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The impact of Early Cretaceous shallow-water carbonate build-up on the paleoceanographic record

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The evolution of the early Cretaceous, northern Tethyan carbonate platform was not only influenced by changes in sea level, detrital influx, and surface-water temperature, but also by changes in trophic levels. We distinguish between phases of carbonate production dominated by oligotrophic photozoan communities and by mesotrophic and eventually colder water heterozoan communities. Superimposed on this bimodal trend in platform evolution were phases of platform demise for which we provide improved age control based on ammonite biostratigraphy. The initial phase of these episodes of platform demise corresponds in time to episodes of oceanic anoxic events (OAE's) and environmental change in general. Based on a comparison between the temporal changes in an early Cretaceous, ammonite-calibrated, δ^{13}C record from southeastern France and coeval changes in the platform record, we suggest that the history of carbon fractionation along the northern Tethyan margin was not only influenced by changes in the oceanic carbon cycle such as in the rate of production and preservation of organic and carbonate carbon, and in the size of the oceanic dissolved inorganic carbon (DIC) reservoir, but also by the above-mentioned changes in the ecology and geometry of the adjacent carbonate platform. Phases of photozoan carbonate production induced positive trends in the hemipelagic carbonate δ^{13}C record. Phases of heterozoan carbonate production pushed the δ^{13}C system towards more negative values. Platform drowning episodes implied an initial increase in δ^{13}C values, followed by longer-term decrease in δ^{13}C values.