



Cadmium enrichments in Jurassic carbonates: towards the causes and mechanisms

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Cadmium (Cd) enrichments in Jurassic shallow-water calcareous rocks are related to (1) important biological activity and organic matter production; and (2) the quantity of Cd available in seawater. In dynamic sedimentary environments on the carbonate platform, organic matter was trapped by rapid, episodic deposition of sediment bodies and the consequent establishment of reducing conditions in the uppermost part of deposits associated with organic matter degradation. In those early diagenetic environments, Cd becomes desorbed and transferred partly into sulphuric phases and partly into surrounding carbonate grains. Calcareous ooids may also be directly enriched in Cd by sequestration of this element within the layers of organic matter associated with the ooid cortex. Cd enrichments in lagoonal environments are proposed to be related to microbial activity, via micritisation and/or by direct bioconcentration in carbonate phases.

The Cd enrichments in Jurassic carbonates are likely to be linked to general environment change, and especially to intense volcanic processes, which may have led to an increase in the availability of Cd in the environment. Volcanic processes may explain both the unusual Cd contents of these carbonates and the presence of other trace-elements in some of the investigated samples. Possible candidates are (1) the important phase of silicic volcanism related to the break-up of Gondwana which has been identified in Patagonia and in Antarctica for the Jurassic time; and (2) the volcanic centre situated in the North Sea which was active during the Jurassic and early Cretaceous.