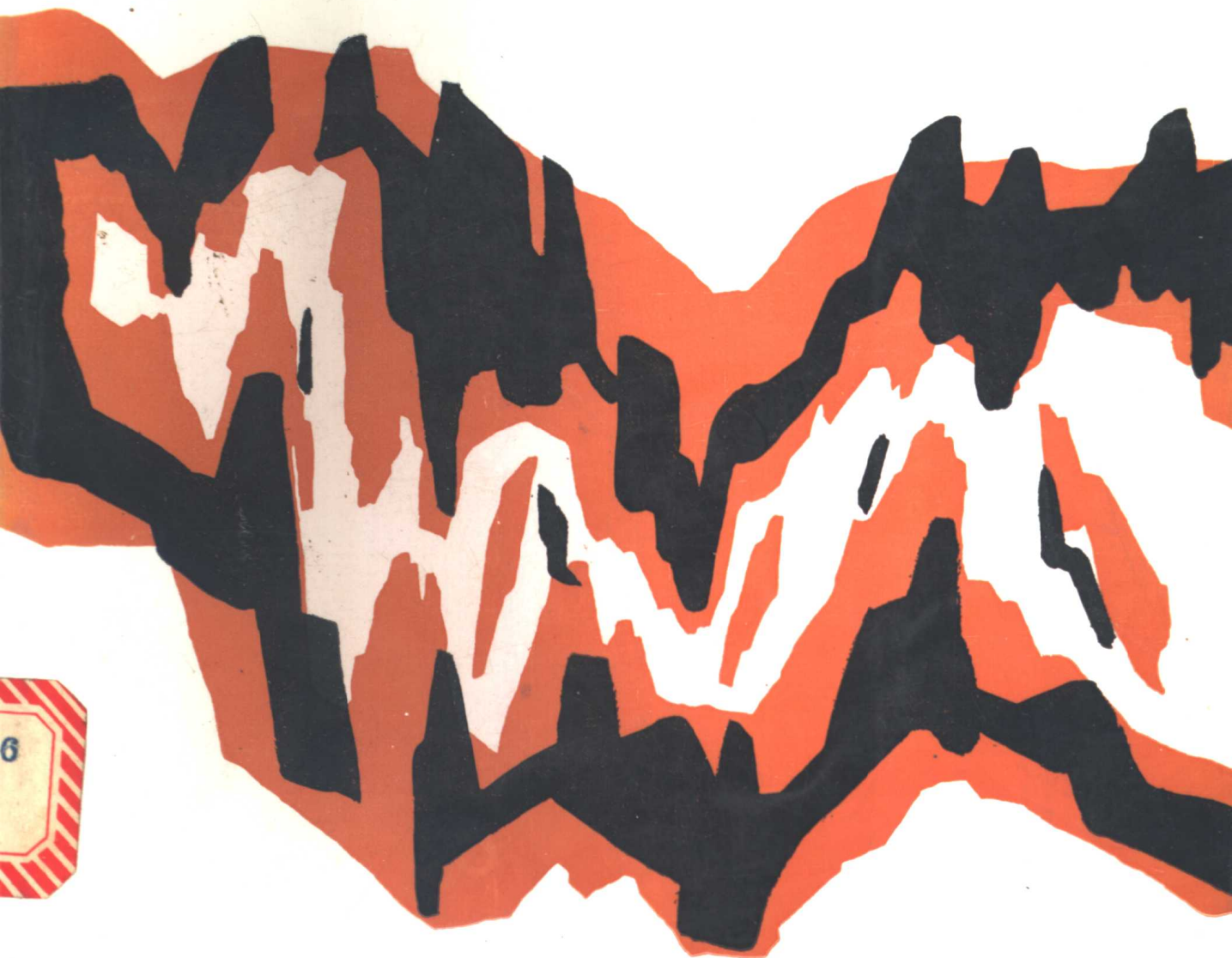


《桂林岩溶地质》之二

桂林岩溶 与碳酸盐岩

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内 容 简 介

这是一本研究碳酸盐岩与岩溶发育关系的专著。全书分两篇共十四章。第一篇详细论述了桂林泥盆—石炭系碳酸盐岩的地层、结构成因类型、沉积相、成岩后生作用和物理力学性质等；第二篇在叙述了岩溶层组类型的划分之后，以岩石地貌学观点，从微观到宏观，详细论述了各种岩溶地貌和洞穴形态的岩性控制和形成机理，最后就岩溶发育规律的研究方法问题进行了讨论。

