

## GEOLOGICAL SIGNIFICANT OF SPOROPOLLEN ASSEMBLAGE IN THE XUESHAN FORMATION

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The Xueshan Formation is a set of red coarse clastic deposit of land facies consisting mainly of lithic sandstone, pebbled sandstone, conglomerate, intercalated with siltstone and mudstone. It is distributed in the eastern part of north Qiangtang Basin, and overlies conformably the Suowa Formation bearing marine fossils. It is very difficult to find valuable fossils from the Xueshan Formation excepting rare bivalve fragments and prints.

We collected a few spore and pollen samples from the middle part of the Xueshan Formation in Tuonamulematianbao section, Shuanghu, in 1997, when we made geological survey for petroleum and nature gas. Some fossils of spore and pollen were obtained from these samples. They are: *Cyathidites minor*, *Toroisporis* sp., *Todisporites minor*, *Lygodiumsporites subsimplex*, *Cicatricosisporites ludbrookii*, *C.* sp., *Psophosphaera* sp., *Chasmatosporites minor*, *Classopollis annulatus*, *C. clssoides*, *C. minor*, *Cerebrropollenites carlylensis*, *Callialasporites dampieri*, *Quadraeculina anellaeformis*, *Pseudopicea variabiliformis*.

Among the sporopollen assemblage, *Classopollis* and *Cyathidites* are the common elements in Jurassic, and often occur in the underlying Suowa Formation. But, the proportion of the important Cretaceous elements, *Lygodiumsporites subsimplex*, *Cicatricosisporites ludbrookii*, *C.* sp., is higher than that in the Suowa Formation.

The common appearance of the spore Lygodiaceae is the important characteristics of the Cretaceous sporopollen assemblage. Especially, *Cicatricosisporites* is believed as the typical Cretaceous sporopollen member by some stratigraphers. However, there are different views on its initial appearance. According to some exiting information, there are few pioneers of this genus occurring in Tithonian of upper Jurassic in southern England, eastern Holland, northern Germany, Poland, Moskov area of Russia, and western Canada. In our country, *Lygodiumsporites subsimplex*, *Cicatricosisporites* sp. were found in the Datonghe Formation of the late Jurassic in Minhe basin, Qinghai. Similarly, there are also *Lygodiumsporites* sp., *Cicatricosisporites* sp. in the Penglaizhen Formation of the upper part of the upper Jurassic in Sichuan basin. Yu-jingshan placed the Rehe Group of the western Liaonin into the upper Jurassic according to its bivalve assemblage, although Pu-ronggan maintained that this Group belongs to lower Cretaceous for it contains *Lygodiumsporites* sp., *Cicatricosisporites* sp.

In addition, we obtained 8 ESR ages from the Xueshan Formation. They vary from 158.0 to 131.0 Ma., corresponding to the time range from the late Jurassic to the early-early Cretaceous (Oxfordian to Hanterivian).

In view of the above-mentioned facts, we believe that the Xueshan Formation is a diachronous lithostratigraphical unit, and the Qiangtang Basin began uplifting and breaking away from the marine environment in the Oxfordian period.

**Key words:** Northern Qiangtang; Xueshan Formation; sporopollen assemblage; diachronous; Oxfordian; uplifting