

Paleoenvironmental perturbation of southern high latitudes across Oceanic Anoxic Event 1b through lower Albian, Cretaceous

*Toshiyuki Matsuta¹, Takashi Hasegawa¹

1. Kanazawa University

Cretaceous is a period of high volcanic activity and higher average temperature of the Earth surface compared with modern condition (Scotese et al., 2021, Earth Science Reviews). Oceanic Anoxic Event 1b is recorded in the late Aptian through early Albian marine sediments distributed over low latitude regions in the Northern Hemisphere (Leckie et al., 2002, Paleooceanography). To understand the global view of OAE1b, further studies from Southern Hemisphere are required. In this study, geochemistry of IODP Site U1513 from the Mentelle Basin off southwestern Australia was studied. The site was located in high latitudes of Southern Hemisphere during Cretaceous. Total organic carbon content (TOC), total nitrogen content (TN), organic carbon isotope ratio ($\delta^{13}\text{C}_{\text{org}}$), carbonate carbon and oxygen isotope ratios ($\delta^{13}\text{C}_{\text{carb}}$ and $\delta^{18}\text{O}_{\text{carb}}$) were analyzed. Initially, carbon isotope stratigraphy was constructed for inter-regional correlation that also allowed us to recognize OAE1b horizon. Negative excursion with double trough that characterize OAE1b (Paquier level) was found both from $\delta^{13}\text{C}_{\text{carb}}$ and $\delta^{13}\text{C}_{\text{org}}$ curve. In association with the excursion, $\delta^{18}\text{O}_{\text{carb}}$ also showed conspicuous negative excursion suggesting rapid warming of surface water more than 10 °C during OAE1b. Then the $\delta^{18}\text{O}_{\text{carb}}$ showed gradual recovery (cooling). TOC/TN ratio indicated that the organic matter was mainly derived from terrestrial plants, and that relative contribution of terrestrial plants in the total organic matter fluctuated with surface water temperature. In summary, paleoenvironments recorded in Site U1513, southern high latitude, was fluctuated in association with OAE1b. It suggests that the extension of OAE1b was reached deep in the Southern Hemisphere and it was a quasi-global event.

Keywords: Oceanic Anoxic Event 1b, The high latitudes of the Southern Hemisphere, IODP Exp.369 U1513