

The first record of the mid-Barremian Oceanic Anoxic Event in the Zagros Basin: evidence from calcareous nannofossils

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One of the Mid-Cretaceous Oceanic Anoxic Events is the mid-Barremian Oceanic Anoxic Event, which is recorded from different basins along the northern proto-central Atlantic margins and the Tethys Ocean (Godet *et al.*, 2006; Malkoč & Mutterlose, 2010; Yilmaz *et al.*, 2012; Huck *et al.*, 2013). This event is associated with major changes in the ocean-climate system, such as warming, eutrophication and $\delta^{13}\text{C}$ excursions (e.g., Coccioni *et al.*, 2003; Godet *et al.*, 2006; Mutterlose *et al.*, 2009, 2010; Huck *et al.*, 2013; Aguado *et al.*, 2014). Sediments of the Barremian interval have been analyzed from the Garau Formation in the Zagros Basin which is part of the Neo-Tethys Ocean (west of Iran). The aim of the present study is to document the presence of the mid-Barremian Event (MBE) based on calcareous nannofossil biostratigraphy and paleoecology.

The studied interval mainly consists of green to gray marls, marly limestones, marly shales, black shales and limestones. According to the index calcareous nannofossils, the NC5 biozone of Roth (1978), emended by Bralower *et al.* (1995), is recorded and divided into NC5C, NC5D and NC5E subzones.

Fluctuations in surface water fertility and temperature can be assessed by analyzing changes in nutrient and temperature indices for calcareous nannofossil. In the present study, species such as *Micrantholithus* spp., *Lithraphidites carniolensis*, *Diazomatolithus lehmanii*, *Cyclagelosphaera margerelii*, *Nannoconus* spp., *Rhagodiscus asper* and *Watznaueria barnesiae* are considered as warm water taxa and *Biscutum constans*, *Helenea chiastia* and *Zeu-grhabdotus embergeri* are regarded as cool water taxa. An increasing trend in the number of warm water taxa can be observed in NC5D that can be a signal of the mid-Barremian warming event. An increasing trend in the number of eutrophic taxa is also recorded from the middle part of NC5D, which can also be a sign of the MBE, similar to other parts of the world, e.g., southern Spain (Aguado *et al.*, 2014).

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