

CONTROL OF ORBITAL FORCING AND HIGHER-ORDER SEA LEVEL FLUCTUATIONS ON MID-CRETACEOUS BLACK SHALE FORMATION IN THE TARFAYA BASIN (MOROCCO)

1 Wagner, T., 1 Beckmann, B., 2 Luderer, F., 2 Kuhnt, W., 1 Kasten, S., 1 Roehl, U.. 1 University of Bremen, Germany; 2 University of Kiel, Germany

The Cenomanian/Turonian (C/T) black shales from Tarfaya (Morocco) are well known for their exceptional high time resolution and pronounced cyclicity. Cycles represent fluctuations in organic carbon and pelagic carbonate content, showing oil source rock qualities in organic-rich layers (kerogen type I/II). Spectral analysis from density logs confirm a strong power at the obliquity band of orbital frequencies (39 ky) comparable to late Quaternary upwelling cycles off NW-Africa. Based on a high resolution cyclo- and biostratigraphic framework we studied the CTBE black shale cycles using organic and inorganic geochemical and micropaleontological methods.

Data from well S75, located in the central Tarfaya Basin, are presented. Thirty-two obliquity cycles were identified in a 100 m thick C/T sequence. Based on the extinction of *R. cushmani* and a positive excursion in the $\delta^{13}\text{C}_{\text{org}}$ signal we estimated a duration of about 230 ky for the CTBE. Records from this part of the sequence, including results from elemental analysis, Rock-Eval pyrolysis, ICP, and ultra-high resolution XRF scanning logs, reveal cyclic patterns which confirm strong sub-Milankovitch forcing. Highest accumulation of marine organic carbon is not recorded at the maximum excursion of the $\delta^{13}\text{C}_{\text{org}}$ signal but with a delay of about 20 ky just before a higher-order sea level highstand at the C/T transition. About 140 Ky after the CTBE a change from mainly anoxic/strongly dysoxic depositional conditions to the onset of short-term supply of better oxygenated bottom waters is marked by temporarily increased oxygen indices and the re-occurrence of benthic life.