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The eustatic chimera: isn't the Cenomanian maximum flood a dynamic topography puzzle?

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More and more, dynamic topography is predicted to seriously control sea level, which challenges the concept of eustasy, but field evidence are sparse. In order to evaluate the space and time evolution of relative sea level variations, we made paleogeographic reconstructions for three consecutive stages around the presumed Cenomanian maximum flood. For that purpose, we compiled stratigraphic charts and existing paleogeographic maps to reconstruct shorelines at a global scale and infer transgressive and regressive phases. The Cenomanian transgressive phase is essentially present around the Tethys, whereas regression prevails at higher latitudes. Furthermore, diachronicity accompanies the presumed sea level high, for the trend reverses between the three stages in the northern hemisphere while it further subsides in the southern one. These reconstructions therefore suggest that an evolving degree two structure of uplift and subsidence may be more endemic of this period than uniform sea level change and thus, they better recall internal dynamics than eustasy. Indeed, flooding accompanies the Tethyan subduction zone, while regressions are located above spreading oceans. We interpret relative sea level change during the late Cretaceous as the traces of the negative dynamic subsidence above the Tehyan slab in the one hand, and in the other hand of the superplumes (African in particular) that lead to the breakup of the Atlantic. We further confront our results to the predictions of Steinberger, who provides estimates of dynamic topography since the latest Albian. We conformably observe, for instance, positive anomalies in North America, in the Baltic area, or in South Africa, but the model mostly fails to predict the observe diachronicity in vertical ground motion.