

简报

# 湖北三叠纪海生爬行动物的层位及时代<sup>1)</sup>

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**摘要** 通过对化石点的实地调查证实,湖北南漳、远安发现的海生爬行类除孙氏南漳龙(大冶组顶部或嘉陵江组底部)外都产自嘉陵江组,它们的时代同为早三叠世奥伦尼克期。由孙氏南漳龙、南漳湖北鳄、湖北汉江蜥和远安贵州龙形成的这一海生爬行动物组合,是上扬子地区层位最低的,生存时代早于其他海生爬行动物组合。与产自欧洲的肿肋龙类有密切亲缘关系的贵州龙和汉江蜥,是该科最早的代表,也是鳍龙类最早的代表之一,为探讨鳍龙类和肿肋龙类的起源及传播提供了新的证据。

**关键词** 湖北远安、南漳,早三叠世,海生爬行类

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中国三叠纪海生爬行动物化石分布于贵州、湖北、安徽、广西、西藏等省区,其中前两个省产出化石最丰富。湖北已经发现和报道的化石包括孙氏南漳龙(*Nanchangosaurus suni* Wang, 1959)、南漳湖北鳄(*Hupehsuchus nanchangensis* Young, 1972)、湖北汉江蜥(*Hanosaurus hupehensis* Young, 1972)和远安贵州龙(*Keichousaurus yuananensis* Young, 1965)。它们分布于鄂西的南漳和远安两县。这些化石都有确切地点信息,但有关层位和时代的确定却有些混乱。原因是化石是由不同的人在不同的时期采集的,在确定含化石地层的时代时使用了不同的标准。为了搞清这些化石的层位和时代,更好地与贵州三叠纪海生爬行动物进行对比,2001年9月我们实地考察了上述各化石的产地,得出了一些不同于前人的结论。

据王恭睦(1959)报道,孙氏南漳龙产于“湖北省南漳县巡检区凉水泉乡古井阴坡。……湖北地质队根据岩性判断,该标本应产于大冶石灰岩中,但实际层位尚不清楚。……时代应属于早三叠世,但由于南漳龙有较原始的构造,故可能属于早三叠世早期”。杨钟健和董枝明(1972)在综述中国的水生爬行动物概况时接受了这一观点。但Carroll and Dong(1991)在对化石进行重新研究时称“孙氏南漳龙最初被记述为采自下三叠统,但现在它的时代被推测为中三叠世,虽然它比南漳湖北鳄的时代要早一些”。他们在文章中并未陈述时代变更的理由。由于“大冶灰岩”这一名称在建立的初期包括的范围较大,后赵金科等(1962)将鄂西大冶灰岩上部以白云岩为主的地层划分为“嘉陵江组”,归于中三叠世;下部以薄层为主的灰岩称“大冶群”,归于早三叠世。目前首先需要确定的是化石产出

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的层位。据此次调查,凉水泉乡的现用名为雷坪乡,古井的现用名是焦家湾。焦家湾村庄附近既分布有大冶组顶部的薄层灰岩也有嘉陵江组底部的浅色白云质灰岩。据当地村民介绍,近年来在这两个层位中都有“龙”化石发现。虽然村民热心地为我们指认了发现孙氏南漳龙的山坡,但他们说化石是在山坡上捡到的,由于年代久远,无从考证,目前只能笼统地认为化石发现于大冶组的最顶部或嘉陵江组底部。据最新的区域地层研究资料(徐光洪等,2002),大冶组为跨时代的地层单元,它的一至三段属印度阶,第四段与嘉陵江组属于奥伦尼克阶。发现于大冶组顶部或嘉陵江组底部的孙氏南漳龙时代为早三叠世奥伦尼克期早期。

湖北汉江蜥发现于南漳县巡检乡松树沟老湾。杨钟健先生将其层位归于嘉陵江组下部,时代定为中三叠世早期。此次在老湾村附近发现有巴东组底部的杂色碎屑岩。而产出化石的地点(N31°25'16.3", E111°37'42.5")与嘉陵江组—巴东组的界线相距不远,含化石层当属嘉陵江组的上部。

南漳湖北鳄发现于南漳县巡检乡白鹤船(白河川)土岭。我们在土岭村未找到化石的发现者,因此很难确定化石的确切层位。但当地大面积嘉陵江组灰岩的出露表明,可能确如 Carroll and Dong (1991)所推测的,南漳湖北鳄的时代要晚于孙氏南漳龙,并且近年来在嘉陵江组中发现过不少南漳湖北鳄标本。远安贵州龙同样产于嘉陵江灰岩中,化石点位于远安县城西北望城乡。

