

Towards a palaeoecological model of the Mesoproterozoic Taoudeni basin

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The mid-Proterozoic rock record preserves a relatively moderate diversity of early eukaryotes, despite the early evolution of fundamental features of the eukaryotic cell [1]. Common hypotheses involve the redox state of stratified oceans with oxic shallow waters, euxinic mid-depth waters, and anoxic and ferruginous deep waters during this time period. Mid-Proterozoic eukaryotes would have found suitable ecological niches in estuarine, fluvio-deltaic and coastal shallow marine environments near nutrient sources [2], while N₂-fixing photoautotrophs bacteria would have been better competitors than eukaryotic algae in nutrient-poor niches [3]. Here, we present the first palaeoecological model of the late Mesoproterozoic Taoudeni basin, Mauritania, Northwestern Africa. Sediments were deposited under shallow waters in pericratonic and epicratonic marine environments. Both microfossil assemblages and iron speciation were analyzed on the same samples, with the aim of better understanding the palaeoecology of early eukaryotes. Our study of the palaeobiodiversity shows the presence of prokaryotes and eukaryotes in the basin. Palaeoredox conditions rapidly fluctuated from anoxic to oxic states across the basin, but in terms of anoxic episodes, ferruginous conditions dominated in epicratonic environments, while euxinia was prevalent in pericratonic environments. A relatively higher fossil eukaryotic diversity was observed from epicratonic environments.

[1] Javaux and Knoll (in press), *J Paleontology*; [2] Anbar and Knoll (2002), *Science* **297**, 1137-1142; [3] Johnston et al. (2009), *PNAS*, **106**, 16925-16929.