本书是目前国内外碳酸盐岩与岩溶发育关系研究中最详细的。可供岩溶学和岩溶地区水文地质、工程地质工作者及大专院校有关专业师生参考。对于从事碳酸盐岩岩石学以及与其有关的石油地质、矿床地质和旅游地质工作者也有一定参考价值。

《桂林岩溶地质》分册目录

- 第一分册 桂林岩溶地质概论 (重庆出版社)
- 第二分册 桂林岩溶与碳酸盐岩 (重庆出版社)
- 第三分册 桂林岩溶与地质构造 (重庆出版社)
- 第四分册 桂林第四纪冰川地质 (重庆出版社)
- 第五分册 桂林岩溶洞穴 (地质出版社)
- 第六分册 桂林岩溶(画册)
(上海科学技术出版社)
- 第七分册 桂林环境水文地质与水资源保护
(中国地质科学院乙类《地质专报》)
- 第八分册 桂林水资源评价及其方法
(重庆出版社)
- 第九分册 桂林环境工程地质 (重庆出版社)
- 第十分册 机载热红外扫描在桂林岩
溶地质中应用
(中国地质科学院乙类《地质专报》)
- 各分册相应的录相拷贝由科学出版社出版

代 序

《桂林岩溶与碳酸盐岩》是一本研究碳酸盐岩与岩溶发育关系的专著，内容丰富，实验数据充分，论点明确，在中国岩溶发育基本理论的研究上，是很有意义的。据我所知，本书是国内、国外同类研究工作中最详细的。

影响岩溶发育的因素当然很多。某一地区的岩溶地貌及岩溶发育程度是多种因素综合作用的结果，但必须把各个因素分离开来，逐个作详细的分析研究，然后综合起来，才能对岩溶发育规律有更深入的了解。这也是建立具有中国特色的岩溶发育理论，在岩溶学上有所创新的必须遵循的途径。

碳酸盐岩是岩溶发育的物质基础。从上述观点来看，这个研究工作在学术上是很重要的。特别是桂林—阳朔地区是世界最著名的热带岩溶发育区，又是举世闻名的旅游风景区，选择这个地区进行这方面的详细工作，将会在国际上产生重大影响。

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南京大学地理系教授

任美铤

1986年5月26日

PREFACE

«Karst and Carbonate Rocks in Guilin» is a monograph on the relationship between carbonate rocks and development of karst. This book has substantial contents, ample data of experiment and clear arguments. It has eventful significance for fundamental theory research of karst development in China. As far as I know, this book is the most detailed in this kind of study both at home and abroad.

There are many factors that influence the development of karst. The karst topography and its development extent of any region are resulted from the comprehensive action of these factors. But only through a detailed study on each factor, then sum up all these factors, can we better understand the law governing karst development. This is the only way we should follow in establishing the karst development theory with Chinese features and bringing forth new ideas in karst science.

Carbonate rocks are the material base for karst development. Accordingly, this research is very important academically. Moreover, Guilin-Yangshuo area is well known all over the world as a type locality of tropical karst development and a scenic tourist locality. The author chooses this area to study the relationship between carbonate rocks and development of karst minutely, will perhaps exert influence to the world.

Rén Meie

Academician of Academia Sinica
and Professor of Geography of
Nanjing University
26 May, 1986

前 言

“桂林山水甲天下”。桂林—阳朔一带，以其绮丽多姿的山光水色，吸引着古今中外的游客。她已经成为国内外最著名的旅游风景区之一。

桂林的山，平地拔起，玉笋簪峰，神态仙态；漓江的水，澄澈清秀，萦绕回环，宛若青罗；山中洞穴，千回万转，深邃幽长，如入迷宫；洞内钟乳，瑰丽缤纷，琳琅满目，美不胜收。山俊、水秀、洞奇、石美，堪称桂林风景四绝。它们组成了一幅完美的岩溶景观，是最典型的热带岩溶发育区，素为国内外广大岩溶学家所瞩目。

桂林山水，不但具有重要的观赏价值，而且具有重大的科学价值。巨大的大自然力量，已经为我们祖国塑造了这一得天独厚的自然艺术之官，我们炎黄子孙就更应该奉献我们的智慧，探索这自然艺术之官的奥秘。

美丽的山，奇特的洞，无不发育于特定的岩石中。“碳酸盐岩是岩溶发育的物质基础”⁽¹⁾。过去在研究岩溶时，大多偏重于地貌形态以及气候、构造等因素的影响。地貌形态的描述固然重要，气候和构造等因素的影响也不可忽视，但如果离开了形成这种地貌的物质基础，显然就不全面了。在特定的气候、构造及水动力条件下，“某一地区的实际地形往往决定于当地岩石的性质”⁽²⁾；对于以溶蚀作用为主要营力的岩溶地貌来说，更是如此。因此，研究岩石性质对岩溶发育的影响，应该成为岩溶学研究的主要内容之一。

