191-12 - THE RESPONSE OF CORBIÈRES CARBONATE PLATFORM TO EARLY CRETACEOUS SUPER GREENHOUSE CONDITIONS

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Abstract

Marine reef systems host highly diversified ecosystems. that are vulnerable to climate change causing intense stress: recently in the barrier reefs of Australia where 91% of the reef has been affected by coral bleaching. During the Earth's history, paleoclimatic and paleoenvironmental conditions deteriorated causing stress on shallow-marine carbonate ecosystems; for instance, Mesozoic Oceanic Anoxic Events (OAEs) correspond to perturbations of the global carbon cycle triggered by climate instability and enhanced volcanism, and can serve as models for carbonate platform demise to help mitigate comparable processes that affect modern oceans.

During the Early Aptian, atmospheric greenhouse gases increased, causing carbonate ecosystems to survive, adapt, or disappear. To investigate the mechanisms by which these ecosystems adjust to stresses, and how carbonate production can continue at a lower rate with less diversity. This research links environmental deteriorations associated with the Early Aptian OAE1a with the adaptation of benthic ecosystems by investigating a carbonate platform preserved along the northern Tethyan margin (25°N) in the present day Corbières region of southern France. In the rock record the OAE1a is identified by well-defined trends in the evolution of carbon isotope ($\delta^{13}C$) values and is associated with enhanced preservation of organic matter in deep marine settings. By identifying perturbations in the carbon cycle and in fossil assemblages associated with the OAE1a, parameters that favor carbonate-producing ecosystems can be recognized. We hypothesize that in latitudes with an arid, warm climate, the transfer of siliciclastic particles and dissolved nutrients are limited, and the resilience of carbonate platforms is enhanced. Preliminary results show that in the Corbières, seven of eight isotopic segments characteristic of the OAE1a are present, while lithofacies switch from limestones with rudist bivalves and corals characteristic of a healthy, photozoan assemblage, to marlstones with oysters typical of a more stressful environment, before the return to a photozoan ecosystem. This research suggests that the Corbières carbonate platform adapted to environmental deteriorations associated with the OAE1a, and returned to a pre-crisis state following the OAE1a.

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