Terrestrial biota and climate during Cretaceous greenhouse in NE China

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Northeast China offers a unique opportunity to perceive Cretaceous stratigraphy and climate of terrestrial settings. The sediments contain variegated clastic and volcanic rocks, diverse terrestrial fossils, and important coal and oil resources. Four Cretaceous biotas of Jehol, Fuxin, Songhuajiang and Jiayin occurred in ascending order. For scientific purpose, a coring program (SK1) provides significant material for Cretaceous research. The SK1 presents a continuous section of Upper Cretaceous non-marine fossils, magnetochron successions and chronostratigraphic events. These events are integrated with marine events by an X/Y graphic plot between the core data and a global database of GSSP and key reference sections (SCOTT et al., 2012). More precisely, age interpolation based on CA-ID-TIMS U–Pb zircon dates and the calibrated cyclostratigraphy places the end of the Cretaceous Normal Superchon at 83.07 ±0.15 Ma (DENG et al., 2013). This date also serves as an estimate for the Santonian–Campanian stage boundary (HE et al., 2012; WANG et al., 2016). It also places the K/Pg boundary within the upper part of the Mingshui Formation. The terrestrial and marine life and the analytical data of elemental composition, $\delta^{13}C_{org}$, and biomarkers show that lake water salinity changed along with a Coniacian–Santonian marine incursion. High lake-level coincides with the sea transgression during the time. High salinity resulted in the development of periodic anoxic environments of the basin. One of these times of deposition of organic-rich mud correlates with the mangnetochron of C34N/C33R and Coniacian–Santonian planktic foraminifera horizon. This marine flooding correlates with OAE 3 and it is possible that the global oceanic anoxic event may have influenced organic carbon burial in the Songliao Basin for this brief period. The evolution of 4 biotas corresponds to the Cretaceous climate change. We tentatively interpret the terrestrial record to reflect the changes in both global climate and regional basin evolution.

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