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ABSTRACT BOOK

Mercury and phosphorus fluctuations across the Oceanic Anoxic Event-2 in the Tethyan shallow water carbonate platforms

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The Cenomanian–Turonian Oceanic Anoxic Event 2 (ca. 94 Ma; OAE-2) represents one of the largest short-term perturbations of the global carbon cycle, associated with extensive deposition of organic carbon-rich levels (black shales) in ocean basins around the world, and with major changes in geochemical cycles and biological turnovers. Several triggering mechanisms have been proposed, ranging from increased oceanic/atmospheric pCO_2 resulting from the emplacement of large igneous provinces (LIP) to increased nutrient inputs to surface waters from continental sources. Volcanoes are a primary source of mercury (Hg) to the global oceanic-atmospheric system. Recently, analyses of mercury concentration recorded in cretaceous carbonates have shown to be a robust proxy for ancient volcanic episodes.
On the other hand, an intensified hydrological cycle and a consequent increase in continental weathering is thought to have fueled the high marine primary productivity associated to the deposition of black shales at many locations during the OAE-2. Among the essential nutrients for primary productivity, phosphorus (P) is of particular interest, given its role as a limiting nutrient on geologic time scale.
To date, most of the geochemical Hg and P data dealing with OAE-2 come from deep-water carbonate successions, whereas the shallow-water carbonate counterparts have been much less investigated. Furthermore, detailed P and Hg concentration records encompassing the entire OAE-2 interval are scarce.
Here, we present new Hg and P analyses, together with sedimentological and stable isotopes (C and O) data, from well-exposed Tethyan shallow water carbonates sections, across the OAE-2. Biostratigraphy and carbon-isotope stratigraphy were used to establish a precise stratigraphic framework and for high-resolution correlations. Results show that all platforms experienced significant Hg and P variations, which can be correlated among the different locations. A marked positive shift in concentrations of both elements is observed straggling the onset of OAE-2. Finally, the high-resolution stratigraphic framework established in this study allowed to compare shallow water record with the deep marine one providing important insights for understanding how global environmental and oceanographic perturbations caused by OAE-2 affected shallow-water settings and at which temporal scale.