本世纪五十年代末至六十年代初，关于碳酸盐岩的成因和分类，在国际上发生了一次重大革命，这就是碳酸盐岩的浅水机械沉积成因学说和结构成因分类法⁽³⁾。这一新理论和新分类法，不

但促进了碳酸盐岩岩石学、岩相古地理学和沉积学理论的发展；同时在寻找石油、天然气和层控矿床等方面，已经取得了丰硕的成果，而且也为研究岩性对岩溶发育的影响，打开了新的广阔的前景。

用现代碳酸盐岩的新理论和新分类法来研究岩溶现象，始于六十年代中期^[4]。二十多年来，国内外不少作者各自从碳酸盐岩的某些特征出发，探讨了其与岩溶发育的关系^[5-17]，使岩溶发育基本理论的研究逐步深入。但是，迄今为止，我们还没有看到一本全面论述碳酸盐岩与岩溶发育关系的专著。

桂林附近，碳酸盐岩地层发育，岩石类型齐全；桂林又是举世闻名的热带岩溶发育区，“应该成为建立世界岩溶模式的基础”^[18]。因此，深入研究这个地区的碳酸盐岩与岩溶发育的关系，对于探索岩溶作用理论，研究岩溶发育规律，建立岩溶发育模式，将具有重大意义。

目 录

代序	ii
前言	iii
英文摘要	1

第一篇 碳酸盐岩

第一章 碳酸盐岩地层	17
一、区域地层概述	17
二、主要剖面简述	18
三、碳酸盐岩岩层层序	24
四、地层研究的一些新进展	26
第二章 碳酸盐岩结构成因类型	32
一、颜色	32
二、矿物成分	34
三、结构	35
四、构造	37
五、唐家湾生物礁的发现及其意义	39
六、扁豆状泥质灰岩及其成因和沉积环境分析	45
七、碳酸盐岩结构成因类型	49
第三章 碳酸盐岩沉积相	57
一、桂林泥盆—石炭纪沉积环境概述	57
二、不同相区碳酸盐岩岩性特征	58
三、不同相区碳酸盐岩的古生物标志	60
四、不同相区碳酸盐岩地球化学特征	61
五、碳酸盐沉积的水动力条件	65
六、碳酸盐岩沉积环境分析	70

七、碳酸盐岩沉积相和相模式	72
第四章 碳酸盐岩的成岩后生作用和孔隙演化	74
一、白云岩化作用	74
二、胶结作用	77
三、重结晶作用和溶解充填作用	79
四、孔隙类型和孔隙演化	80
第五章 碳酸盐岩物理力学性质	82
一、孔隙度	82
二、吸水率和渗透率	86
三、容重	87
四、力学强度	89
五、物理力学性质与岩石结构的关系	91

第二篇 碳酸盐岩与岩溶发育的关系

第六章 碳酸盐岩岩溶层组类型	95
一、岩溶层组类型的划分原则	95
二、碳酸盐岩岩层组合特征	97
三、岩溶层组类型	99
四、各岩溶层组类型的主要特征	101
五、不同层组类型的岩溶发育特征及水文地质意义	102
第七章 影响碳酸盐岩溶蚀速度的主要因素	103
一、碳酸盐岩溶蚀试验	103
二、影响溶蚀速度的岩性因素及其分类	104
三、溶蚀试验和岩性因素的原始数据	105
四、溶蚀速度与岩性关系的多元统计分析	105
五、溶蚀试验过程中的物理破坏	125
六、结论和讨论	128
第八章 碳酸盐岩的微溶蚀机理	129
一、不同成分碳酸盐岩的微溶蚀机理	129
二、不同结构组分的微溶蚀机理	130
三、溶蚀试验过程中的矿物沉淀	131
四、结论和讨论	132
第九章 方解石和白云石的差异溶蚀作用	134
一、差异溶蚀的形态类型	134

