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(震旦纪—新近纪)

马永生　陈洪德　王国力　主编

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项目领导： 张永刚　关德范　许卫平

项目顾问： 刘宝珺　曾允孚

项目专家组： 马永生　陈洪德　王国力　许效松　郭彤楼
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主要参加人员

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马永生

中国石油化工股份有限公司科技开发部

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序

岩相古地理研究及编图在中国地质界起步较早，20世纪50年代刘鸿允先生以地层学为基础，编制了我国最早的古地理图册。随着沉积地质学的发展和相关学科的深化以及板块构造学说的崛起，岩相古地理研究也转入了新的发展阶段。新一代的古地理图以盆地和洋板块、陆板块、地块为构造-古地理单元，特别注意地质历史中构造运动阶段的转折；以岩性相为基础，重视充填物的性质、类型、沉积构造、生物相、生态相、环境相和古气候转变等铸记；综合盆地中的各类地质事件体作为地壳、岩石圈沉积演化和构造演化的记录和辨别标志，从而分析地质历史中古板块、海陆分布，分析沉积区和物源区以及洋陆转换和盆山转换。沉积地质学家和古地理研究者以构造运动的地质记录作为盆地的主控边界条件，以进行全球或大区际的古地理复原和等时性对比为终极目标；而古地磁学的发展和层序地层学的实践，推动了古地理复原和等时性对比研究的进程。

20世纪80～90年代，在全国区域地质调查、沉积和层控矿产、能源地质及大地构造等学科取得重要成果的基础上，王鸿祯先生率先组织全国有关单位的专家和学者，以活动论和地质历史演化发展阶段论为指导，于1985年出版了《中国古地理图集》，在古地理研究上具有开拓、先驱和启迪的意义。在“七五”期间，我本人和许效松等组织南方各省区地质系统和有关科研院校的工作者，以板块构造理论为指导，以构造控盆、盆地控相的思路为途径，研究南方海相盆地的沉积相和古地理，于1994年出版了《中国南方岩相古地理图集（震旦纪—三叠纪）》。那本图集还尝试性地对我国各块体做了古地理复原，并初步实践层序地层学的分析方法，对我国新一代岩相古地理研究起到了积极的推动作用。

1999年和2003年，由成都理工大学沉积地质研究院联合滇黔桂油田分公司、江汉油田分公司、江苏油田分公司、西南分公司及杭州石油地质研究所共同承担了“中国南方震旦纪—中新生代构造-层序岩相古地理研究与编图”项目，该项目由中国石油化工股份有限公司科技开发部主持，组织了百余名沉积地质学家和石油地质学家，历时五年，开展了中国南方震旦纪—中新生代构造-层序岩相古地理的系统研究，编制了一套完整的南方海相和陆相盆地的构造-层序岩相古地理图件。2005年中国石油化工股份有限公司科技开发部和南方勘探分公司组织有关专家结合中国南方油气勘探取得的重大突破对项目的研究成果进行了集成、提炼和深化研究。该成果在沉积地质的学科发展上和在油气地质的实际应用上均有重大的指导意义。

构造-层序岩相古地理研究是以板块构造、活动论和层序地层学为指导，参考了近十余年国内外学者对层序地层学研究的新成果，采用多学科综合手段，对大量野外实测剖面、钻井、地震剖面等资料的沉积体系和层序地层进行了分析；在区域构造和沉积盆地格架及演化研究基础上，首次系统地建立了震旦纪至中新生代的构造－层序格架。

盆地古地理演化的等时性是沉积学家的目标，该图集以层序界面为对比依据编制古地理图，在国内树立了露头层序实际应用的典范。海相盆地以不整合面和最大海泛面为依据，建立了南方13个统一的Ⅱ级超层序等时对比界面，分别编制以体系域为单元的岩相古地理图，包括低位体系域、海侵体系域和高位体系域，在陆相盆地构造-层序岩相古地理研究上也具有创新性；以湖泛面为边界条件，于晚三叠世—中新生代地层中划分出11个构造层序，下部为湖扩体系域，上部为湖缩体系域，分别编制岩相古地理图。

项目的研究成果与岩相古地理图在油气地质勘探上具有重要的指导意义：一是以重要的油气勘探区块作为沉积构造域划分的首选目标；二是重点研究各区块油气勘探中的重大基础地质问题；三是加强对生、储、盖沉积体的研究；四是关注上覆陆相盆地对下伏海相盆地的改造，包括建设性和破坏性两方面。

