澄江动物群国家地质公园

基础地质及考察指南

THE BASIC GEOLOGY AND INVESTIGATION GUIDEBOOK OF CHENGJIANG FAUNA NATIONAL GEOPARK

蒋志文　陈爱林　著

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内 容 提 要

本书共分四章，全面介绍澄江动物群国家地质公园，尤其侧重于基础地质和动物群最新研究成果，并为野外考察提供细节和建议。

第一章全方位介绍保护区宏观信息：地理位置，交通条件，气候水文，保护区建立、管理，保护对象和功能区划分。第二章为本书重点，系统介绍保护区悠久研究历史，地层系统，构造格架和期次，建立综合地层剖面，并对主要地层问题、重大地质事件深入讨论。第三章回眸澄江动物群发现、意义及分布，展示最新研究成果，简明扼要讨论世界著名的早期生命演化三大实例，深层次理解澄江动物群特殊地位和科学价值。第四章综合前三章内容，提供国家地质公园科学考察详细信息。

书末附有国家地质公园地质图、地形及考察路线，以及截至发稿时的研究论著目录和化石名单。

SUMMARY

The Chengjiang Fauna National Geopark is in the central part of Dongshan region, nearly 5 km S60°E of Fenglu town – the Chengjiang county town. It is extended 4 km northward and 4 km southward from its core Maotianshan mountain, which looks like an irregular "zigzag" pattern. The first discovery place of the fauna is on the west slope of Maotianshan Mountain, geographic coordinates E 102°57′30″, N 24° 39′30″, altitude +1907 m.

On 1 July 1984, HOU Xian – guang who was working in the Nanjing Institute of Geology and Palaeobiology of Academia Sinica at that time found 2 specimens, which separately belong to head shield and tail of *Naraoia longicaudata* Zhang et Huo, 1987. Moreover, there are still the paragenetic Leanchoilia, Bivalved Arthropoda, Trilobita, Branchiocarid and Worm, etc, which preserve the imprint of biological soft – bodied tissue, thus the veil of "Chengjiang Fauna" buried underground more than 500 m. y. has been opened up. It has become the focus of world attention, which has been regarded as "one of the most surprising discovery in relation to the important event of life evolution study in the 20th century", "the rare event in the history of the world palaeobiological study".

In 1988, J. W. Cowie who was the chairman of the International Stratigraphic Commission and the chairman of the International Working Group on Precambrian – Cambrian Boundary at that time defined the Chengjiang Fauna as follows: "An Association of skeletalized trilobites with prolific soft – bodied Metazoans (including arthropoda)".

In 1991, JIANG Zhi – wen supplemented the definition memtioned above: "the Chengjiang Fauna means the palaeobiological fossils (geological age 530 Ma) of paragenous skeletalized Arthropoda (including trilobita) with prolific Metazoans (partial preservation of the imprint of soft – bodied tissue), which are discovered first in the yellow – green shale of Lower Cambrian Qiongzhusi Formation Upper

Yuanshan Member on the west slope of Maotianshan Mountain" in "The Basic Geology and Development Perspective of Protected Area of Chengjiang Fauna" (Project No. D109 of Applied Basic Study Foundation of Yunnan Scientific Commission).

So far the Chengjiang Fauna has been found in many sections in Wuding, Dongchuan, Malong and Qujing, etc, outside the Chengjiang area. Moreover, it still trends extensively, but they are all within the east part of Yunnan, ie, the region from the east Niushoushan Acient upliffed area to the west Dianzhong (Central Yunnan) Old Rise (Kangdian Ancient Land) and from the Tonghai – Huaning line in the south to the north Huize, which looks like a reversal triangle. Nevertheless, the most abundant areas are the Chengjiang Fauna National Geopark and Mafang – Ercai Village of Xishan District, Kunming.

The genesis and evolution of life on the earth is one of the most important scientific difficulties to people's mind, which hasn't been solved completely yet in the earth and life sciences domain. Scientists all over the world diligently strive and do their best to find out the actual material and evidence. The discovery of Chengjiang Fauna has supplied the lack at least in the early Cambrian life evolution. There are not only the complete biological fossil varieties, original ancestors of most biological species (including Vertebrata) and very complete individuals, but also the imprint of biological soft – bodied tissue can be preserved preciously on a part of specimens, which vividly reappear the general development level, ecological model, food link of marine biological world 530 m. y. before and general appearence of the remote ancestor of present organism, and very precisely show the details of biological evolution. They are the very rare evidences of "Cambrian Biological Explosion", which is arranged in the "3 wonders of early life evolution on the earth", together with "Ediacara Fauna" (580 Ma) of Australia and "Burgess Shale Fauna" (515 Ma) of Canada.

The Chengjiang Fauna exists in the Early Cambrian marine sedimentary strata. As the carrier of fossil, the rock and stratum are not only the preservation site of fossil, but also can comprehensively reflect the environment, medium, nutriment, climate and other dynamic factors, which result in the complete explaination of the whole process of development, existence, death and burying of the fauna from other aspects, then further searching into the geological development history, structual evolution history, biological evolution history and metallogenetic history of the protec-

ted area.

In 20 – odd years since the discovery of Chengjiang Fauna, because of the excavation and study of fossil in large scale, there are rather abundant writings on palaeobiology and systematic evolution. We have had known the fauna contents, characteristics, nomenclature and basic evolution traces of various fossils. However, there are very few researching works on the basic geology of protected area, which influences the study on the geological environment, ecological system, palaeogeographic pattern of organism existence, the explanation of process of existence state, death, burying and lithifaction of organism and then certainly influences the understanding of general features of basic geology in protected area of visitors and investigators.

