Stable Sr isotopes of carbonate fractions as tracer for weathering activity during OAE2

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The Cretaceous Ocean Anoxic Events (OAEs), amongst the largest climatic perturbations in the Phanerozoic, resulted in strong biogeochemical changes within the environment and subsequently led to the deposition and preservation of unusually large amounts of organic matter. The organic matter is characterized by positive $\delta^{13}C$ excursions, both in marine and subaerial environments. Increased volcanic activity has been linked to OAEs as the initial forcing mechanism that resulted in such significant global paleoclimatic change, as well as increased continental weathering activity, and increased ocean productivity.

Using a leaching technique, we analysed the carbonate fractions of samples from the Iona-1 core from the Western Interior Seaway, one of the most complete sections of the Cenomanian–Turonian interval spanning the OAE2 (Eagle Ford Formation). The carbonate fractions were chosen because of their sensitivity to environmental changes capable to track and record changing seawater conditions. We present the first coupled stable Sr isotope analyses of rock samples from this interval, combined with trace element analyses, to better demonstrate whether the biological precipitation rate of carbonate was the main factor that sustained ocean productivity and to understand the biogeochemical mechanisms that governed the global ocean during the OAE2. The normalized REE plots show a negative Ce anomaly and track well with the $\delta^{13}C$ curve of the interval, illustrating that carbonates record the seawater trend. Additionally, our results show an increase of phosphorus concentration, thus suggesting a possible increased-weathering forcing mechanism.