中国南方各地质时代的沉积地层完整，发育最全，沉积构造特征完美，是沉积学研究的理想园地。该专著和图集的面世，无疑在我国沉积学和古地理研究上均具有超前效应和领先地位，在国际沉积学界也属上乘，对推动和发展我国沉积地质学将会有很大的影响。

刘宝珺

2008 年 3 月

FOREWORD

Research on lithofacies palaeogeography and its map compilation started early in the field of geology in China. As early as the 1950s, Mr. Liu Hongyun compiled the first China's atlas of palaeogeography based on stratigraphy. With the development of sedimentary geology and related disciplines as well as the emergency of plate tectonics, research on lithofacies palaeogeography has stepped into a new stage. Taking basins, oceanic plates, continental plates and land mass as tectonics-palaeogeography units, the new generation of palaeogeographic maps pays special attention on the transition of tectonic movement stages in the geological history; places emphasis on the marks on properties, types, sedimentary tectonics, biofacies, ecofacies, environmental facies and palaeoclimatic change in terms of filling materials on the basis of lithologic facies; integrates various geological basin events to records and discrimination markers of sedimentary and tectonic evolutions of earth crust and lithosphere so as to analyze palaeo-plates, distribution of sea and land, sedimentary regions, provenances, ocean-land conversion and basin-mountain conversion. Sedimentary geologists and palaeogeographers regard geological records of tectonic movements as master control boundary conditions of basins and aim at palaeogeographical restoration and isochronous comparison on global and interregional scales, while development of paleomagnetism and practice of sequence stratigraphy have promoted the process of palaeogeographical restoration and isochronous comparison research.

In the 1980s and 1990s, major achievements were obtained in geological surveys and some academic fields associated with sedimentation and layer-controlled minerals, energy geology and geotectonics. On this basis and under the guidance of tectonic activity and stage theories, Mr. Wang Hongzhen organized experts and scholars in institutions related concerned to publish the *Atlas of the Palaeogeography of China* in 1985, as a pioneer in studies on palaeogeography. During the 7th Five-Year Plan (1986–1990), Xu Xiaosong, and I as well as some others researched sedimentary facies and palaeogeography of southern China's marine facies basins by organizing geological and other academic institutions and universities of some southern China's provinces and autonomous regions. With the thoughts of plate tectonics theory, tectonics-controlled basins and basin-controlled facies, we completed the *Atlas of Lithofacies Palaeogeography in Southern China (Sinian–Triassic)*. Published in 1994, this atlas aimed to restore plates of China in palaeogeography and for the first time the analytical method of sequence stratigraphy was used, which further promoted the research on lithofacies palaeogeography in China.

In 1999 and 2003, the Institute of Sedimentary Geology under Chengdu University of Technology, cooperating with Yunnan-Guizhou-Guangxi Oilfield Branch, Jianghan Oilfield Branch, Jiangsu Oilfield Branch, Southwest China Oilfield Branch and Hangzhou Institute of Petroleum Geology, conducted the project "Studies and Map Compilation on Tectonics and Sequence Lithofacies Palaeogeography from Sinian to Middle Cenozoic Eras in Southern China", launched by the Technology Department of China Petroleum & Chemical Corporation (Sinopec). During the five-year implementation of the project, more than 100 sedimentary geologists and petroleum geologists made a systematic research on tectonics and sequence lithofacies palaeogeography during the eras from Sinian to Middle Cenozoic in southern China, compiled a whole set of maps of tectonics-sequence lithofacies palaeogeography for marine and continental facies basins of southern China. In 2005, based on breakthrough on exploration of oil and natural gas in southern China, the Sinopec Technology Department and Sinopec South China Exploration Branch made an integrated, summary and in-depth study. This product is of instructive significance not only for disciplinary development of sedimentary geology, but also to practical application of oilfield geology.

The research on tectonics-sequence lithofacies palaeogeography took plate tectonic, activity tectonics and sequence stratigraphy as a guide, as well as the latest results at home and abroad in the last over 10 years for reference. Meanwhile, through a comprehensive multidisciplinary means, it made an analysis of materials on sedimentary systems and sequence strata obtained from a number of field sections, drilling wells and seismic profiles. For the first time, a tectonics-sequence framework from Sinian to Middle Cenozoic eras has been established systematically based on the study on regional tectonic and sedimentary basins.