To counter the situation mentioned above, this book is written on the basis of "The Basic Geology and Development Perspective of Protected Area of Chengjiang Fauna" (JIANG Zhi – wen, 1991) and in combination with the new research results in recent years.

In this book, we comprehensively and systematically interpret the history of geological research and the main viewpoints on the protected area, regional geological setting and structure outline, stratigraphic system, comprehensive stratigraphic section, important stratigraphic section and fossil collection site of the protected area, the discussion about important stratigraphic problems, discovery, significance, main research results and geographical distribution of fauna, the newest fossil list of fauna, reference materials, briefing important discovery and the correlation and discussion of 3 faunas of early life evolution on the earth, etc. Finally, we put forward the suggestions on geomorphology, hydrology, vegetation, local residents, road and communication, investigation route and main scenic spots, etc, related to the geological investigation in the Chengjiang Fauna National Geopark.

目　录

CONTENTS

前　言

澄江动物群国家地质公园位于澄江县城凤麓镇 S60°E 约 5km 的东山区中部。以帽天山为核心，向北、向南各延伸约 4km，状如不规划的“∩”形。动物群首发地为帽天山西坡，地理坐标：东经 102°57′30″，北纬 24°39′30″，标高 +1907m（图 1）。

1984 年 7 月 1 日，当时在中国科学院南京地质古生物研究所工作的侯先光，于下寒武统筇竹寺组玉案山段上亚段黄灰色、黄绿色页岩中发现两块分属于 *Naraoia longicaudata* Zhang et Hou，1987（长尾纳罗虫）的头甲和尾甲标本，与之共生的还有保存生物软体组织印痕的林乔利虫、大型双瓣节肢动物、其他三叶虫、鳃虾类、蠕虫等化石，从而揭开了蕴藏地下 5 亿多年的“澄江动物群”的面纱。世人为之瞩目，称其为“20 世纪生命演化重大事件中最惊人的发现之一”，“世界古生物研究史上所罕见”。

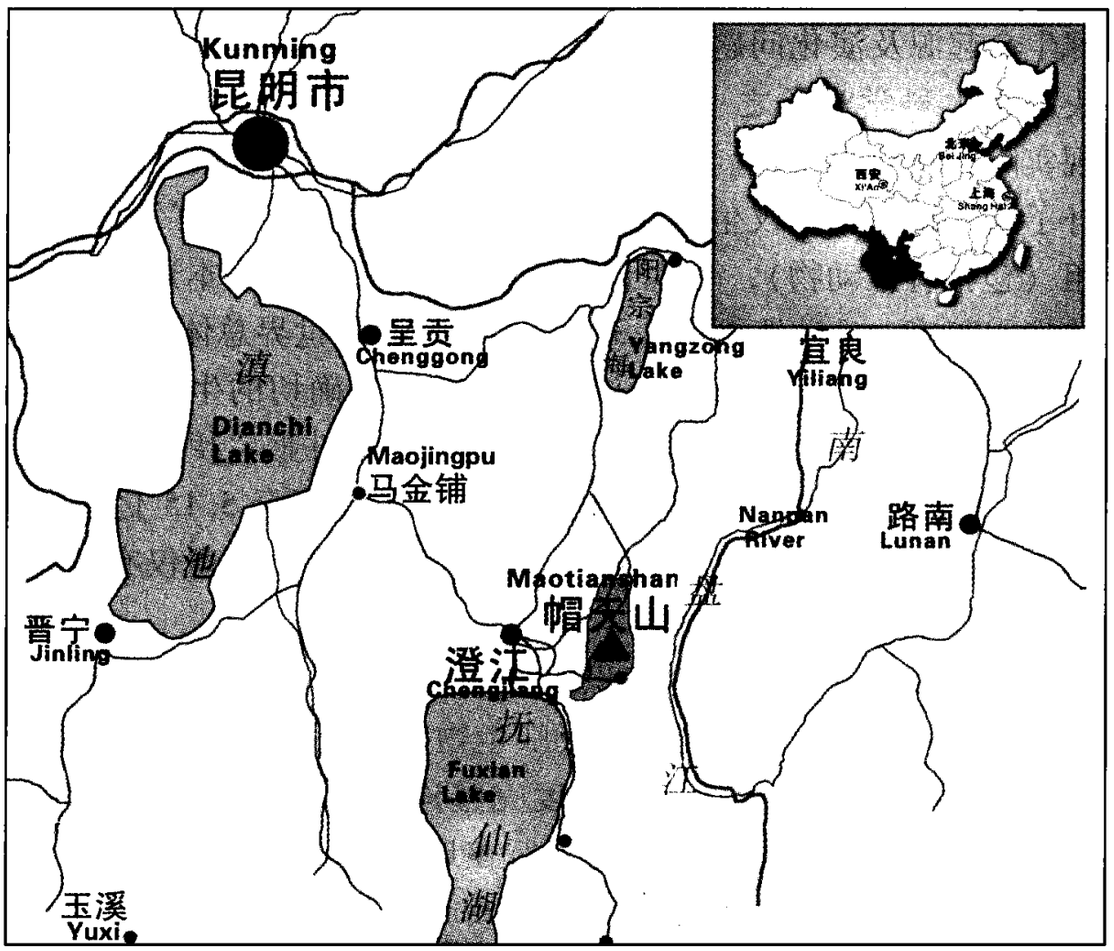

图 1　澄江动物群国家地质公园位置

1988 年，时任国际地层委员会主席、国际前寒武系—寒武系界线工作组主席 J. W. Cowie，曾将澄江动物群定义为：“*An Association of skeletalised trilo-*