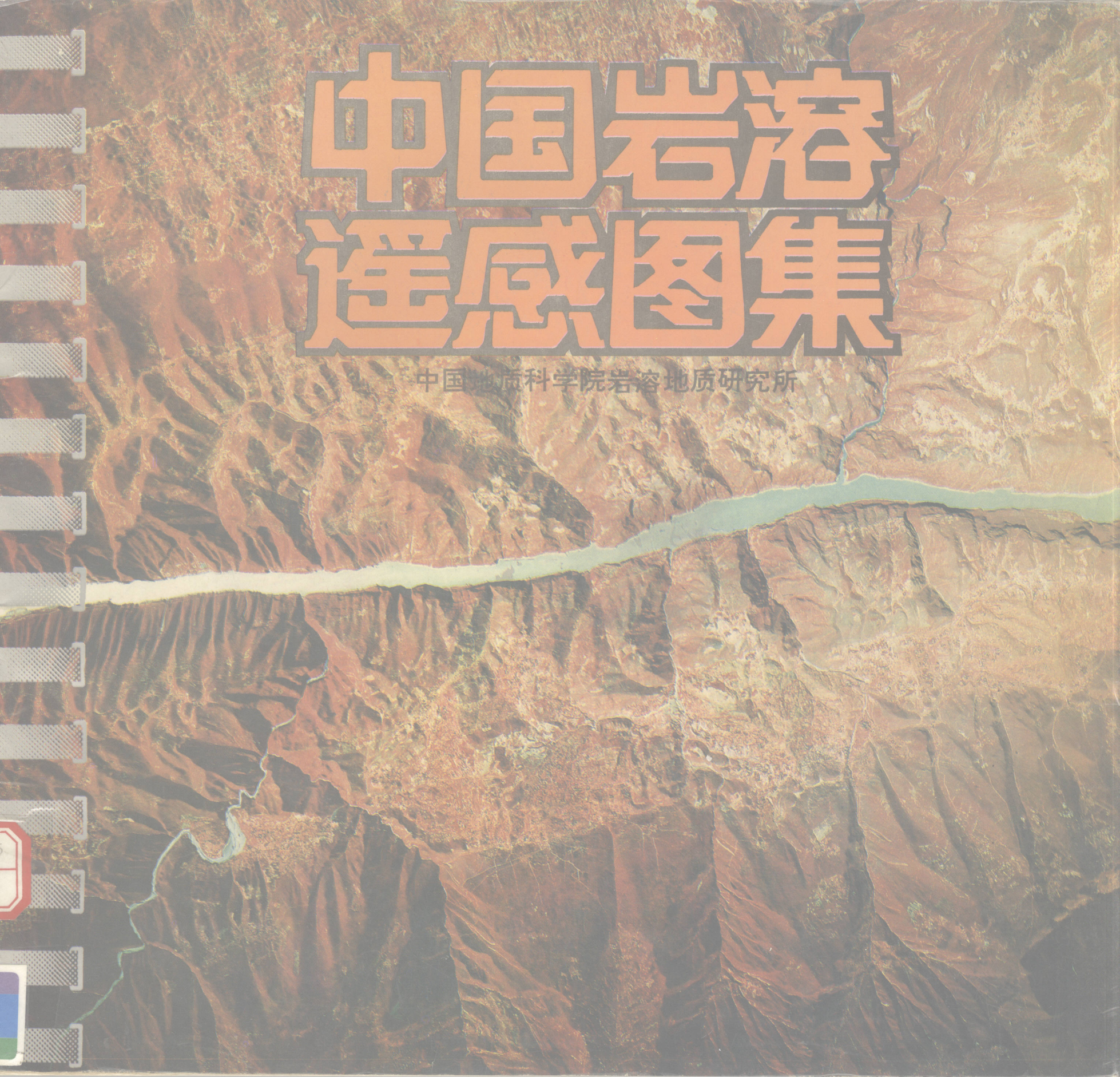


中国岩溶 遥感图集

中国地质科学院岩溶地质研究所



中國書畫
圖鑑

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陈亚江 摄 （桂林、重庆摄影联展一等奖）

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序 言

遥感作为一门空间探测技术，为人类提供了从地球以外认识环境、研究环境的直观工具，从而提高了人类改造与保护环境的能力，进一步增强了人类与环境的密切关系。

遥感技术在国民经济和科学研究的许多领域获得了广泛的应用，在地质调查和各项研究中尤其得到了迅速的发展，显示了遥感技术的巨大潜力和远大前景。

岩溶在我国分布面广，景象万千，应用遥感技术研究岩溶及其环境，对岩溶区的开发治理有着重要意义。遥感图像可为人们观察岩溶形态、岩溶发育要素、岩溶地貌类型以及资源调查等提供方便条件；在识别地下水露头，确定浅层富水区，解译地下水补、径、排条件，追索地下河踪迹等方面，发挥良好作用；通过线性形象，解译断裂、裂隙、大型节理，不仅对岩溶研究具有十分重要意义，并可作为研究构造网络理论及力学分析的重要先导。总之，遥感图像视域宽广，影像直观，便于在更大范围里，从整体上对岩溶进行全面研究。

《中国岩溶遥感图集》是地质矿产部水文司1981年下达给岩溶地质研究所及江西、贵州、云南等省水文地质大队的一项科研任务，由杰显义同志担任主编，殷宝林、李双岱、张忻同志担任副主编。编辑目的在于对近年来的岩溶遥感应用成果进行一次总结，为地质、水利交通、工程设计、城市和农村建设等方面的科研、生产和教学提供一个识别岩溶现象和科学研究的参考工具。图集中200幅典型样片是从大量稿片中筛选出来的，主要选自岩溶比较发育的西南、中南各省。为全面反映我国岩溶，也选取了东北、西北、华北和西藏地区的少量样片。内容包括碳酸盐岩类的地层、岩性、岩溶形态、地貌类型和水文地质、工程地质应用等。图

集从目前实际出发，以可见光黑白航片为主，兼收部分卫星像片、彩色片、彩色红外片、热红外扫描片及假彩色合成片等。集中稿片及有关资料主要来自地质矿产部系统基层地质队及研究单位，绝大多数经过检查验证，资料可靠，内容比较系统全面。

图集在编辑过程中，得到地质矿产部水文地质司及中国地质科学院领导的关怀，并得到各有关省地矿局和水文地质工程地质大队的大力支持。

1985年3月中国地质科学院、地质矿产部水文地质司对图集进行了评审，评委会对本图集给予了较高评价。该图集的出版希望能对岩溶遥感应用的进一步深入和发展，起到积极促进作用，能为我国“四化”建设作出贡献。

袁道先

陈昌礼

1987、11

PREFACE

As a technique of space exploration, remote sensing provides mankind with an audio—visual tool to recognize and study the environment from outside the Earth's atmosphere, thus enhancing the ability of mankind to reform and protect the environment. The close relationship between mankind and the environment has, therefore, been reinforced.

The remote sensing technique has been widely applied to a number of aspects in the national economy and in scientific research and has shown a rapid development particularly in the field of geological investigations. Its potential and future prospect has been manifested.

widely and multifariously distributed in China, karst is of significant importance in the application of remote sensing techniques to its research, exploitation and transformation. Remote sensing images make it possible for people to directly observe karst features, classify geomorphological categories and investigate its resources. When interpreting fractures, fissures and large—sized joints proceeding from linear image characteristics, one can obtain principal guides in the tectonic network theory study and mechanics analysis. Having lifelike images and a wide visual field, remote sensing is of great help in the study of the characteristics and regularities of karst development as a whole. Furthermore, it has been instrumental in identifying ground—water resurgence, demarcating shallow water—concentration zones, interpreting replenishment, runoff and discharge conditions of ground—water as well as following the trace of subterranean streams.

