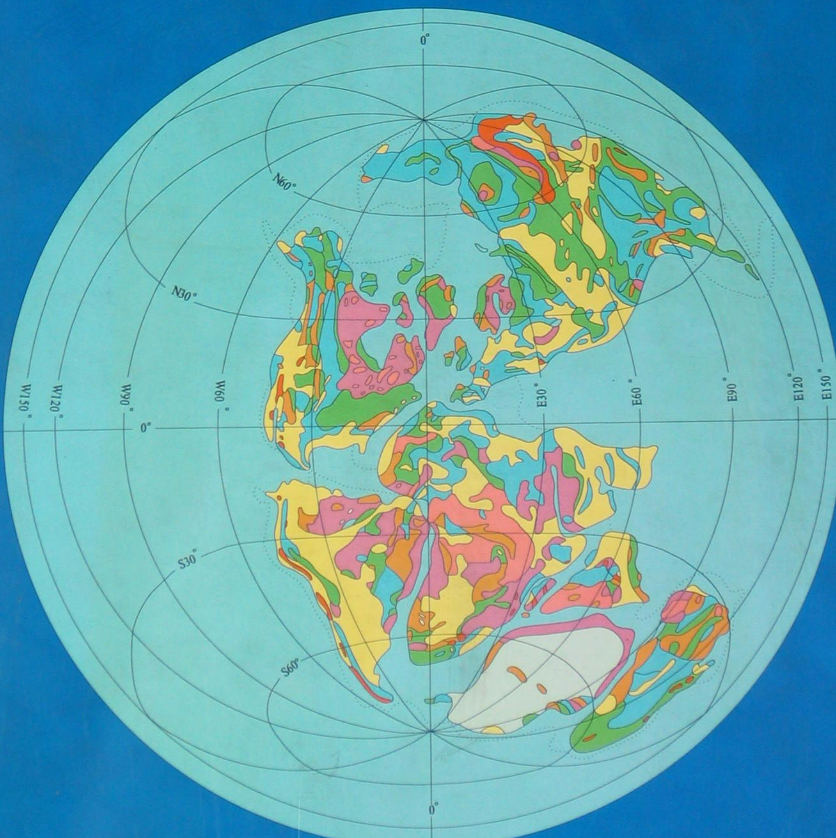
中国地壳演化与
矿产分布图集



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中国人民武装警察部队黄金指挥部　编制

蒋　志　主编

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学术顾问：涂光炽　王鸿祯　胡　魁

主　　编：蒋　志

副 主 编：白万成　董建乐

编制人员：蒋　志　白万成　董建乐
黄　斌　王科强　孔爱云
臧忠淑　李　莉　孙　岳

印刷工艺：牛宝茹　冯晓丽

Academic Advisers:
Tu Guangchi, Wang Hongzhen, Hu Kui

Chief Compiler:
Jiang Zhi

Associate Chief Compilers:
Bai Wancheng, Dong Jianle

Members of Compilation Group:
Jiang Zhi, Bai Wancheng, Dong Jianle
Huang Bin, Wang Keqiang, Kong Aiyun
Zang Zhongshu, Li Li, Sun Yue

Printing technology:
Niu Baoru, Feng Xiaoli

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通　用　图　例

GENERAL LEGENDS

古　构　造　部　分　FOR PALEOTECTONICS

- a | b 地台：a.剥蚀区；b.沉积区 platform: denuded province; sedimentary province
- a | b 陆洼：a.剥蚀区；b.沉积区 continental depression(C.D.): denuded province; sedimentary province
- 陆槽 continentcrustal geosyncline(C.G.)
- 海岭 oceanic ridge
- 海洼 oceanic depression(O.D.)
- a | b 海槽：a.剥蚀区；b.沉积区 oceanocrustal geosyncline (O.G.): denuded province; sedimentary province
- 活动深断裂 active deep fault
- 同沉积断裂 syndepositional fault
- 后期大型平移断裂 subsequent transcurrent fault
- 地壳俯冲带 crustal subduction zone
- 地壳对接消减带 convergent crustal consumption zone
- 构造单元界线 boundary of tectonic unit
- 中酸性侵入岩 mediun-acidic intrusive rock
- 超镁铁质岩 ultramafic rock

