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The widespread Tethyan uppermost Early Aptian sea level fall: data from the western Maestrat Basin (E Iberian Chain, Spain)

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During the uppermost Early Aptian a fall in sea level exposed subaerially a highstand carbonate platform with rudists and corals established in the western Maestrat Basin (E Iberian Chain, Spain). As a result, a broad palaeokarst developed in the proximal parts of the carbonate shelf while a forced regressive wedge was deposited basinwards, at the toe of the highstand slope.

Despite the existence of small phase lags concerning age exist in the literature, this relative sea-level fall could have had a global significance along the Tethyan margin (e.g., Hillgärtner et al. 2003). Nevertheless, in the central part of the Galve sub-basin (western Maestrat Basin), the ammonite collected taxa clearly indicate that this relative sea-level fall and the succeeding base level rise occurred within the *Dufrenoyia furcata* biozone.

In the platform-to-basin transition area of the carbonate platform studied, the relative height between the top of the preserved highstand platform deposits and the top of the detached forced regressive wedge could be representative of the magnitude of this relative sea level fall. Following this approximation, the aforementioned relative sea level fall is estimated to be at least 60 m. However, a probable error of up to several meters should be taken into consideration because the uppermost part of the highstand platform is absent due to erosion, and the lithofacies forming the late highstand systems tract and the forced regressive wedge display distinct features, being presumably sedimented in different bathymetries.

The mechanisms that could have triggered this widespread relative sea level fall are unknown. However, in the Galve sub-basin, the uppermost Early Aptian was characterized by an important subsidence deceleration, with the result that a significant tectonic control of the accommodation space is discarded. Given that the time span of the *Dufrenoyia furcata* biozone is 1 My (Gradstein et al. 2004), the most plausible known single mechanism that could account for a sea level fall of tens-of-meters in less than 1 My is glacio-eustasy (Immenhauser 2005; Miller et al. 2005).

Thus, in line with this hypothesis, the occurrence of at least one cooling event along the upper part of the Early Aptian is needed to explain this rapid and widespread fall in relative sea level. In this regard, and although the Cretaceous has been traditionally interpreted as a greenhouse period, scientists have recently afforded evidence of cold episodes throughout the Aptian time slice that could have favoured the formation of high latitude and/or altitude ice sheets (e.g., Weissert and Lini 1991; Price 1999).

Moreover, and despite a probable diagenetic imprint, the $\delta^{18}O$ results obtained from the geochemical analysis performed following standard techniques in marl and bulk-rock samples collected throughout the Early Aptian succession analyzed seem to display a slow but progressively cooling scattered tendency, which began just before the onset of the Early Aptian oceanic anoxic event (OAE1a) and predates the top of the *Deshayesites weissi*, the whole of the *Deshayesites deshayesi* and the preserved highstand deposits belonging to the *Dufrenoyia furcata* ammonite biozone.

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