Isochronism of basin palaeogeographic evolution is the goal for the research of sedimentologists. According to the comparison with sequence interfaces, this atlas sets a good example for practice use of outcrop sequences across China. As for marine facies basins, on a basis of surface (plane) of unconformity and the largest pansea surface, this atlas establishes 13 isochronous comparative interfaces of unified supersequences at Level Ⅱ, and has maps of lithofacies palaeogeography, with system domains as units, respectively, including low-level systems, marine transgressive systems and high-level systems. In addition, the atlas is innovative in studies on tectonics-sequence lithofacies palaeogeography for continental facies basins, and identifies 11 tectonics sequences in the strata from Late Triassic to Middle Cenozoic, and it has maps of lithofacies palaeogeography with panlake surface as boundary conditions, respectively, including lake extension systems in the lower part and lake shrinking systems in the upper part.

The results of the project and the maps of lithofacies palaeogeography are of great instructive significance to geological exploration of oil and natural gas. First, major oil and gas exploration areas are the primary objective for sedimentary tectonic identification; second, more emphasis should be placed on key fundamental geological problems in each area; third, research on sedimentary formation, storage and cover should be strengthened; fourth, much attention should be focused on the fact that overlying continental facies basins exerted impact on underlying marine facies basins, including constructive and destructive aspects.

Southern China has uninterrupted, well-developed and perfect tectonic sedimentary strata throughout geological ages, thus it is an ideal place for sedimentary studies. There is no doubt that the publication of the monograph and atlas is taking the lead in sedimentological and palaeogeographical studies, and will promote the development of sedimentary geology in China. Also they are the first class works in the international sedimentary circles.

Liu Baojun

March, 2008

前　言

沉积盆地不仅是大陆地壳的基本构成单元，也是能源矿产富集的主要地质单元，一直是地学领域的中心研究课题之一。中国南方大陆显生宙以来，先后经历了古生代洋-陆多旋回开-合演化以及中-新生代陆内盆-山割据和转换耦合两大发展过程，从而形成古生代海相、海陆过渡相与中-新生代陆相叠置发育的多旋回沉积盆地，并在印支-燕山期遭受强烈改造，是典型的大型叠合盆地。古生代与中-新生代比较，无论是沉积物的聚集分布规律、层序充填过程，还是控制这些规律和过程的地球动力学因素都明显不同。即使是对于古生代或中-新生代每一个发展时期，不同盆地演化阶段、不同类型盆地及同一盆地不同相区的层序特征、沉积充填过程和古地理演化也存在较大差异，这使得中国南方虽然具有巨大的资源潜力，但油气勘探却经历了漫长而艰巨的过程。

实践表明，岩相古地理研究和编图不仅是沉积地质学和沉积盆地分析研究的重要内容，而且已成为资源、能源勘探的重要技术方法。通过沉积地质学家的辛勤努力，沉积地质学研究领域的古地理研究和古地理编图得到了快速发展。当前国际上岩相古地理研究总的趋势：一是以大构造单元的块体为单位，按地质历史演化阶段编制活动性古地理图；二是研究对象由大的板块趋向于小的地块或地体；三是“盆山结合”，加强造山带的岩相古地理研究，目的是根据碰撞造山的地质记录反馈克拉通盆地的沉积演化和构造演化；四是编图指导思想和编图技术进一步拓展。

近年来，国外的古地理图都是以古构造地块作为重要单元而编制，特别是全球古地理图，各断代图都是以揭示各构造块体的古地理位置为主，如P. Cook (1988) 编制的《澳大利亚古地理图(寒武纪)》、J. Cope等(1992,1999)编制了英国的《古地理和岩相图集》、J. Dercourt等(1993)编制的《特提斯古环境图》和C. R. Scotese(2001)的《地史图集》等。20世纪我国也开展了大量的岩相古地理研究与编图工程。20世纪50年代由刘鸿允先生以生物地层学为基础编制的《中国全国断代古地理图集》，可谓第一代古地理图。

1984年关士聪教授从海相盆地的油气普查勘探出发，编制了《中国海陆变迁海域沉积相与油气》(晚元古代—三叠纪)，总结了中国大陆地质历史演化，并建立了古海域沉积环境的综合模式。1985年，王鸿祯先生在整体格局上以构造活动论和地质历史发展阶段论为指导，板块构造与传统构造相结合，组织编制出版了《中国古地理图集》，该图集在沉积环境分析上，对沉积体用“沉积组合”的概念表示，丰富了古地理演变史，充实了全球构造理论。这一阶段的工作在我国均称为第二代古地理研究。