The Compilation of this atlas was commissioned by the Department of Hydrogeology and Engineering Geology under the Ministry of Geology and Mineral Resources of PRC in 1981 to the Institute of Karst Geology and Hydrogeological Teams of Jiangxi, Guizhou, Yunnan and other provinces. Its purpose is to sum up the recent research results by remote sensing in karst phenomena identification and field investigation for depart—

ments such as karst geology, water conservancy, transportation, engineering design and urban and rural construction etc. Reproductions of sample images are collected from South—West and Central—South China where karst has been well developed. In order to represent the karst conditions from the whole of China, a few photographs have been selected also from North—East, West—East and North China, Tibet and other regions. For practical use this atlas contains mainly black—and—white aerial photographs and a small number of other kinds. The pictures and data are quite comprehensive and systematic which are generously offered by colleagues from geological teams and research institutions subordinate to the Ministry of Geology and Mineral Resources. The majority data has been checked during field trials.

The atlas was examined in March, 1985 by the Chinese Academy of Geological Science and was highly praised by the Examination Commission. It was suggested that the atlas should be published at an early date. It is our hope that the atlas will assist in the "Four Modernizations" and play an active role in further application of karst remote sensing. Shortcomings and errors are difficult to eliminate completely in this atlas, therefore, comments are appreciated.

The editors are grateful to all concerned from the Department of Hydrogeology and Engineering Geology under the Ministry of Geology and Mineral Resources of PRC, Chinese Academy of Geological Science and the Bureau of Geophysics and Geochemistry.

Yuan Daoxian
Chen Changli

1987. 11

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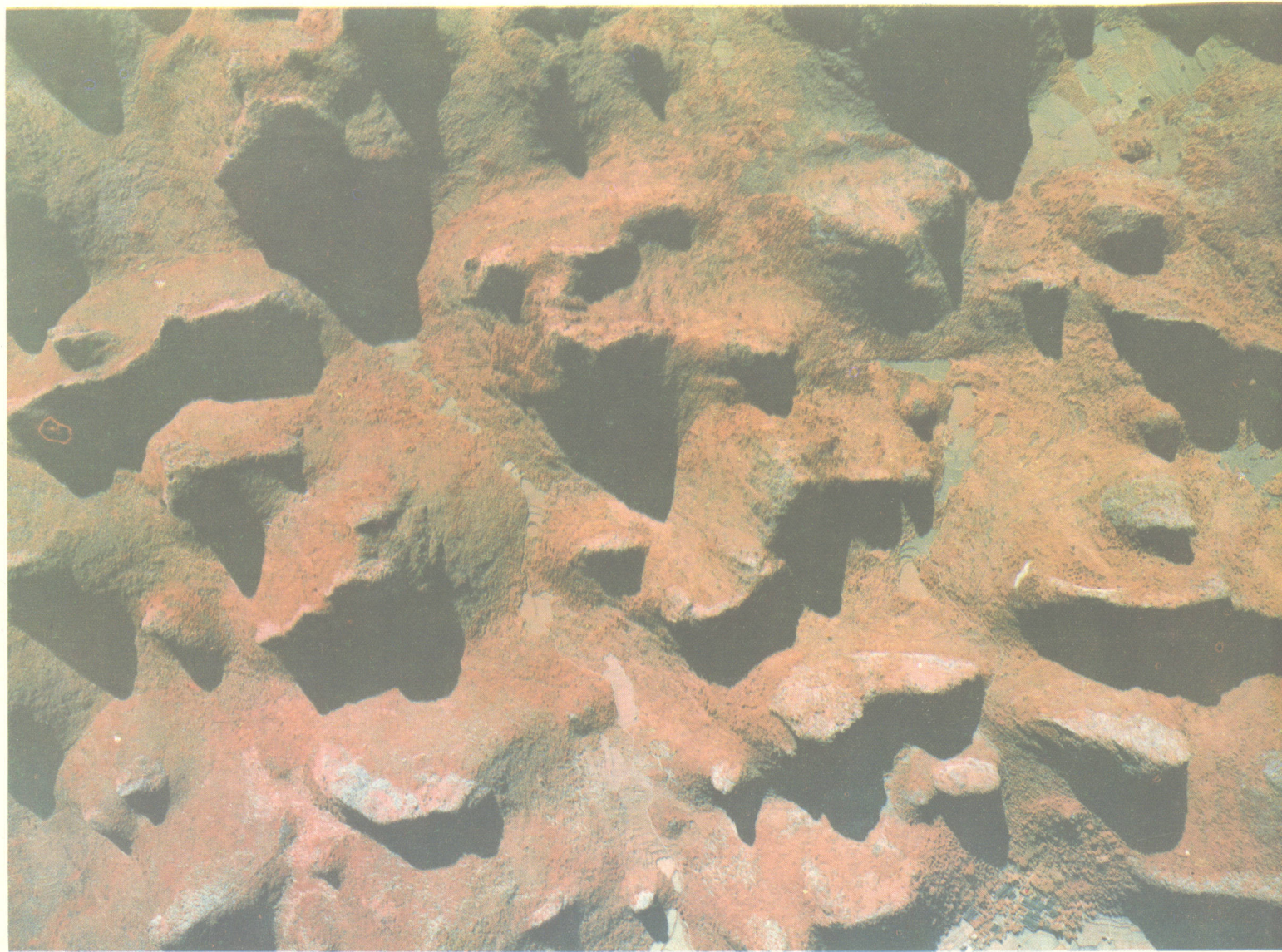
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广西桂林碳酸盐岩影像

