



Ocean dynamics during the Cretaceous: is there something new?

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The enhanced burial and preservation of organic carbon is a key-process in the global biogeochemical cycles of carbon, sulfur and oxygen. It exerts a critical control on ocean chemistry and climate and plays an important role in the formation of petroleum source rocks. Due to its importance, the enhanced carbon burial and its feedbacks on the mid-Cretaceous environment have long been topics of broad interest. Yet, the exact nature and functioning of the palaeo-environment that fostered the massive and almost ubiquitous deposition of organic carbon-rich sediments is still a matter of debate. Here, using the land-sea distribution, bathymetry and topography provided by Sewall et al. (2007, Climate of the Past) for three Cretaceous time slices (120 Ma, 90 Ma and 70 Ma), we ran the fully coupled ocean atmosphere model FOAM. Our aim is to identify possible physical processes making favourable the occurrence of Oceanic Anoxic Events during the Cretaceous period. We will first build a database allowing characterizing the geographical temperature distribution and the deep-water formation areas using marine temperature proxies and Nd isotopes respectively. This database associated to our climatic experiments should help us to validate or invalidate our simulations but should also see as a tool to better interpret the Nd isotopes proxy. We will then depict what are the main changes occurring in our three simulations when compared to present-day climatic system, focusing particularly on the ocean dynamics. A comparison with all previously Cretaceous ocean model will help to identify the results that are not model dependant and to propose a state of the art of our knowledge on the Cretaceous climate.