1980年后，这一时期我国的沉积学、生物地层学、沉积地质学在学科发展与生产实践的结合上均取得较大进展，对能源矿产、沉积、层控矿床起到了一定的指导意义，从而引起各系统、各部门的关注。原地质矿产部在全国范围内成立了“岩相古地理”协作组，多次举办不同部门的沉积学工作者开展学术交流，各行业部门和各省、区及有关学者(如冯增召先生、李思田教授等)相继开展了大量的岩相古地理研究，编绘了分省岩相古地理图和部分油气勘探重点区块、重点层位的岩相古地理图，有力地推动了沉积学和古地理学研究的进程。特别是地质矿产部下达由刘宝□先生组织南方29个单位协作的项目，编制《中国南方震旦纪—三叠纪岩相古地理图集》(1994)，在学术上以新的沉积地质学和构造活动论为指导，把中国南方地区置于沉积地壳演化的背景上，提出南方大地构造发展的历史阶段，强调构造控盆、盆地控相的学术思想，并将沉积学的基础研究与应用研究有机结合。

20世纪80年代诞生的层序地层学原理和方法(Vail et al.，1987，1991；Sarg，1988；Galloway，1989)为盆地充填实体的三维解析提供了有效途径，在全球地层等时对比、盆地分析和油气勘探开发等领域得到普遍重视和广泛应用。层序地层学从四维时空认识沉积体，不仅把时间界面、全球海平面升降、构造沉降、气候和沉积物供应有机地联系起来，而且将岩石地层、生物地层统一于地质年代格架内，从而可以比较真实地再现沉积盆地各演化时期的沉积物来源、构造沉降、沉积充填过程及古气候的相互关系。

针对中国南方海相古生界和陆相中新生界地层发育齐全，沉积类型多样，生物化石丰富，具有良好的生物地层、年代地层和沉积相研究基础、油气资源丰富、勘探难度大等特点，面对国家对能源、资源的重大需求，中国石油天然气勘探必须寻求新的战略选区与勘探领域，1999年和2003年分别受中国石油化工股份有限公司科技开发部委托，由成都理工大学沉积地质研究院联合中国石油化工股份有限公司勘探南方分公司地质科学研究院、江汉油田分公司地质科学研究院、江苏油田分公司地质科学研究院、西南分公司研究院及中国石油股份有限公司杭州石油地质研究所共同承担了“中国南方海相震旦系—中三叠统构造-层序岩相古地理研究及编图”项目和“中国南

方上三叠统—第三系构造-层序岩相古地理研究及编图”项目的研究任务。2005年中国石油化工股份有限公司科技开发部和南方勘探分公司组织有关专家结合中国南方油气勘探取得的重大突破,对两个项目的研究成果进行了集成、提炼和深化研究。其主要科学目标是运用沉积学理论、层序地层学理论、石油地质学理论、板块构造学理论对中国南方震旦系—古近纪进行构造-层序岩相古地理研究，建立完善、统一的中国南方震旦系—古近系的层序划分、对比方案和不同盆地类型内的层序地层格架和模型，运用新的编图指导思想和技术，编制更具等时性、成因连续性和勘探实用性的构造-层序岩相古地图，揭示中国南方震旦纪—古近纪构造-层序岩相古地理特征及演化规律，深入认识等时层序地层格架中生储盖组合特征及时空展布规律，重塑中国南方板块构造格局及演化历史。该成果注重于：①整体性研究，即把盆地作为一个整体,探讨不同时代盆地内层序发育特征及其与盆地演化的关系；②时代性研究，研究不同时代盆地内的沉积充填、层序发育特征、烃源岩特征及生储盖组合关系；③有序性研究，即研究在盆地演化不同阶段所形成的不同类型的烃源岩特征,及其在时代演化上的有序性和在空间分布上的有序性；④综合性研究，运用多学科理论、多种技术方法对中国南方震旦纪—古近纪构造、沉积、层序和岩相古地理进行综合研究。

