ were performed on different components of post-ETME oolitic samples (coated grains, matrix and cement), to be compared with the general mid-Norian-Hettangian trend. We used a multi-technique approach combining LA-ICP-MS, SEM imaging, elemental mapping with EDS and EBSD to inquire the large uncertainty on the time location of Aragonite Sea II-Calcite Sea II transition and to investigate environmental factors connected to global perturbations that followed the emplacement of the Central Atlantic Magmatic Province (CAMP), as trigger of the ETME. Our dataset supports low-Mg calcite as original mineralogy of the ooids/coated grains in a time interval previously defined as an Aragonite II Sea. This has major implication on the understanding of the carbonate saturation in the oceans just after the mass extinction and on the interpretation of several proxies as the C and Ca isotope-system. In addition, further geochemical results highlight the presence of dysoxic conditions in the marine water, an increase in soil erosion and upwelling of deeper water enriched in nutrients traced by a major input of P, ΣREE+Y and detrital elements (Al, Ti) in the key stratigraphical interval with the best developed and highly diverse ooids. The upwelling of nutrients-rich deeper water proves essential for the accretion of well-developed ooids.