Lower Cretaceous formations and paleontology in southeast Mongolia

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The Lower Cretaceous formations in Mongolia are composed of alluvial to fluvio-lacustrine deposits of the Tsagantsav Formation, lacustrine deposits of the Shinekhudag Formation and coal-bearing fluvial deposits of the Khukhteeg Formation in ascending order. Here we summarize stratigraphy and paleontological age constrains of Mongolian Lower Cretaceous deposits.

The Lower Cretaceous Tsagantsav Formation consists of coarse-grained fluvial deposits, fine-grained alluvial plain and lacustrine deposits. The type section of the Tsagantsav Formation is well exposed in Khara Khutul in the East Gobi basin, which consists of sandstone dominant and finer-grained lithology. GRAHAM *et al.* (2001) reported late Neocomian age based on $^{40}Ar/^{39}Ar$ age of 131 ± 1 Ma (Khara Khutul section) and 126 ± 1 Ma (Tsagan Tsav section) of the intercalated basalts. Plant fossils preserved within the sediments also indicate Valanginian to Barremian age. The Tsagantsav Formation contains abundant fossil remains, such as conchostracans, ostracode, plants, dinosaurs (Psittacosauridae), spores and pollen.

The Shinekhudag Formation crops out well in the East Gobi, Nyalga and Choibalsan basins. The type section of this formation crops out in the Shine Khudag locality in northeastern East Gobi. The Formation with 300 to 700 m thickness is composed of paper shale (well-laminated shale), dolomitic marls, dolomite, siltstone and sandstone, which represent characteristics of offshore lacustrine facies in large (extensive), perennial lakes. It also contains abundant fossil remains, such as conchostracans, ostracode, plants, bivalves, and gastropods, charophytes, spores and pollen. The Ar^{40}/Ar^{39} age of intercalated basalts in the upper part of the underlying Tsagantsav Formation is also consistent with the Aptian age of the Shinekhudag Formation. Based on the radiometric age dating (U/Pb age of intercalated tuff), the Shinekhudag Formation is considered to be deposited between ca. 123–119 Ma.

The Khukhteeg Formation is composed mainly of dark greyish coaly mudstone, light greyish sandstones and conglomerates. It is widespread in the east and central Mongolia with a characteristic feature of abundant coal seams (Shivee Ovoo, Tevshin Gobi, Bayan Erkhet, Khuren Dukh, Nalaikh, Baga Nuur localities). The thickness is about 150–300 m. In the type section of the Khukh Teeg hill there are abundant remains of stromatolites. The Khukhteeg Formation is dated as Albian or Aptian–Albian based on the basis of stratigraphic occurrences of turtles and mammals (Dosh Uul, Khar Khutul, Khukh Teeg), molluscs (Khamaryn Khural), champsosaurs and pollen-spore. Plant megafossils suggest that the deposits are late Aptian to Albian in age due to the floral similarity with the equivalent strata in the Amur Basin, Japan and northeastern China.