Aerial photograph of the carbonate terrain in Guilin, Guangxi

碳酸盐岩具有特殊的岩石性质，通过岩溶作用形成特有的地形、地貌、水系及相关特征，并在遥感影像上以特有的色和形的信息区别于非碳酸盐岩。因此，应用遥感影像识别碳酸盐岩，研究其分布，具有良好效果。

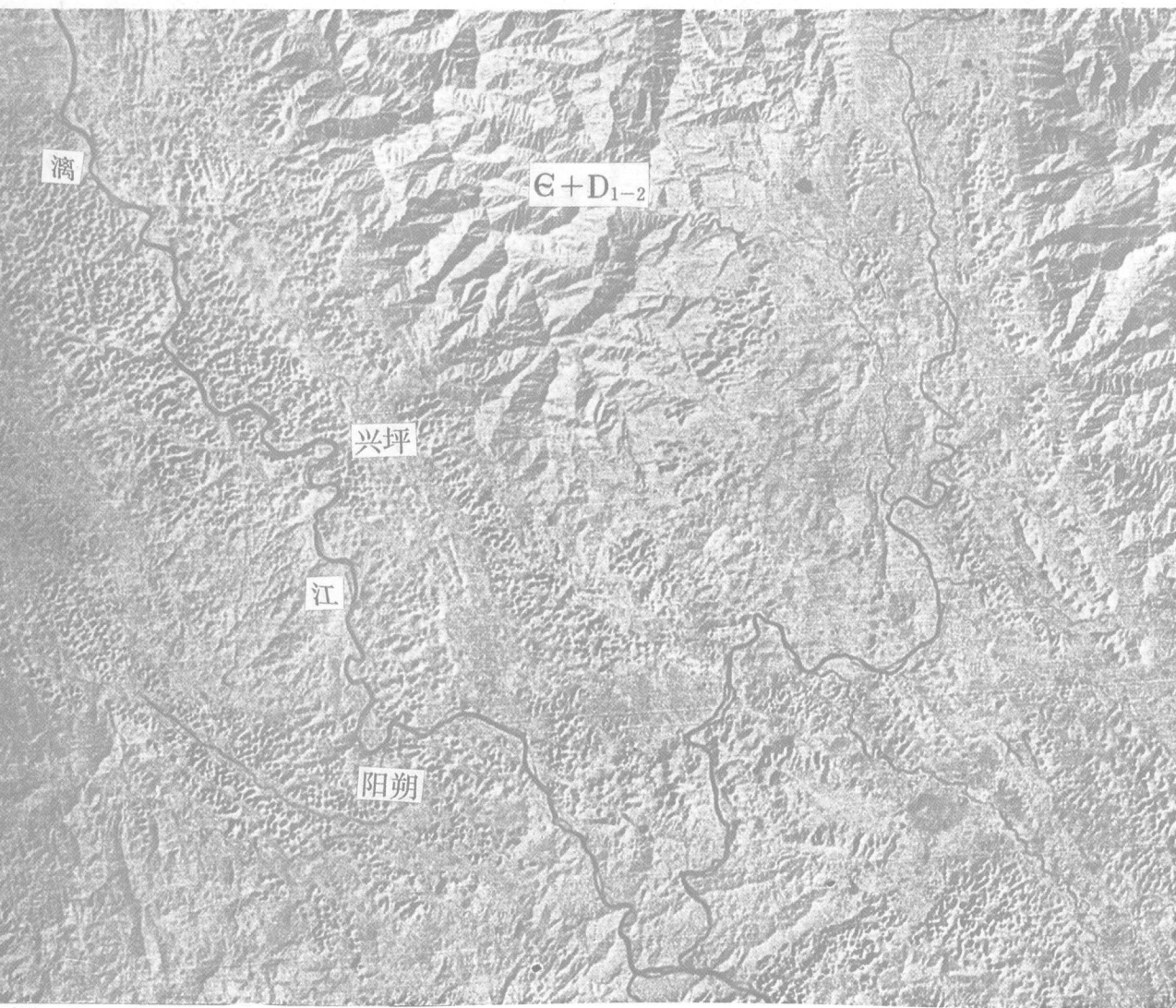
characterized by peculiar topography, geomorphology, water systems and corresponding features formed through karstification due to their particular lithology carbonate rock terrains can be distinguished from non-carbonate ones by their colours and forms in remote sensing images Excellent results can therefore be reached in applying remote sensing images to identification of carbonate rocks and to the study of their distribution.

(一) 碳酸盐岩与其它岩类影像

(I) Carbonate Rocks and Other Rocks

碳酸盐岩在黑白遥感影像上, 呈深浅不等的灰色调。航片上表现为瘤状或斑块状花纹图案。多数情况下可直接观察到不同程度的岩溶现象, 在岩溶正地形比较发育的地区, 形成明显的块状阴影。在卫星像片上呈麻点状或花生壳状花纹图案, 其影像与各类非碳酸盐岩有明显区别, 成为识别碳酸盐岩的标志。

The images of the terrains underlain by carbonate rocks are quite different from those by non-carbonate and the differences are considered as the bases on which they are distinguished. The former can be shown in various tones of grey in black-and-white remote sensing images. The regions with well-developed karst positive landforms are seen distinctly as black shadows. In most cases different karst features are visible directly as patterns of tumour or leopard spot in aerial photographs whereas in satellite images they are illustrated by pit or peanutshell patterns.



1—1 上泥盆统融县组(D_3r)灰岩, 中泥盆统东岗岭组(D_2d)白云质灰岩, 下、中泥盆统(D_1-2)砂岩夹页岩, 寒武系(C)石英砂岩、板岩影像。

广西 兴坪 卫片MSS7 1:40万

1—1 MSS7 Landsat image of a terrain in Xingping, Guangxi (1:400000) underlain by limestone or dolomitic limestone of Middle—Upper Devonian and clastic rock of Middle Devonian or Cambrian.