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Major changes in the marine and terrestrial environment during the latest Aptian and earliest Albian

J.O. Herrle

Earth and Atmospheric Sciences, University of Alberta, 1-26 Earth Sciences Building, Edmonton, Alberta, T6G 2E3, Canada (herrle@ualberta.ca)

The latest Aptian to earliest Albian is characterized by the first appearance of a distinctly modern phytoplankton community accompanied by a cold episode during a generally extreme greenhouse climate. Massive burial of organic matter caused the formation of the black shale 'Niveaus' Jacob, Kilian, Paquier and Leenhardt in the Vocontian Basin (SE France). This interval is reported as the Oceanic Anoxic Event 1b (OAE1b) following the definition of Leckie et al. (2002). Lasting about four million years, OAE1b facilitates analysis of rapid climate change in a greenhouse world, and crucial for understanding climate change.

During latest Aptian angiosperms and diatoms became abundant in the terrestrial and marine environments (Gersonde & Haywood 1990; Heimhofer et al. 2005). Planktic foraminifera experienced their greatest turnover rates since their first appearance, accompanied by a decrease in test size and changes of the ultrastructures of their shells (Leckie et al. 2002). Calcareous nannoplankton show a major change characterized by the influx of the boreal cool water indicator *Repagulum parvidentatum* into the Tethyan Realm (Herrle & Mutterlose 2003). Moreover, ammonite faunas became more cosmopolitan at the expense of Tethyan taxa during this period. Both the influx of boreal nannoplankton taxa and the trend to more cosmopolitian ammonite assemblages in the Tethyan Realm was probably favored by a long-term sea level rise accompanied by a global cooling during the late Aptian to early Albian interval. Most dramatic changes of the marine carbonate system are reflected by the stepwise decrease of nannoconids and carbonate platform drowning accompanied by a positive carbon isotope excursion which is similar to the biocalcification crisis associated with

the early Aptian OAE1a (Erba 1994, Weissert et al., 1998). The massive change in the global carbon cycle is probably linked to a major change in global marine productivity from a calcareous system (nannoconids, foraminifera, carbonate platforms) to a siliceous system (diatoms, sponge spicules), and may reflect the transition to the modern marine ecosystem. However, causes and consequences of these changes remain to be enigmatic and may be linked to changes in the global circulation system, nutrient partitioning, ocean chemistry, global sea-level change, and cooler climate during the Late Aptian to early Albian interval.