Ample and recurrent sea-level fluctuations during the Bajocian: A hint towards middle Jurassic glacio-eustatism

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Mesozoic sea-level fluctuations have been a matter of debate for several decades, especially the extend and origin of sea-level cycles that have a periodicity of about 1 Myr or less. The debate lies in the main driving mechanism for sequence development (global sea-level or sediment flux variations) as well as the reason behind water exchanges between the continents and the oceans (glacio- or aquifer-eustatism). In this study, we focus on the carbonate-dominated sedimentary record of the Bajocian (Middle Jurassic) in the Central High Atlas Basin of Morocco. Several aspects make this basin an appropriate location for discussing Middle Jurassic sea-level changes. Firstly, the outstanding exposures of the High Atlas Mountains, with continuous exposures for 10s of kilometres, allow to describe and track sedimentary packages and their bounding surfaces from proximal to distal settings. Moreover, a combination of ammonite and brachiopod biostratigraphy with carbon-isotopes chemostratigraphy allows to temporarily constrain their development, which permits to correlate and compare the Central High Atlas sedimentary record to other basins. Finally, due to high-subsidence rates, thick Bajocian sedimentary sequences have accumulated, minimizing condensation and hiatus that might prevail in other basins due to a lack of accommodation space creation. Two Bajocian long-term transgressive-regressive (T-R) packages are observed throughout the basin. They are modulated by several medium-term T-R packages, that have each an approximate duration of 1 Myr. These sequences can also be correlated on a basinwide scale. Combined with sedimentological and facies analyses, architectural evidence along proximal-to-distal transect illustrates that several of the medium-term sequences are characterized by the presence of a falling stage and lowstand systems tracts, demonstrating that medium-term T-R stacking patterns are not solely linked to fluctuation in sediment supply, but also to episodes of relative sea-level fall of at least 30m of amplitude. This is confirmed by backstripping analysis performed in a composite section from the center of the Basin. Comparison with Bajocian deposits from France and Scotland, where good biostratigraphic dating is also available, shows that similar contemporaneous sea-level fall can be observed, highlighting their potential global character. The two long-term Bajocian sequences are more difficult to correlate on a global scale, suggesting that they are rather primarily linked to fluctuation in regional sediment supply or dynamic topography processes. The exact cause of the Bajocian medium-term sea-level falls is currently unknown, but it is here interesting to note that a relatively cool globate climate has been postulated for the Middle Jurassic, suggesting that glacio-eustasy was their most likely