此次野外工作证实,除孙氏南漳龙产自大冶组顶部或嘉陵江组底部外,湖北汉江蜥、南漳湖北鳄和远安贵州龙都产自嘉陵江组。中南地区区域地层表编写小组(1972)和陈公信等(1996)都将嘉陵江组的时代确认为早—中三叠世。陈公信等明确指出,嘉陵江组下至上部属于早三叠世晚期(奥伦尼克期),顶部属于中三叠世早期(安尼期)。徐光洪等(2002)则将嘉陵江组完全置于奥伦尼克阶之内,二者的区别在于对嘉陵江组顶部层位的处理不同。其实他们所持的年代地层划分意见是完全一致的,只不过在岩石地层单位划分时,对嘉陵江组厘定的涵义不同而已。陈公信等所指的嘉陵江组顶部为一套浅灰色、灰黄色钙质泥岩夹泥灰岩组合,其中所产的双壳类化石可以确定其时代属中三叠世。若将该套地层纳入嘉陵江组,则嘉陵江组的时代无疑为早—中三叠世。但这套地层无论岩石组合特征,还是生物发育特征都与下伏地层迥异,通常置于巴东组底部。而徐光洪等的划分则将该套地层置于巴东组的底部。因此,本区海生爬行动物的时代属早三叠世,应予首肯。

含化石地层及其时代的准确确定对探讨海生爬行动物类群的起源和迁徙,及古动物地理区系的研究具有重要意义。此次野外工作时间虽短,但可得出下列结论:

1) 湖北南漳、远安发现的海生爬行类除孙氏南漳龙(大冶组顶部或嘉陵江组底部)外都产自嘉陵江组,它们的时代同为早三叠世奥伦尼克期。

2) 近年对黔西南地区三叠纪脊椎动物化石的研究确认了4个海生爬行动物的组合带,最早的组合带出现于关岭组一段,时代为中三叠世安尼期(Wang et al., 2001)。由孙氏南漳龙、南漳湖北鳄、湖北汉江蜥和远安贵州龙形成的这一海生爬行动物组合,是上扬子地区层位最低的,生存时代早于其他海生爬行动物组合。其层位与下扬子区的龟山巢湖龙 *Chaohusaurus geishanensis* Young et Dong, 1972 大致相当。

3) 孙氏南漳龙和南漳湖北鳄的身体结构极为特殊,它们被 Carroll and Dong (1991) 认

为代表一个单独的湖北鳄目 (*Hupehsuchia*), 目前仅发现于中国湖北。

4) 贵州龙和汉江蜥虽然在属一级上也是东特提斯区所特有的, 但它们同属于肿肋龙亚目肿肋龙科 (*Pachypleurosauria*, *Pachypleurosauridae*) (Rieppel, 1998), 与产自欧洲的肿肋龙类有密切的亲缘关系 (Rieppel, 2000)。它们是该科最早的代表, 也是鳍龙类最早的代表之一, 为探讨鳍龙类和肿肋龙类的起源及传播提供了新的证据。

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## THE HORIZON AND AGE OF THE MARINE REPTILES FROM HUBEI PROVINCE, CHINA

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### Summary

So far four genera and species of marine reptiles have been reported from Hubei. They include: *Nanchangosaurus suni* Wang, 1959, *Hupehsuchus nanchangensis* Young, 1972, *Hanosaurus hupehensis* Young, 1972, *Keichousaurus Yuananensis* Young, 1965. All these fossils were found in Nanzhang and Yuan 'an County, Hubei Province. Detailed locality data is available for these specimens, but the horizons and the ages from which they came are mixed up due to the different standards used by the collectors at different times. The horizons and ages of these fossils were surveyed in September, 2001. Our results differ from those published before.

Based on the latest data (Xu et al., 2002), the age of Member I to Member III of Daye Formation is Indian, the age of Member IV of Daye Formation and Jialingjiang Formation is Olenekian.

The horizon from which came *Nanchangosaurus suni* is the uppermost one of the Daye Formation, or the lowermost one of the Jialingjiang Formation. The horizon of *Hanosaurus hupehensis* is the upper part of the Jialingjiang Formation. The locality (N31°25'16.3", E111°37'42.5") lies in Xunjian.

