Foraminiferal biostratigraphy of the Jurassic/Cretaceous transition sequence of the Gucuo section in northern Nyalam, southern Tibet

FANG, Peiyue [1,2], LI, Gang[1,*]

[1] State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Scinces, Nanjing 210008, China
[2] University of Chinese Academy of Sciences, Beijing 100049, China
*gangli@nigpas.ac.cn

According to the latest International Stratigraphic Chart, the base of the Cretaceous is the last system boundary to have a GSSP. It is not an accident because it is fraught with problems and complications. Ammonite, as one of the most important index fossils, has its deficiency of faunal continuity and provincialism during the Jurassic/Cretaceous (J/K) transition. Other fossils, like calpionellids and nannofossils, and non-fossil methods, such as magnetostratigraphy, all have their dificiencies to be used to define this boundary at the moment.

Several decades studies on the biostratigraphy of the J/K boundary sequences in southern Tibet may provide some crucial links for correlating the strata of the western Tethys with that of Pacific domain (Wan et al., 2005). The Gucuo section in northern Nyalam, which has a relative simple structure and yields aboundant fossils, was thought to be one of the best sections to search for the J/K boundary in Tibet (Liu and Wang, 1987; Liu, 1988; Yao et al., 1990).

In the Gucuo sections, the Upper Jurassic Menkadun Formation (Fm) is immediately followed by the Lower Cretaceous Gucuo Fm 1, 2, 3, 4 and 5 (Liu and Wang, 1987). The Gucuo Fm 1 is composed of white, coarse-grained sandstones in the lower part, and a suite of yellow-greenish shales with abundant concretions in the upper part (Yin and Enay, 2004). The Gucuo Fm 2 is composed of greyish green and black shales, mudstone, coarse sandstone and marls. The J/K boundary was delineated either at the base of the Gucuo Fm 1 (Yue et al., 2003), or between the Gucuo Fm 1 and Gucuo Fm 2 (Liu and Wang, 1987; Liu, 1988), or within the Gucuo Fm 1 (Shi, 2000).

In order to settle this dispute we have carried out a microfossil biostratigraphic research on the J/K boundary sequence at the Gucuo village. We collected 79 microfossil samples from the Menkadun Fm, and 50 samples from the Gucuo Fm 1 and Gucuo Fm 2. In total, 50 samples were analysised in the laboratory. We have for the first time found benthic foraminifers in 14 samples, which are mainly from the Gucuo Fm 1. The abundant foraminifer fauna consists of 14 genera (including 10 identified species): *Hyperammina gaultina*, *Rhabdammina cylindrica*, *Ammobaculites agglutinans*, *Ammobaculites coprolithiformis*,

Ammobaculites areniferus, *Ammobaculites cuneatus*, *Ammobaculites* spp., *Ammodiscus* spp., *Astacolus* spp., *Marginulina* spp., *Dentalina biloculina*, *Dentalina* spp., *Nodosaria biloculina*, *Nodosaia* spp., *Lagenammina* spp., *Reophax nodulosus*, *Reophax metensis*, *Reophax* spp., *Haplophragmium* spp., *Trochammina* spp., *Haplophragmoides* spp., *Lenticulina* spp.

Although most of the above mentioned taxa have a long geological range, *Rhabdammina cylindrica* Glaessner, 1937 ranges from Berriasian to Valanginian, *Ammobaculites cuneatus* Vasilenko, 1951 and *Haplophragmoides* Cushman, 1910 occur since the Early Cretaceous. Thus, the above mentioned benthic foraminifer fauna can be of an Early Cretaceous age, which supports the Early Cretaceous age assignment for the Gucuo Fm 1.

References

Wan, X.Q., Gao, L.F., Li, G.B., Chen, W. and Zhang, Y., 2005, Jurassic-Cretaceous Boundary Strata in Gyangze-Nagarze Area, Tibet. *Geoscience*, **19**, 479-487 (in Chinese).

Liu, G.F., 1988, Late Jurassic and Early Cretaceous ammonites from Nyalam Gucuo area Xizang (Tibet). In: Professional Papers of Xizang (Tibet) Paleontology. Chinese Academy of Geological Sciences. Geological Publishing House, Beijing, pp. 1–65 (in Chinese, with English abstract).

Liu, G.F. and Wang, S.E., 1987, A new advance in study of the upper Jurassic and Lower Cretaceous of the Himalayas, Xizang (Tibet). In: Editorial Committee of Professional Papers of Stratigraphy and Palaeontology, Chinese Academy of Geological Sciences (Ed.), Professional Papers of Stratigraphy and Palaeontology No. 17. Geological Publishing House, Beijing, pp. 143-166 (in Chinese, with English abstract).

Yao, P.Y., Liu, X. and Fu, D.R., 1991, New observation on the Jurassic-Cretaceous boundary section at Gucuo, Nyalam, Xizang. *Bulletin of the Chinese Academy of Geological Sciences*, **21**, 41–54 (in Chinese, with English abstract).

Yin, J.R. and Enay, R., 2004, Tithonian ammonoid biostratigraphy in eastern Himalayan Tibet. *Geobios*, **37**, 667-686.

Shi, X.Y., 2000, Latest Jurassic to Early Cretaceous depositional sequences and environment evolution in the Qomolongma area, South Xizang(Tibet). Proceeding of the Third National Stratigraphical Conference of China. Beijing: Geological Publishing House, pp. 260-264 (in Chinese).

Yue, L.Q., Shi, X.Y. and Wang, H.Z., 2003, Sedimentary environments of submarine fan of the Lower Cretaceous in northern Himalayas. *Journal of Palaeogeography*, **5**, 391-403 (in Chinese, with English abstract).