Campanian-Maastrichtian (Late Cretaceous) Paleoenvironment in the East Asia: Palynological insights

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Knowledge of the Cretaceous climatic changes has been derived principally from oceanic scientific drilling. Global cooling would have occurred before and after the Campanian/Maastrichtian (C/M) boundary (Late Cretaceous), judging from the marine sediment records (e.g. Miller et al., 2005). This cooling event may have affected terrestrial organisms. Especially, plants are sensitive to climate change, and flora would have been affected by the global cooling.

The Songliao Basin is the largest Cretaceous oil-gas producing lacustrine basin in Northeast China. The Songliao paleo-lake was at its greatest extent in the Late Cretaceous with continuous sediment deposition (Wan et al., 2013). In recent years, the Continental Scientific Drilling Project was carried out under the framework of the International Continental Scientific Drilling Program (ICDP) to recover a nearly complete Cretaceous terrestrial sedimentary record in this basin. These core samples are named the Songke Core-1 (North) (SK1 (N)) and the Songke Core-1 (South) (SK1 (S)). The SK1 expected to provide hints of the influence of the cooling event in land. We examined spore and pollen obtained from the SK1 (N) to obtain hints of the influence of the global cooling in terrestrial region in East Asia.

In the Songliao Basin, the C/M boundary is considered to exist in the section from the uppermost Nenjiang to lower Mingshui Formations (e.g. Wan et al., 2013). However, its stratigraphic position has been controversial still. We re-examined the stratigraphic position in the SK1 based on the newest Geological Time Scale. The C/M boundary is in normal polarity of C32 (Gradstein et al., 2012). Deng et al. (2013) revealed the magnetostratigraphy in the SK1, and suggested that N2, which is normal polarity from the upper Sifangtai to the lower Mingshui Formations, could be readily correlated with C32n. Therefore, this boundary could have existed in this normal polarity.

We corrected 47 rock samples between the uppermost Nenjiang Formation and lower Mingshui Formation, and found 70 genera and 136 species from 13 horizons. Most of occurrence horizons yielded *Abietineaepollenites* spp., *Cedripites* spp., and

Psophosphaera spp. Gao et al. (1999) carried out palynorogical analysis in the Songliao Basin, and explained parents of each genus, temperature zone, and humidity of their habitat. We applied our result to the conclusion of Gao et al. (1999) for examining paleaoenvironmental change.

Abiespollenites spp., *Balmeisporites* spp., *Inaperturopollenites* spp., and *Ephedripites* spp. prefer temperate temperature, and increased in N2. The C/M boundary may have existed in this normal polarity. This fact could be one of the influences of the global cooling. In other wards, parents of these genera could have increased in vegetation by the global cooling of the C/M boundary.

We proposed a range of stratigraphic position of the C/M boundary in the Songliao Basin (SK1). In the standard chronostratigraphy, however, the C/M boundary has been defined in marine sediments (Gradstein et al., 2012). Lacustrine deposits of the Songliao Basin need to correlate with marine deposits. The Izumi Group is one of the Upper Cretaceous marine deposits in southwest Japan. This group yields spore and pollen, and has a potential to produce a biostratigraphic framework for the Campanian-Maastrichtian. We found spore and pollen from 17 localities above and below the C/M boundary in the Izumi Group. We will attempt to correlate palynofloral assemblages of the Songliao Basin with those of the Izumi Group.

References

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