本图集是在项目研究成果基础上提炼、集成、深化而成，是近百位研究人员近十年研究成果的结晶。整个研究工作在中国石油化工股份有限公司科技开发部张永刚副主任、许卫平处长，勘探开发研究院关德范院长的直接领导和主持下进行，得到了中国石油化工股份有限公司牟书令原高级副总裁、蔡希源副总地质师、李干生副总地质师、金之钧副总地质师，中国石油化工股份有限公司油田部、海相办公室、勘探开发研究院、勘探南方分公司、江汉油田分公司、江苏油田分公司、西南分公司和成都理工大学等单位的领导和专家给予了大力支持和帮助，项目顾问刘宝珺院士、曾允孚教授及陈子恩教授级高工对本项目的设计、研究思路和实施都提出了许多宝贵的指导意见，特谨向上述单位和个人表示衷心感谢！

PREFACE

Sedimentary basins, which are not only basic constitutional units of continental crust, but also major geological units of energy minerals enrichment, are one of the core issues in the earth science. Since Phanerozoic, the Southern China's continent has undergone two processes, i.e., multi-cyclic ocean and land evolution during Paleozoic and inner continental zigzag basin and mountain and their conversion coupling during Meso-Cenozoic eras, and formed multi-cyclic sedimentary basins of marine facies and sea-land transitional facies in Paleozoic era and of continental facies superimposed development in Meso-Cenozoic eras, which was reconstructed during Indo-China and Yanshan epoches, thus southern China is a typical massive superimposed basin. Compared with Meso-Cenozoic, Paleozoic witnessed differentiations in distribution of sediments accumulation, sequence filling process as well as in the geodynamic factors influencing and forming these regularities and processes. There exist great differences in the characteristics of sequences, sedimentary filling processes and palaeogeographical evolutions for each epoch of Paleozoic or Meso-Cenozoic, for different basin evolution stages, for different types of basins, and even for different facies regions of the same basin. That is why oil and gas exploration went through quite a long period in southern China in despite of great resource potentials.

Facts have proved that research and map compilation of lithofacies palaeogeography is not only important in sedimentary geology, but also a key technological method for resource and energy exploration. Great progress has been made rapidly in this field after hard work of sedimentologists. Four characteristics reveal the current trends of research on lithofacies palaeogeography in the world as follows: (1) Taking large tectonic mass as units, maps of active palaeogeography are compiled in the order of evolution stages in geological history; (2) In terms of research objectives, small mass or terrain is replacing large mass or terrain; (3) Research on orogenic belts combining basins and mountains are being strengthened in order to reflect sedimentary and tectonic evolutions of craton basins according to geological records from collision mountain-building; (4) Guidelines and technologies of map compilation have been further advanced.

In recent years, overseas maps of palaeogeography have been compiled based on palaeo-tectonic mass. Especially for global maps, palaeogeographical locations of various mass are positioned on dating maps, such as *Palaeogeographic Atlas of Australia (Cambrian)* compiled by P. Cook (1988), *Atlas of Palaeogeography and Lithofacies* compiled by J. Cope et al. (United Kingdom, 1992, 1999), *Atlas Tethys Palaeoenvironmental Maps* by J. Dercourt et al. (1993) and *Atlas of Earth History* by C. R. Scotese (2001), etc. In the 20th century, China conducted many research works on lithofacies palaeogeography and map compilation. As early as the 1950s, Mr. Liu Hongyun completed the first maps of palaeogeography based on biostratigraphy, named as *Atlas of Geochronologic Palaeogeography of China*.

In 1984, Professor Guan Shicong, from oil and gas survey and exploration of marine facies basins, complied *Sedimentary Facies and Oil and Gas in the Regions with Change of Sea and Land in China (Late Proterozoic-Triassic)*. This book summarized China's continental evolution in geological history and established integrated modes for paleosea sedimentary environment. In 1985, Mr. Wang Hongzhen, under the guidance of tectonic activity and stage theories and with the combination of plate and traditional tectonics, organized and compiled *Atlas of Palaeogeography in China*. In this work, he used the concept of sedimentary assemblage to represent sedimentary body for sedimentary environmental analysis, which enriched the evolution history of palaeogeography and global tectonic theory in terms of sedimentary environment analysis. This is so-called the second generation of palaeogeography.

