The stable isotope record from the Albian to Turonian Shilaif Basin (United Arab Emirates) – Climatic perturbations from a palaeo-equatorial intra-shelf basin perspective

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The Cretaceous on the Arabian shelf is expressed by a thick succession of shallow marine to pelagic carbonates and siliciclastic sediments. During the Albian stage a widespread transgression led to the formation of the extensive Shilaif intra-platform basin, which persisted into the Turonian. Yet, a detailed regional chronostratigraphic framework does not exist for this time interval on the Arabian shelf. Carbon isotope chemostratigraphy ($\delta^{13}C_{CARB}$, $\delta^{13}C_{ORG}$), especially when carried out at high resolution and coupled with independent stratigraphic tools such as biostratigraphy, has been proven to be a valuable tool to integrate the sedimentary succession into a precise time frame. The continuous pelagic to hemipelagic carbonate succession of the Shilaif basin further offers an exceptional opportunity to observe marine equatorial palaeoenvironmental changes in the Cretaceous (Albian – Turonian) greenhouse climate.

Here we present a high-resolution chemostratigraphic profile ($\delta^{13}C_{CARB}$, $\delta^{13}C_{ORG}$, $\delta^{18}O_{CARB}$) and a biostratigraphic (nannofossil) record over 270 meters of continuous core material from central Abu Dhabi (United Arab Emirates). The investigated succession from the Shilaif intra-platform basin includes the Mauddud and Shilaif formations and extends from the mid Albian to the Early Turonian. The sediments represent outer ramp to basinal intra-shelf carbonates that vary from laminated organic-rich to clean bioturbated intervals. Carbonate carbon isotope values across the core range between ~1.0‰ VPDB and ~3.0‰ VPDB and organic carbon isotope values between -27‰ VPDB and -24‰ VPDB. Isotopic evidence of the Middle Albian Oceanic Anoxic Event (OAE) 1c, latest Albian OAE 1d, Mid-Cenomanian event (MCE I) and Cenomanian-Turonian boundary event (OAE 2) are confirmed and supported by calcareous nannofossil biostratigraphy. The results of this study contribute to an improved chronostratigraphic framework for the Shilaif basin as it allows correlation with regional (VAHRENKAMP, 2013; VAHRENKAMP et al., 2015; WOHLWEND et al., 2016) and global (e.g. JARVIS et al., 2006; GAMBACORTA et al., 2015) well-calibrated carbon isotope records.

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