Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)
©2009. Japan Geoscience Union. All Rights Reserved.

MIS009-P02 Room: Convention Hall Time: May 25 17:15-18:45

Reconstruction of terrestrial paleoenvironmental change from the Jurassic-Cretaceous lacustrine deposits in SE Mongolia

Hitoshi Hasegawa[1*], Hisao Ando[2], Takashi Hasegawa[3], Tohru Ohta[4], Masanobu Yamamoto[5], Noriko Hasebe[6], Gang Li[7], Niiden Ichinnorov[8]

[1]CRIS, Hokkaido University, [2]Dept. of Earth Sciences, Ibaraki Univ., [3]Dept. of Earth Sciences, Kanazawa Univ., [4]Faculty of Edu., Int. Arts, Sci., Waseda, [5]Faculty of Env. Ear. Sci., Hokkaido Univ, [6]Division of Ear., Env. Sci., Kanazawa U., [7]Nanjing Inst. of Geol. and Palaeont., [8]Paleontol. Center, MAS, Mongolia

The Jurassic-Cretaceous period is characterized by an extremely warm "greenhouse" climate, elevated atmospheric CO2 levels, and repeated occurrences of Ocean Anoxic Events (OAEs); however, detailed processes and causal mechanisms of these marked events, particularly the response of terrestrial climate system, have been poorly understood. Possible causal mechanisms of OAEs in the greenhouse conditions include enhanced surface productivity and the excess of organic burial in the oceans. Terrestrial weathering may have increased terrigenous input into the oceans ("Weathering Hypothesis"; e.g., Weisert et al., 1998; Hasegawa, T., 2003). To evaluate interaction between the land and the ocean during OAE interval, we investigated terrestrial paleoenvironments at intra-continental sites in eastern Eurasia.

We examined the lower Cretaceous and the middle-late Jurassic lacustrine deposits (Shinekhudag and Khamarkhoovor formations, respectively) in southeast Mongolia. The Shinekhudag Formation, well exposed in the Shine Khudag locality, is composed mainly of paper shale, oil shale and silty mudstone, with high content of organic carbon. Strata are continuously exposed about 50 0 m in thickness. The age of the Shinekhudag Formation is estimated as Aptian or Barremian-Aptian based on the floral and molluscan evidence (Martinson and Shuvalov, 1973; Krassilov, 198 2; Jerzykiewicz and Russell, 1991), and K-Ar age data of basaltic rocks in the uppermost part of the underlying Tsagantsav Formation (ca. 126 Ma: Graham et al., 2001). Khamarkhoovor Formation, well exposed in the Eedemt locality, is also composed of paper shale, oil shale and silty mudstone, with higher content of organic carbon. The age of the strata in Eedemt locality is newly defined as middle-late Jurassic, based on the conchostracans biostratigraphy (Li et al., in submitted). These shale and silty mudstone successions are rhythmically alternated (decimeter-, meter-, tens of meter-scale) both in Shine Khudag and Eedemt localities, which can be controlled by orbital cycles.

To establish detail chronostratigraphy of the middle Jurassic-lower Cretaceous lacustrine deposits and reconstruct terrestrial paleoenvironmental changes, we are conducting the following approaches; 1) carbon-isotope stratigraphy; 2) cyclostratigraphy of the rhythmically alternated shale and silty mudstone successions; 3) conchostracans biostratigraphy; 4) fission-track age dating of intercalated tuff; 5) reconstruction of paleoweathering changes based on the major elemental ratios and weathering index (Ohta & Arai, 2007); and 6) paleotemperature reconstruction with organic proxies (e.g., TEX86). Establishment of the carbon-isotope stratigraphy and high resolution cyclostratigraphy enable us a high-resolution and precise correlation of the terrestrial paleoenvironmental changes with the specific global events (such as OAEs). Understanding of the global climate system, in particular, the terrestrial climate during the past "greenhouse" period gives clue to future prediction of anthropogenic global warming.

Keywords: lacustrine deposits, Cretaceous, Jurassic, terrestrial, cyclostratigraphy, OAEs