After 1980, much progress was achieved in both disciplinary development and productive practice of sedimentology, biostratigraphy and sedimentary stratigraphy, and it was of instructive significance to energy minerals, sediments and layer-controlled deposits, and aroused attention from administrative departments concerned. The Ministry of Geology and Mineral Resources set up cooperation groups called lithofacies palaeogeography throughout the country. After that, the ministry organized academic exchanges for sedimentologists in different departments. Meanwhile, some scholars conducted many research works on lithofacies palaeogeography in succession among different departments and different provinces (autonomous regions), such as Mr. Feng Zengzhao and Professor Li Sitian. These results also included the map compilation of lithofacies palaeogeography by administrative divisions as well as by major exploration plates and layers, which further intensified research on sedimentology and palaeogeography. It is worth mentioning that the Ministry of Geology and Mineral Resources assigned that Mr. Liu Baojun organized and compiled *Atlas of Lithofacies Palaeogeography in Southern China (Sinian-Triassic)* in 1994 with 29 institutions of southern China involved in this work. In academic terms, under the guidance of new sedimentary geology and tectonic activity theory, he put forward the historical periods of tectonic development in southern China on a background of sedimentary crust evolutions, and intensified the academic thoughts of tectonics-controlled basins and basin-controlled facies, with the combination of basic research and practical application.

The principles and methods of sequence stratigraphy, launched in the 1980s (Vail et al., 1987, 1991; Sarg, 1988; Galloway, 1989), provides a powerful means for the 3-dimensional interpretation of basin filling body, and is universally emphasized and widely used in such fields as isochronous comparison of global layers, basin analyses as well as and oil and gas exploration and exploitation. Sequence stratigraphy gets to know sedimentary bodies from a 4-D space and time. It links the components of time interface, global eustasy, tectonic subsidence, climate

change and sediment sources, but also correlates with the framework combining rock strata and biostrata in geological periods, thus it reconstructs the interaction of sediment sources, tectonic subsidence, sedimentary filling processes of sedimentary basins and palaeoclimate in different evolution stages.

Southern China, characterized by difficult exploration of rich oil and gas resources, has well-developed, various and perfect tectonic sedimentary strata in marine Paleozoic and continental Meso-Cenozoic, and provides a basis for studying biostrata, strati-strata and sedimentary facies. Faced with national great demand for energy and resources, China must seek for new strategic regions and exploration areas with oil and gas reserves. Assigned by the Technology Department of China Petroleum & Chemical Corporation (Sinopec) in 1999 and 2003, respectively, the Institute of Sedimentary Geology under Chengdu University of Technology, together with the Institute of Geological Sciences under Sinopec South China Exploration Branch, Institute of Geological Sciences under Sinopec Jianghan Oilfield Branch, Institute of Geological Sciences under Sinopec Jiangsu Oilfield Branch, Institute of Southwest China Branch and Hangzhou Institute of Petroleum Geology under Sinopec, undertook the projects *Studies and Map Compilation on Marine Tectonics and Sequence Lithofacies Palaeogeography from Sinian to Middle Triassic Periods in Southern China* and *Studies and Map Compilation on Tectonics and Sequence Lithofacies Palaeogeography from Upper Triassic to Tertiary Periods in Southern China.* In 2005, based on the breakthroughs on exploration of oil and natural gas in southern China, the Sinopec Technology Department and Sinopec South China Exploration Branch organized the experts related to make an integrated, summary and in-depth study of the results of the above two projects. The scientific objectives are, by means of the theories of sedimentology, sequence stratigraphy, petroleum geology and plate tectonics, to study tectonics-sequence lithofacies palaeogeography from Sinian to Paleogene periods in southern China, so as to set up a perfect and integrated system for sequence identification, comparative schemes, and frameworks and models for sequence strata in different types of basins; by means of new guidelines and technologies of map compilation, to compose maps of tectonics-sequence lithofacies palaeogeography, with more advances in isochronism, cause continuity and practical applicability for exploration, so as to reveal the characteristics and evolutions of tectonics-sequence lithofacies palaeogeography from Sinian to Paleogene periods in southern China, to get a better understanding of sedimentary formation, storage and cover in the framework of isochronous sequence strata, and to reconstruct the pattern and evolutionary history of plate tectonics in southern China. Attentions have been paid to: (1)Integrity research. Taking basins as an integrity to study the relationship between sequence development and basin evolution in different periods of time; (2)Period research. Studying the characteristics of sedimentary filling, sequence development and source rocks in different periods of time, and the relationship of sedimentary formation, storage and cover;(3) Orderliness research. Studying different types of source rocks formed in different development stages of basins as well as the orderliness of such rocks on time and space scales; (4) Comprehensive research. Conducting a comprehensive study on tectonics, sediments, sequences and lithofacies palaeogeography from Sinian to Paleogene periods in southern China by using disciplinary theories and various technologies.