二、差异溶蚀的控制因素	135
三、结论和讨论	138
第十章 白云岩的整体岩溶化作用	140
一、白云岩的岩溶发育特征	140
二、白云岩的矿物学和岩石学特征	141
三、白云岩整体岩溶化的机理	143
四、结论和讨论	143
第十一章 峰林石山的形态类型及其岩性控制	145
一、峰林石山的形态类型	145
二、峰体形态的岩性控制	147
三、不同形态峰体的形成机理	149
四、结论和讨论	151
第十二章 山体的离立化和洞穴化程度	152
一、山体的离立化程度	153
二、山体的洞穴化程度	154
三、结论和讨论	155
第十三章 洞穴形态及其岩性控制	157
一、洞穴形态类型及其岩性控制	157
二、不同形态洞穴的形成机理	161
三、结论和讨论	162
第十四章 岩溶发育规律研究浅见	163
一、关于现象与本质的问题	163
二、关于典型与一般的问题	165
三、关于一点论与系统论的问题	166
后记	168
附录：相关系数检验表	169
参考文献	170
图版说明	175
图版	181

CONTENTS

Preface (by Prof. Ren Meie)	i
Introduction	iii
English Summary	1

Part One Carbonate Rocks

Chapter 1. Stratigraphy of Carbonate Rocks	17
1. 1. Outline of Regional Strata	17
1. 2. Description of Major Sections	18
1. 3. Sequence of Strata	24
1. 4. New Achievements in the Study of Strata	26
Chapter 2. Textural Genetic Types of Carbonate Rocks	32
2. 1. Colour	32
2. 2. Mineral Composition	34
2. 3. Texture	35
2. 4. Structure	37
2. 5. Discovery of Bioherm at Tangjiawan and its Significance	39
2. 6. Lenticular Pelitic Limestone and Analyses of Its Genesis and Sedimentary Environ- ments	45
2. 7. Textural Genetic Types of Carbonate Roc- ks	49

Chapter 3. Sedimentary Facies of Carbonate Rocks	
.....	57
3. 1. Outline of Sedimental Environments on Devonian-Carboniferous in Guilin	57
3. 2. Lithological Characteristics of Carbonate Rocks in Different Facies Regions	58
3. 3. Palaeontological Marks of Carbonate Rocks in Different Facies Regions	60
3. 4. Geochemical Properties of Carbonate Rocks in Different Facies Regions	61
3. 5. Hydrodynamic Conditions of Carbonate Sediments	65
3. 6. Analysis of Sedimental Environment on Carbonate Rocks	70
3. 7. Sedimentary Facies and Facies Models of Carbonate Rocks	72
Chapter 4. Diagenesis and Deutero-genic Action and Pore Evolution of Carbonate Rocks	74
4. 1. Dolomitization	74
4. 2. Cementation	77
4. 3. Recrystallization and Solution-Filling	79
4. 4. Pore Types and Pore Evolution	80
Chapter 5. Physico-Mechanical Properties of Carbonate Rocks	82
5. 1. Porosity	82
5. 2. Water Absorption and Permeability	86
5. 3. Bulk Specific Gravity	87
5. 4. Mechanical Strength	89
5. 5. Relationship Between Physico - Mechanical Properties and Texture of Carbonate Rocks	91

Part Two Relationship Between Carbonate Rocks and Development of Karst

Chapter 6. Karst Strata Associations Types of Carbonate Rocks	95
6. 1. Divided Principles of Karst Strata Associations Types	95
6. 2. Strata Associations Characteristics of Carbonate Rocks.....	97
6. 3. Karst Strata Associations Types	99
6. 4. Main Properties of Different Karst Strata Associations Types	101
6. 5. Karstic Development Properties of Different Karst Strata Associations Types and Their Significance of Hydrogeology	102
Chapter 7. Main Factors Affecting the Corrosion Rate of Carbonate Rocks	103
7. 1. Corrosion Test of Carbonate Rocks	103
7. 2. Lithological Factors Affecting Corrosion Rate and Its Classification	104
7. 3. Initial Data of Corrosion Test and Lithological Factors	105
7. 4. Multi-Statistical Analysis of the Correlation Between Corrosion Rate and Lithology	105
7. 5. Physical Destruction in Process of Corrosion Test.....	125
7. 6. Conclusion and Discussion	128
Chapter 8. Micro-Corrosion Mechanism of Carbonate Rocks	129
8. 1. Micro-Corrosion Mechanism of Carbonate Rocks in Different Composition.....	129
8. 2. Micro-Corrosion Mechanism of Textures with Different Components	130
8. 3. Precipitation of Mineral in Process of Corrosion Test	131
8. 4. Conclusion and Discussion	132

