



Glacio-eustasy during the Valanginian – Early Cretaceous: evidence from the peri-vocontian zone (SE France)

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The Valanginian is a period of global environmental change as illustrated by several perturbations. A major $\delta^{13}\text{C}$ positive excursion, the Weissert Event, suggests that the carbon cycle is affected from the latest Early Valanginian to the Early Hauterivian (Weissert et al., 1998). A change of facies from photozoan to heterozoan assemblages on the Helvetic carbonate platform (Switzerland; Föllmi et al., 1994) and greater abundance of eutrophic nannofossils taxa (Italy; Erba & Tremolada, 2004) suggest an increase of trophic resources in the latest Early Valanginian.

In order to better understand the link between these changes, sea-level fluctuations have been reconstructed in detail from the Middle Berriasian to the earliest Hauterivian. Sections from the peri-vocontian area (SE France) have been investigated because of the good quality of outcrops on the carbonate platforms, their margins and in the Vocontian Basin. Sections ranging from the most proximal zone (Swiss Jura) to the basin were interpreted in terms of sequence stratigraphy and cyclostratigraphy, and correlated at high-resolution. Using the identified small- and large-scale sequences as well as depositional geometries, sea-level fluctuations were then reconstructed. Two main trends are evidenced during the studied interval: (1) the amplitude of the sea-level fluctuations gradually increased from the Middle Berriasian to the Early Valanginian, and reached its highest (several tens of meters) from the middle Early Valanginian to the

Valanginian/Hauterivian boundary and, (2) sea-level variations were quite symmetrical in the Late Berriasian, slightly asymmetrical in the Early Valanginian and strongly asymmetrical from the latest Early Valanginian to the earliest Hauterivian. Moreover, three orders of sea-level fluctuations were recognized in the sediments of the perivocontian zone. Platform-basin correlations and cyclostratigraphical interpretations of the basinal sections evidence an astronomical control of the sea-level variations, mainly by the two eccentricity cycles of 100 and 400 kyrs .

The increase in the amplitude of the sea-level fluctuations and their change from symmetrical to asymmetrical can be related to the onset of a major cooling event in the Early Valanginian (Puc  at et al., 2003). Fast transgressions followed by slower regressions would correspond to waxing and waning of high-latitude ice during most of the Valanginian, especially from the latest Early Valanginian to the latest Late Valanginian. Glacio-eustatic sea-level fluctuations in tune with the 100 and 400 kyr eccentricity cycles are in agreement with glaciations during the Valanginian and probably the Early Hauterivian as proposed by McArthur et al. (2007).

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