This atlas is a product resulting from an integrated, summary and in-depth study of the projects above-mentioned, and a crystallization of almost ten years of hardworking of nearly 100 researchers. The research work was led by Sinopec, and directed by Zhang Yonggang, Deputy Director and Xu Weiping, Section Head, under the Sinopec Technology Department, and Guan Defan, President of Sinopec Exploration & Production Research Institute, and with the help of quite a few leaders and experts, namely Mou Shuling, former senior Vice President of Sinopec, associate geological engineers-in-chief including Cai Xiyuan, Li Gansheng and Jin Zhijun, as well as some Sinopec-related divisions, i.e., Oilfield Department, Marine Facies Office, Exploration & Production Research Institute, South China Exploration Branch, Jianghan Oilfield Branch, Jiangsu Oilfield Branch, Southwest China Exploration Branch, and Chengdu University of Technology. Meanwhile, Academician Liu Baojun, Professor Zeng Yunfu and Senior Engineer Chen Zi'en, who are consultants, have given their valuable suggestions to the launch, research and implementation of the project. We express our heartfelt gratitude to all the above-mentioned departments and individuals.

构造-层序岩相古地理通用图例

稳定沉积区

- 砂砾岩与砂岩互层
- 砂岩夹含砾砂岩
- 含砾砂岩、砂岩、粉砂质泥岩、粉砂岩互层
- 含砾砂岩、砂岩与泥岩互层
- 砂砾岩、砂岩与砂质泥岩互层
- 含砾砂岩、泥岩、粉砂岩与灰岩互层
- 砂岩与粉砂岩互层
- 砂岩夹泥质粉砂岩
- 砂岩夹粉砂质泥岩
- 砂岩夹砂质泥岩
- 砂岩夹页岩
- 砂岩与页岩互层
- 砂岩与泥岩互层
- 砂岩、泥质粉砂岩与粉砂岩互层
- 砂岩夹粉砂质页岩
- 砂岩夹粉砂质泥岩与泥岩
- 粉砂岩与泥质粉砂岩互层
- 砂岩与泥岩互层
- 泥岩夹砂岩
- 粉砂质页岩夹粉砂岩
- 砂质泥岩
- 砂质泥岩与页岩互层
- 灰岩与鲕粒灰岩互层
- 碳质页岩
- 砂岩、粉砂岩夹白云岩
- 白云岩夹砂岩、粉砂岩
- 白云岩、砂岩互层
- 灰岩、泥岩和砂岩互层
- 砂岩、泥岩、灰岩、白云岩互层
- 砂岩、生屑灰岩、泥岩互层
- 白云岩与膏溶角砾岩、砂岩互层
- 粉砂岩、灰岩与白云岩互层
- 粉砂岩、泥岩与灰岩互层
- 砂屑灰岩夹页岩
- 灰岩夹砂岩
- 灰岩、泥灰岩与生屑灰岩互层
- 灰岩、泥岩和粉砂岩互层
- 粉砂质泥岩、泥岩与灰岩互层
- 灰岩、泥岩夹粉砂岩
- 白云岩、燧石条和团块白云岩与页岩互层
- 砂质泥岩、泥岩、生屑灰岩互层
- 粉砂质泥岩、泥岩、灰岩互层
- 灰岩夹粉砂岩
- 白云岩、泥岩与粉砂质泥岩互层
- 灰岩、泥岩与粉砂质泥岩互层
- 灰岩与泥质条带灰岩互层
- 白云岩、硅化藻白云岩与粉砂质泥岩互层
- 白云岩、硅化藻白云岩与页岩互层
- 藻白云岩、钙质泥岩与鲕粒白云岩互层
- 白云岩、鲕粒灰岩与页岩互层
- 白云岩、泥灰岩与泥岩互层
- 泥岩夹灰岩
- 泥岩、泥灰岩与灰岩互层
- 泥岩、泥灰岩与硅质泥岩互层
- 灰岩夹泥岩
- 泥灰岩、泥岩与硅质页岩互层
- 白云岩夹灰岩、页岩
- 白云岩夹灰岩、碳质页岩
- 白云岩、灰岩、碳质页岩互层
- 灰岩与页岩互层
- 角砾白云岩、白云岩夹灰岩
- 白云岩夹角砾白云岩
- 生屑灰岩
- 生屑灰岩夹白云岩
- 灰岩、泥灰岩与生屑灰岩互层
- 灰岩与生屑灰岩互层
- 白云岩与膏岩互层
- 白云岩夹膏岩
- 礁灰岩、泥灰岩与硅质页岩互层
- 鲕粒白云岩
- 鲕粒灰岩
- 鲕粒灰岩夹页岩
- 白云岩、鲕粒灰岩与灰岩互层
- 白云岩夹藻白云岩
- 生屑灰岩与砂屑灰岩互层
- 灰岩夹生物灰岩
- 介壳灰岩
- 藻白云岩、雪花状白云岩葡萄状白云岩互层
- 葡萄、雪花白云状与鲕粒、颗粒白云岩互层
- 葡萄、藻白云岩与颗粒白云岩互层
- 藻白云岩与石膏岩、盐岩互层
- 白云岩与泥质白云质互层
- 泥岩与泥灰岩互层
- 灰岩与泥灰岩互层
- 灰岩、白云岩与白云质灰岩互层
- 白云岩与灰岩互层
- 白云岩夹灰岩
- 白云岩与白云质灰岩互层
- 灰岩
- 白云岩
- 灰岩夹白云岩
- 玄武岩

