

Paleoenvironments of a Cretaceous marginal ocean basin - the Turonian to Santonian of the Australo-Antarctic Gulf, IODP Site U1512

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IODP Expedition 369 (Australia Cretaceous Climate and Tectonics) drilled an approximately 700 m thick Santonian to Turonian succession (nannofossil zones CC 17-CC 10) at Site U1512 in the Great Australian Bight (Fig. 1). Site U1512 was drilled aiming at understanding the paleoceanographic evolution of the Southern Australian realm during the final stages of the breakup of Eastern Gondwana and to help document the Late Cretaceous climate evolution in the Southern High Latitudes (SHL).

The formation of the Australo-Antarctic gulf is characterized by rapid subsidence from the Albian onwards. Restricted accommodation space and a marginal marine setting that is affected by the discharge of a vast continental river system to the North are factors that seriously influenced the paleoecologic setting recovered in the Great Australian Bight.

Material recovered at IODP Site U1512 presents an unique record of a deep water agglutinated foraminifera community from the Southern High Latitudes. The highly diverse assemblages yield many new taxa that are yet to be described.

Calcareous benthic foraminifera are generally rare or absent, as well as planktonic taxa. Calcareous benthic foraminifera are frequently recovered from the early to mid-Turonian as well as Santonian strata. Hole U1512A yields highly abundant radiolaria from the mid Turonian onwards - the share of radiolarian of the total microfossil assemblage often exceeds 50% in the younger strata of U1512. The stratigraphic framework is based on calcareous nannofossil biostratigraphy and assigns the succession to calcareous nannofossil zones CC16/17-CC10c.

Preliminary results show a diverse foraminiferal assemblage: 180 taxa were identified (126 agglutinated and 54 calcareous). The most common elements of the deep-water agglutinated foraminifera assemblage are tubular (i.e., *Kalamopsis grzybowski*, *Bathysiphon* spp, *Ammodiscus* spp...) and planispiral forms (i.e., *Haplophragmoides* spp., *Buzasina* sp., *Labrospira* spp...). The Turonian strata yield highly abundant *Bulbobacculites problematicus* and *Spiroplectamina navarroana*. The presence of *Uvigerinamina* provides a tie-point to the Tethyan deep-water agglutinated foraminifera biozonation of Geroch & Nowak (1984).

The total abundance of tubular agglutinated taxa that show an epifaunal habitat preference in relation to the entire assemblage peaks just before we record an increase in the abundance of radiolaria in the mid Turonian. Generally, the abundance of tubular agglutinated foraminifera and radiolaria correlates negatively through Hole U1512A.

The assessment of foraminiferal assemblages together with the evolution of other fossil groups (Radiolaria in particular) indicates unstable conditions at Site U1512 during the early Turonian-Santonian.

Preliminary results from the quantitative analysis of the benthic foraminiferal assemblages could indicate either changes in paleobathymetry or instable patterns in ocean circulation creating a restricted paleoenvironmental regime during Late Cretaceous times. The prominent increase in the abundance of radiolaria during the mid-Turonian coincides with a previous peak in the abundance of tubular epifaunal foraminifera. This could either indicate an increase in bathymetry (and associated changes in ocean chemistry) that would roughly correspond to the Turonian sea level highstand. As high latitudes reflect climatic change more directly, changes in the microfossil assemblage could furthermore reflect a subtle recovery of the mid Turonian SHL temperature regime after the Cretaceous thermal maximum.

Keywords: Cretaceous , Australia, Antarctica