We were not able to contact the collector of the holotype of *Hupehsuchus nanchangensis*, so it is difficult to confirm the exact horizon that this fossil came from. But there are lots of outcrops of the limestone of the Jialingjiang Formation in Tuling, Baihechuan, Xunjian, the locality of the holotype of *Hupehsuchus nanchangensis*, and many specimens of *Hupehsuchus* have been found in Jialingjiang Formation in recent years, so it is possible that the age of *Hupehsuchus nanchangensis* is younger than that of *Nanchangosaurus suni* as suggest by Carroll and Dong (1991). The holotype of *Keichousaurus yuananensis*, from Wangcheng, Yuan 'an County, also comes from the Jialingjiang Formation.

These four genera of fossils form one marine reptile assemblage of Olenekian (Early Triassic) in age. This is the oldest marine reptile assemblage in Upper Yangtze area. Its horizon is comparable to that of *Chaohusaurus geishanensis* from Nanlinghu Formation in Lower Yangtze area.

The anatomy of *Nanchangosaurus suni* and *Hupehsuchus nanchangensis* is unique among reptiles. They were accordingly classified in a separate order, Hupehsuchia, by Carroll and Dong (1991). The animals of this order have been found exclusively in Hubei, China. *Hanosaurus* and *Keichousaurus* are endemic genera of East Tethys, but they are successive sister taxa of pachypleurosaurs from Europe (Rieppel, 1998). These two genera are the earliest member of Pachypleurosauridae, they are also among the earliest members of sauropterygians. They provide new insights about the origination and migration (spread) of sauropterygians and pachypleurosaurs.

### References

- Carroll RL, Dong ZM, 1991. *Hupehsuchus*, an enigmatic aquatic reptile from the Triassic of China, and the problem of establishing relationship. *Philos Trans R Soc Lond, Ser B*, **331**:131 ~ 153
- Chen G X (陈公信), Jin J W (金经纬), Wu X S (吴细松) et al., 1996. Stratigraphy (lithostratic) of Hubei Province. Multiple classification and correlation of the stratigraphy of China, **42**:1 ~ 284 (in Chinese)
- Rieppel O, 1998. The systematic status of *Hanosaurus hupehensis* (Reptilia: Sauroptergia) from the Triassic of China. *J Vert Paleont*, **18**(3):545 ~ 557
- Rieppel O, 2000. Sauropterygia I. In: Wellnhofer P ed. *Encyclopedia Paleoherpetology*, part 12A:1 ~ 134
- Wang GM (王恭睦), 1959. Discovery of a new fossil reptile from Hupeh Province, China. *Acta Paleont Sin (古生物学报)*, **7**(5):367 ~ 378 (in Chinese with German summary)
- Wang L T (王立亭), Li J L (李锦玲), Wang X J (王新金) et al., 2001. Biostratigraphy of Triassic marine reptiles in southwest Guizhou and adjacent area. *Acta Geol Sinica*, **75**(4):349 ~ 353
- Xu G H (徐光洪), Zhang Z L (张振来) et al., 2002. Triassic. In: Wang X F, Chen X H, Zhang R J et al. eds. *Protection of precise geological remains in the Yangze Gorges area, China with the study of the Archaean-Mesozoic multiple stratigraphic subdivision and sea-level change*. Beijing: Geological Publishing House (in Chinese)
- Young C C (杨钟健), 1965. On the new nothosaurs from Hupeh and Kweichow, China. *Vert Palasiat (古脊椎动物学报)*, **9**(4):315 ~ 365 (in Chinese with English summary)
- Young C C (杨钟健), 1972a. On a new Thalattosaurian from Nanchang, Hupeh, China. *Mem Inst Vert Paleont Paleoanthropol, Acad Sin A (中国科学院古脊椎动物与古人类研究所甲种专刊)*, **9**:17 ~ 27 (in Chinese)
- Young C C (杨钟健), 1972b. *Hupehsuchus nanchangensis*. *Mem Inst Vert Paleont Paleoanthropol, Acad Sin A (中国科学院古脊椎动物与古人类研究所甲种专刊)*, **9**:28 ~ 34 (in Chinese)
- Young C C (杨钟健), Dong Z M (董枝明), 1972. On the aquatic reptile of Triassic in China. *Mem Inst Vert Paleont Paleoanthropol, Acad Sin A (中国科学院古脊椎动物与古人类研究所甲种专刊)*, **9**:1 ~ 6 (in Chinese)
- Zhao J K (赵金科), Chen C Z (陈楚震), Liang X L (梁希洛), 1962. Triassic of China. *Proceedings of the National Stratigraphical Conference of China*. Beijing: Geological Publishing House. 1 ~ 132 (in Chinese)