



## **Impact of middle Cretaceous (Albian to Turonian) climatic changes in the eastern sub-equatorial marginal Pacific region**

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A new Albian-Turonian carbon isotope ( $\delta^{13}\text{C}_{\text{carb}}$  and  $\delta^{13}\text{C}_{\text{org}}$ ) curve based on epeiric-neritic carbonate successions from Peru is reported. The study was carried out to test the hypothesis that mid-Cretaceous OAEs, which are well-documented in the Tethys and Atlantic realm, are equally recorded in the epeiric-neritic realm of the eastern sub-equatorial Pacific as exposed in Northern and Central Peru. Depositional environments range from shallow subtidal inner ramp to outer ramp settings. For this purpose, we combined chemostratigraphic and sedimentological information from expanded and well-exposed sections in NW Peru. The geochemical data provide evidence for the record of the OAE1b set, the OAE1c, the OAE1d, as well as the Cenomanian-Turonian Boundary Event (OAE2), known as one of the most extreme carbon cycle perturbation. The new  $\delta^{13}\text{C}$  record is constrained by biostratigraphic evidence and  $^{87}\text{Sr}/^{86}\text{Sr}$  isotope stratigraphy using well-preserved oyster shells. Sedimentological observations, combined with the  $\delta^{13}\text{C}$  stratigraphic record, were used to elucidate the complex interplay of climate changes, nutrient supply and platform drowning. These observations indicate: (1) A late Aptian-early Albian change from siliciclastic- to carbonate-dominated sedimentation that may be coeval with the placement of the Kilian event. (2) Incipient platform-drowning during the early Albian probably linked to the impact of the Paquier event. (3) An early middle Albian demise of neritic carbonate production that coincides with the Leenhardt Level, followed by middle Albian condensed sedimentation that reports prominent negative values in  $\delta^{13}\text{C}_{\text{carb}}$ . (4) Renewed carbonate ramp production during the late Albian-middle Cenomanian. (5) An upper Cenomanian-middle Turonian transition interval with the OAE2 represented by a 44-m-thick sedimentary succession characterized by rhythmically bedded marls, marly limestones and limestones. Despite the scarcity of significant amount of organic matter (a.k.a, black shales) or indicators of oxygen deficiency, the  $\delta^{13}\text{C}$  curve matches well with published high-resolution curves for coeval successions in the Pacific elsewhere (Pacific Guyots; Hokkaido, Japan; Guerrero, Mexico), European Tethys (Vocontian Basin, France; Piobbico section, Italy; English Chalk; Wurstorf section, Germany) and Western Atlantic domain (Pueblo Colorado, USA; Sierra Madre, Mexico), supporting the global nature of the isotope patterns observed in Peru.