Chapter 9. Differential Corrosion of Calcite and Dolomite	134
9. 1. Formal Types of Differential Corrosion	134
9. 2. Controlling Factors of Differential Corrosion	135
9. 3. Conclusion and Discussion	138
Chapter 10. En Masse Karstification of Dolomite	140
10.1. Karstic Development Properties of Dolomite	140
10.2. Mineral and Petrological Properties of Dolomite	141
10.3. The Mechanism of En Masse Karstification of Dolomite	143
10.4. Conclusion and Discussion	143
Chapter 11. The Forms and Lithological Control of Isolated Peaks in the Peak-Forest Plain	145
11.1. Formal Types of Isolated Peaks	145
11.2. Lithological Control of Peak Forms	147
11.3. Forming Mechanism of Different Formal Peaks.....	149
11.4. Conclusion and Discussion	151
Chapter 12. Isolation Degree and Cavity Degree of Peaks	152
12.1. Isolation Degree of Peaks	153
12.2. Cavity Degree of Peaks	154
12.3. Conclusion and Discussion	155
Chapter 13. Morphological Types of Caves and Their Lithological Control	157
13.1. Morphological Types of Caves and Their Lithological Control	157
13.2. Forming Mechanism of Different Formal Caves	161
13.3. Conclusion and Discussion	162
Chapter 14. My Humble Opinions in the Study of the Law Governing Karst Development	163

14.1. About Problems of Phenomena and Essence	163
14.2. About Problems of Particularity and Generality	165
14.3. About Problems of the Doctrine Affirming Only One Aspect and Systematology	166
Postscript	168
Appendix: The Inspectoral Table of Correlation Coefficient	169
References	170
Explanations of Plates	175
Plates	181

Part One

Carbonate Rocks

**“Carbonate rocks are
the material base for the
development of karst”**

1. Stratigraphy

The carbonate rocks exposed near Guilin consist of the Middle Devonian Donggangling formation, the Upper Devonian Guilin formation and Rongxian formation, the Lower Carboniferous Yanguan stage and Datang stage in platform facies region; The Upper Devonian Fuhe member, Wuzhishan formation and Luoming formation in platform-basin (trench) facies region. A calculation from four surveyed sections gives a total thickness of 2200m.

Based on the sectional study and the regional investigation, the author expound that the Upper Devonian is diastrophic in platform facies region, discover two transitional sediments of slope facies in Upper Devonian of platform-basin facies region. and two new lithostratic units are established, namely Fuhe member (D_{3f}) and Luoming formation (D_{3lu}), based on regional erosional hiatus surface, Yanguan stage (C_{1y}) of Lower Carboniferous is divided into two members, they can be correlated with the strata of the neighbour areas.

The sketch stratigraphical division is as Table 1.

2. and 3. Textural Genetic Types and Sedimentary Facies

According to the textural genetic classification there are seven major kinds of carbonate rock, sparry allochemical limestone, micrite limestone and micrite allochemical limestone, leopard-porphyrific micrite organic lime-dolomite, medium crystal dolomite, lenticular pelitic limestone, pelitic limestone with siliceous

Table 1

Facies Region			Platform Facies	Platform-basin (trench) Facies
Overlying Strata			Cretaceous	?
System	Series	Stage		
Carboniferous	Lower	Visean (Datang)	Huangjin Fm.	Not measure*
		Tournaisian (Yanguan)	Upper Mem. Lower Mem.	
Devonian	Upper	Famennian	Rongxian Fm.	Luoming Fm. Wuzhishan Fm.
		Frasnian	Guilin Fm.	Lazhutai Fm.* Fuhe Mem.
	Middle	Givetian	Donggangling Fm.	

*non-carbonate rock

aggregates, bioherm limestone.

They are distributed in two facies regions and six facies zones.

Their main characteristics are shown in Table 2.

4. Diagenesis and Deutero-genic Action and Pore Evolution

Thin section study shows that there is a wide variety of the initial pore types of the carbonate rocks in this region. Interparticle pores and covered pores supported by particle grains are dominant in sparry allochemical limestone, while framework pores, coelom pores and bore pores in bioherm limestone, and intercrystal pores supported by crystal grains in dolomite. Most of the initial pores are either cemented by sparry calcites or filled by micrites and fine-grained clastics during diagenetic process, with only part of intercrystal pores in dolomite and of framework pores in bioherm limestone left. However, solution process may also lead to the formation of interparticle pores, intraparticle pores and fissures during diagenetic and deutero-genic processes.

A scanning electron microscopic of observation cast acidification was made to study the pore types and their connection. On the basis of textural features, the pores of carbonate rocks can be divided into five types: (1) intercrystal pores, found in dolomite, generally triangular or polygonal, well connected (Plate V-7,