

Upper Cretaceous stratigraphy and paleoenvironments of the Tarfaya Atlantic coastal basin, SW Morocco

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We present high resolution X-ray fluorescence (XRF) scanning data from Upper Cretaceous outcrop sections and two newly drilled sedimentary cores in the Tarfaya Atlantic coastal basin, SW Morocco. Cores Tarfaya SN^o1 and SN^o2 (27° 42' 36.6''N, 12° 56' 39.0''W; 27° 57' 43.1''N, 12° 48' 37.0''W) recovered continuous, extensive, organic-rich sedimentary successions, which closely track the paleoceanographic evolution and sea level history of this shelf basin during the Turonian to Campanian. The early Turonian, late Coniacian and middle Santonian are characterized by enrichment of redox/carbon flux sensitive elements such as Mn, S, Ba, Br and biogenic Si, indicating pronounced dysoxic horizons that reflect impingement of the oxygen minimum zone on the shelf during sea-level highstands. The late Turonian is marked by successive eustatic regressive events, which correspond to increases in detrital carbonate (expressed by decreases in log-ratios of Al/Ca, Ti/Ca, Si/Ca and Fe/Ca) and more oxic conditions on the shelf (decreases in the log-ratios of Mn/Ca, S/Ca and S/Fe indicating decreased pyritization).

Our record also reveals spectacular unconformities in the late Turonian and at the Santonian-Campanian boundary, which we relate to 3rd order global eustatic lowstands of Hardenbol et al. (1998). The early Campanian transgression, recorded in Tarfaya SN^o 1 and in the Sebkha Tah and Tisfourine sections in the southern part of the basin, led to substantial deepening and enhanced accumulation of fine-grained clay-rich hemipelagic sediments. The end of the Cretaceous sedimentary succession, expressed in the Sebkha Tisfourine section and Tarfaya SN^o1, is marked by a major hiatus, which comprises the entire latest Cretaceous (middle Campanian-Maastrichtian) and Paleogene. Future work will focus on extending the XRF scanning records in cores Tarfaya SN^o3 and SN^o4 (27° 58' 32.2''N, 12° 40' 22.5''W; 27° 59' 46.4''N, 12° 32' 40.6''W) to develop a complete Late Cretaceous depositional history down to the late Albian and on providing a high resolution carbon isotope record for integration with the orbitally tuned cyclostratigraphy.

Key words: XRF scanning, oxygen minimum zone, eustatic sea level, Late Cretaceous, Tarfaya basin, Morocco

Reference

Hardenbol, J., Thierry, J., Farley, M.B., Jacquin, T., De Graciansky, P.C., and Vail, P.R., 1998, Mesozoic and Cenozoic sequence chronostratigraphic framework of European basins, in Graciansky, P.C. de, Hardenbol, J., Jacquin, T., and Vail, P.R., eds, Mesozoic and Cenozoic sequence stratigraphy of European basins: SEPM Special Publication 60, p. 3-13.