矿　产　部　分　FOR MINERAL RESOURCES

矿产种类及规模　Commodity and size

矿种 / 规模	铁 Fe	锰 Mn	铬 Cr	铜 Cu	铅 Pb	锌 Zn	铅-锌 Pb-Zn	钴 Co	镍 Ni	钴-镍 Co-Ni	铝 Al	钨 W	锡 Sn	钼 Mo	锑 Sb	汞 Hg	金 Au	银 Ag	耐火粘土 Refractory clay	萤石 Fluorite	菱镁矿 Magnesite	磷 Phosphorus
超大型 supper large	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	▼				
大型 large	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	▼	⏢	⏢	⏢	⏢
中型 middle	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	▼	⏢	⏢	⏢	⏢
小型 small	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	▼				

矿种 / 规模	重晶石 Barite	硫 Sulphur	芒硝 Mirabilite	钾盐 Potassium salt	天然碱 Trona	硼 Boron	钠盐 Sodium salt	钠盐-芒硝 Sodium salt-Mirabilite	钠盐-钾盐 Sodium salt-Potash	芒硝-硼 Mirabilite-Boron	钠盐-硼 Sodium salt-Boron	水泥灰岩 Cement Limestone	石材 Dimension stone	玻璃硅质原料 Glass siliceous mineral	高岭土 Kaolins	膨润土 Bentonite	石膏 Gypsum	石墨 Graphite	石棉 Asbestos	白云母 Muscovite	滑石 Talc	金刚石 Diamonds	煤 Coal	石油 Oil
大型 large	⏢	⏢	◒	◒	◒	◒	◒	◒	◒	◒	◒	■	■	■	◆	◆	◆	◆	◆	◆	◆	⬢	▬	▬
中型 middle	⏢	⏢	◒	◒	◒	◒	◒	◒	◒	◒	◒	■	■	■	◆	◆	◆	◆	◆	◆	◆			

矿床类型　Type of deposit

- 产于显生宙镁铁质、超镁铁质岩中的矿床 deposit hosted in phanerozoic mafic and ultramafic rocks
- 产于陆相火山岩中的矿床 deposit hosted in continental volcanic rocks
- 产于风化堆积物中的矿床 deposit hosted in weathering residues
- 产于中性-酸性侵入体内部及其外接触带中的矿床 deposit hosted in medium-acidic intrusive and its exocontact
- 产于沉积岩中的矿床 deposit hosted in sedimentary rock
- 产于海相火山岩中的矿床 deposit hosted in marine volcanic rock
- 产于中-深度变质岩中的矿床 deposit hosted in mesometamorphic-hypometamorphic rock

赋矿围岩时代　Time of host rock

- 新生亚代 Cenozoic subera
- 中生亚代 Mesozoic subera
- 晚古生代 Upper Palaeozoic era
- 早古生代 Lower Palaeozoic era
- 原生代 Primeval era
- 始生代 Eozoic era
- 隐生代 Cryptozoic era

前　言

本图集是在中国科学院院士、地学部主任涂光炽先生，中国科学院院士、中国地质大学（北京）教授王鸿祯先生和地质矿产部矿产资源储量管理局局长胡魁先生3位专家顾问的具体指导下，在中国人民武装警察部队（以下简称武警）黄金指挥部和武警黄金地质研究所的领导与支持下完成的。编制本图集旨在以蒋志先生提出的新地球脉动学说为理论指导，以理论地质年表为时序，用系列图的形式反映中国地壳演化特征和矿产时空分布规律。图集编制工作于1994年6月开始，1996年4月结束，历时近两年。图集编制人员分工是：引论、讨论和文字说明由蒋志、白万成、董建乐编写；地壳演化编图负责白万成，矿产编图负责董建乐，计算机制图负责黄斌，图文总体技术审核蒋志；编制人员有蒋志、白万成、董建乐、黄斌 、王科强、孔爱云、臧忠淑、李莉、孙岳。

