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A Late Jurasssic to Cretaceous sedimentological and chemostratigraphic transect trough the Oman Mountains; from the Arabian Platform into the Hawasina Basin

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The Oman mountains preserve a Late Jurassic to Cretaceous continental margin transect with the Arabian carbonate shelf and the adjacent deep Hawasina Basin which is outcropping in the nappe pile of the Oman Mountains today. The whole nappe pile containing the continental margin transect is today outcropping in the Central Oman Mountains. The sediment successions of the Platform (Kahmah & Wasia Group) and the Hawasina Basin (Sumeini, Hamrat Duru and Kawr Group) provide the opportunity to investigate the response of an eastern Tethyan equatorial ocean system to multiple perturbations of the carbon cycle during the Cretaceous.
Shallow water sediments on the Arabian carbonate shelf and continental slope to turbiditic basinal successions are difficult to date with biostratigraphy and sequence stratigraphy. Therefore we complement existing sequence and biostratigraphy with our newly established carbon isotope chemostratigraphy.
The Hawasina Basin and also the easternmost Arabian Platform were affected by the Late Jurassic sea level rise, by changes in oceanography and also by regional tectonics. The widespread shift towards a "pelagic Maiolica Limestone Facies" (Lower Sid'r, Nadan Fm, Rayda Fm) documents this transition in oceanography. Chemo- and biostratigraphy serve for correlation of the pelagic facies across the Hawasina Basin. Pelagic to hemipelagic conditions existed until the time of the Valanginian carbon isotope excursion. With the onset of this excursion chert and silicification features in the pelagic sediments disappeared for a while. Coarse turbidites indicate that the Arabian carbonate platform prograded during Valaginian and Hauterivian time more than 300 km towards the northeast. Facies changes towards coarser turbidites complicates the use of chemostratigraphy as a correlation tool. However, chemostratigraphy of the Barremian to Cenomanian combined with existing radiolarian biostratigraphy in the Hamrat Duru Group shows episodes of reduced sedimentation rate with an episode of intense silicification during Aptian-Cenomanian time.
The equatorial position of the Arabian Platform and the offshore Hawasina Basin provide information on a peculiar oceanographic situation. Wind driven equatorial currents combined with upwelling current were most active during extreme greenhouse epi-sodes. Resulting nutrient rich water masses may explain chert pulses during the onset of the OAE1a and OAE2 and the absence of black shales because of continuous deep water ventilation.