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Insights into Early Cretaceous Pacific Ocean palaeoceanography from the Calera Limestones, central California

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Our understanding of Early Cretaceous palaeoceanography relies heavily on observations from the then narrow ocean basins of the Tethys and Atlantic Oceans, and we have only fragmentary evidence from the largest contiguous Cretaceous marine environment, the proto-Pacific Ocean. This fragmentary record results from loss of much of the proto-Pacific sea floor to subduction but, additionally, ocean drilling has struggled to core continuous sections due to the ubiquitous presence of 'unrecoverable' chert-rich sediments. However, the record as it stands still provides a tantalising glimpse of Early Cretaceous climates and environments in the Pacific Ocean, including evidence for 'oceanic anoxic events' (OAEs) and associated biotic change. In order to improve our understanding of Pacific Ocean palaeoceanography we have exploited the little studied, but virtually unique, sections of the White Calera Limestone, part of an accreted terrane, the Franciscan Complex, exposed in central California, USA. These calcareous sediments were deposited in pelagic environments in the proto-Pacific Ocean on either seamounts or oceanic plateaus of the (now-subducted) Farallon plate, analogous to present-day plateaus on the Pacific plate such as Shatsky Rise and Hess Rise. Previous work has shown that the White Calera Limestone is Aptian–Cenomanian in age and includes organic-rich sediments that are proto-Pacific Ocean expressions of OAEs. We present the results of recent field, petrographic and geochemical (δ^{13}C, δ^{18}O, TOC) studies. These results strongly suggest that, despite burial diagenesis and accretion-related low-grade metamorphism, the White Calera Limestone has retained primary geochemical signals that can be used to assess the timing and record of OAEs in the Pacific Ocean relative to those in the Tethys and

Atlantic Oceans.