扬子大陆边缘及滇黔桂沉积区

- 含砾砂岩夹页岩
- 含砾砂岩与砂质页岩互层
- 含砾砂岩与泥岩互层
- 页岩夹含砾砂岩
- 砂岩与泥岩互层
- 页岩与砂岩互层
- 砂岩夹泥岩
- 砂岩、粉砂岩、碳质页岩互层
- 砂岩、页岩、灰岩互层
- 灰岩、砂岩、泥岩与粉砂岩互层
- 砂岩夹灰岩、页岩
- 砂岩、泥岩与角砾灰岩互层
- 砂岩、灰岩、粉砂岩与泥岩互层
- 砂岩、灰岩、泥灰岩与泥岩互层
- 硅质页岩、砂岩、泥岩互层
- 页岩夹砂岩、砂质页岩
- 砂岩、砂质页岩与页岩互层
- 砂岩、泥岩、粉砂岩、灰岩互层
- 碳质页岩夹砂岩、硅质岩
- 泥岩夹粉砂岩
- 粉砂岩、页岩、白云岩互层
- 砂岩、泥岩、页岩与砂质页岩互层
- 泥岩、硅质页岩与凝灰质砂岩互层
- 灰岩、粉砂质泥岩、凝灰质砂岩、泥岩互层
- 灰岩、砂质泥岩与火山岩互层
- 含砾砂屑灰岩与页岩互层
- 钙屑浊积岩夹粉砂岩和碳质页岩
- 钙屑浊积岩、硅质页岩、碳质页岩互层
- 页岩、砂质泥岩与砂屑灰岩互层
- 页岩与砂屑灰岩互层
- 角砾状灰岩、砂屑灰岩与页岩互层
- 灰岩与角砾灰岩互层
- 角砾灰岩与页岩互层
- 滑塌角砾岩钙屑浊积岩与碳质页岩互层
- 角砾灰岩与泥灰岩互层
- 粉砂岩、碳质页岩与页岩互层
- 泥岩夹泥质粉砂岩
- 泥岩、凝灰岩、粉砂岩互层
- 粉砂岩、泥灰岩与泥岩互层
- 粉砂岩、灰岩、硅质页岩、泥岩互层
- 泥岩、粉砂岩与泥灰岩互层
- 灰岩与生物碎屑灰岩互层

目　录

1　构造-层序划分单元及中国南方大地构造特征

2　中国南方SS1 ~ SS7（震旦纪—早古生代）构造-层序岩相古地理图

3　中国南方SS8 ~ SS13（晚古生代—中三叠世）构造-层序岩相古地理图

4　中国南方TS1～TS8（晚三叠世—白垩纪）构造-层序岩相古地理图

5　中国南方TS9 ~ TS11（古近纪—新近纪）构造-层序岩相古地理图

6　中国南方震旦纪-新近纪构造-层序岩相古地理