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# 191-11 - THE DEMISE OF A SUBTROPICAL CARBONATE PLATFORM DURING APTIAN SUPER GREENHOUSE TIMES



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4:10 PM - 4:25 PM



Mile High Ballroom 4B (Colorado Convention Center)

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## Abstract

Enhanced greenhouse conditions during the Early Cretaceous favored the development of carbonate platforms in epicontinental seas. The Early Aptian Oceanic Anoxic Event (OAE) 1a corresponds to a major perturbation of the global carbon cycle which resulted in strong variations in the carbon stable isotope ( $\delta^{13}\text{C}$ ) record. Submarine volcanism triggered the OAE1a that impacted the development of marine ecosystems; moreover, its unfolding favored the preservation of organic-rich shales in oceanic basins, while shallower carbonate platforms either adapted to changing environmental conditions or drowned. The Vercors region of southern France includes a shallow marine carbonate succession that potentially recorded the OAE1a. We investigate ecological changes in carbonate ecosystems and decipher the impact of environmental changes on benthic, carbonate-producing communities, to test the hypothesis that carbonate ecosystems first adapted to increasing environmental stress before they drowned.

First, the petrographic analysis of thin sections from four localities informs on the dating and ecology of the platform: at the top of the carbonate platform series characterized by a photozoan assemblage with rudist, corals and green algae, incised valleys represent a major drop in sea level. Incisions are filled with facies rich in crinoids, bryozoans, orbitolinids, or ooids, and capped by crinoid- and quartz-rich beds without the return of a healthy carbonate ecosystem.

Second, the carbon stable isotope and elemental compositions of rock samples confirm the presence of an OAE1a equivalent and coeval paleoenvironmental conditions, respectively. A negative spike followed by a positive excursion in  $\delta^{13}\text{C}$  values from the top of the carbonate photozoan platform upward confirms the presence of the OAE1a. A coeval increase in continental detrital inputs is associated with higher values of the chemical index of alteration, that accelerate into the youngest, siliciclastic-rich beds. This suggests that enhanced continental weathering augmented the detrital supply to shallow seas that diminished the efficiency of photozoan assemblages and favored the switch to an ecosystem dominated by suspension feeders before the platform drowned.

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