Orbital Turning of the upper Albian from the site U1513D – Palaeoenvironmental implications

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An exceptional record of Cretaceous climate and carbon cycle perturbations was recovered at Site U1513 in the Mentelle Basin, southwest of Australia at a paleolatitude of 60°S, during IODP Expedition (Huber et al., 2019). However, sediments across the Albian–Cenomanian transition (307.10 to 282.61 m) are barren of microfossils, and this lack of biostratigraphic indicators limits our ability to study paleoenvironmental change. Here we present results from cyclostratigraphic analyses, which provide new age constraints for the Albian-Cenomanian boundary. Time series analysis of high-resolution (2 cm) elemental data obtained through XRF core-scanning and natural gamma radiation confirm the influence of orbital forcing. Filtering the 3.5 m periodicity, which likely corresponds to the short (100 kyr) component of eccentricity-modulated precession, leads to a duration estimate of 64*100= 6.4 Myr for the interval covering the Albian–Cenomanian transition (from 387m to 285.45 m). Independently derived logging data of natural gamma radiation reveal a similar number of short eccentricity cycles. The barren interval contain 23 cyles of short eccentricity suggesting a duration of 23*100=2.3 Myr. The clear expression of short eccentricity cycles allows us to estimate the duration of the barren interval at 2.3 Myr. This astronomical time scale provides an age model to reconstruct the timing of changes in Cretaceous oceanography and sedimentation in the Mentelle Basin, and highlights the sensitivity of southern high latitude paleoclimate to eccentricity forcing.

Keywords: IODP, U1513D, Orbital Turning, Upper Albian

Huber et al. 2019. Site U1513. *In* Hobbs, R.W., Huber, B.T., Bogus, K.A., and the Expedition 369 Scientists, *Australia Cretaceous Climate and Tectonics*. Proceedings of the International Ocean Discovery Program, 369: College Station, TX (International Ocean Discovery Program).