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Turonian-Santonian depositional and sea level history of the Tarfaya Atlantic coastal basin, SW Morocco

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The Turonian to Santonian organic-rich successions deposited in the continuously subsiding Tarfaya Atlantic coastal basin (SW Morocco) allow detailed reconstruction of depositional environments and correlation to eustatic sea level changes. We present high-resolution X-ray fluorescence (XRF) scanning and natural gamma-ray (NGR) records from a newly drilled sedimentary core Tarfaya SN°2 (27° 57′ 43.1′′N, 12° 48′ 37.0′′W), which recovered a continuous sedimentary succession from a middle to outer shelf environment. In the latest Turonian, the late Coniacian, and the middle and latest Santonian, high NGR and Al with low Mn and Ca content indicate pronounced dysoxic horizons that reflect impingement of the oxygen minimum zone on the shelf during sea level highstands. In contrast, lower NGR and Al with higher Mn and Ca values indicate high detrital carbonate content and more oxic conditions related to regressive events in the late Turonian, early to middle Conacian and early Santonian. Exceptionally high sedimentation rates (>10cm/kyr) characterize the late Turonian, and spectral analyses of XRF and NGR data reveal that sedimentation was mostly controlled by obliquity and precession, suggesting an overriding glacioeustatic control. However, the response to orbital forcing weakened during the latest Turonian, when sedimentation rates declined markedly to ∼2 cm/kyr. We will extend this study to three newly drilled cores nearby that recovered sediment sequences from the late Albian to late Turonian and from the late Santonian to Campanian in order to retrace the complete Late Cretaceous depositional history of the Tarfaya Basin and to develop a high-resolution carbon isotope stratigraphy allowing correlation to records from other continental margins.

Key words: Late Cretaceous, Tarfaya Basin, XRF scanning, natural gamma-ray, oxygen minimum zone, sea level, orbital forcing.