编图过程中，引用了前人的大量资料。其中，构造演化图以王鸿祯主编的《中国古地理图集》（地图出版社，1985）为基础，部分地引用了程裕淇主编的《中国区域地质概论》（地质出版社，1994）和《中国地质图（1：500万）》（地质出版社，1990）；矿产部分主要引用了全国矿产储量委员会（下称全国储委）1993年的《全国矿产储量平衡表》，地质出版社、中国地质矿产信息研究院和中国地质科学院矿床地质研究所合编的《中国矿产资源图（1：500万）》及其说明书（地质出版社，1992）、宋叔和主编的《中国矿床》（上、中、下册）（地质出版社，1994）、翟光明主编的《中国石油地质志》（石油工业出版社，1987）等。在本图集的最后列出了主要的参考文献，另有其他许多参考文献资料限于篇幅未能一一列出。

图集编制工作得到了各界的支持和帮助。构造地质学家、北京大学教授何国琦先生逐幅审阅图稿，并给予指导和修正；武警黄金指挥部姜大明、阎凤增、杨建昆、张燕石高级工程师，李仕臻高级经济师，赵华经济师和武警黄金地质研究所吴尚全、李维明、董晓辉高级工程师对图集编制提出了宝贵意见；全国储委、中国地质矿产信息研究院、中国地质科学院地质研究所、冶金工业部天津地质研究院和武警黄金地质研究所等单位提供了大量资料；北京长地公司图形工程部对电子图稿进行了校改；武警黄金指挥部徐年生高级工程师完成了文稿的英文翻译工作；中国地质矿产信息研究院毛廷科、彭利生，武警黄金地质研究所向永生、齐金忠、王秀云、张福泽、林树本、赵春祥、祝登丰、陈静瑜、张英杰等同志在资料收集整理和文图编辑过程中给予了帮助。

在此，我们对上述在编图过程中给予技术指导的专家、顾问和在各方面给予帮助和支持的部门、单位和个人表示衷心的感谢。

以新地球脉动学说为指导，用系列图的形式反映中国地壳演化和矿产分布特征，本图集仅是一种尝试。由于编制时间仓促，加之编者的理论水平和对资料掌握消化的程度所限，图集中不妥乃至错误之处在所难免，敬请读者批评指正。

编　者

1996年4月

FORWARD

The present atlas is completed under the specific guidance of Mr Tu Guangchi, Academician of the Chinese Academy of Sciences (CAS) , and Director of the Department of Earth Sciences of CAS, of Mr Wang Hongzhen, Academician of CAS and also a professor of China University of Geosciences, Beijing, and of Mr Hu Kui, Director of Administrative Bureau of Mineral Resources and Reserves, Ministry of Geology and Mineral Resources (MGMR), along with the assistances of Gold Headquarters (GH) , Ministry of Metallurgical Industry (MMI) and of Institute of Gold Geology attached to GH as well as with the general leadership of the Atlas Compiling Committee. The object of compiling this atlas is to display the characteristics of crust evolution of China and the regularities of space-time distribution of mineral resources in the form of serial maps and in the order reflected on the theoretical geologic time scale, employing the new guiding hypothesis of pulsation of the Earth put forward by Mr Jiang Zhi. The compilation of the atlas began in June, 1994, and drew to a close in April, 1996, lasting almost two years. Division of labour in the compilation runs as follows: Jiang Zhi, Bai Wancheng and Dong Jianle wrote the Intro duction, Discussion and Captions of the maps; Bai Wancheng was in charge of the compilation of crust evolution of China; Dong Jianle was responsible for the compilation of maps of mineral resources; Huang Bin took charge of computer graphics; Jiang Zhi checked the overall techniques concerning both pictures and texts. The staff taking part in the compilation of the atlas are as follows: Jiang Zhi, Bai Wancheng, Dong Jianle, Huang Bin, Wang Keqiang, Kong Aiyun, Zang Zhongshu, Li Li, Sun Yue.

Cited in the process of compilation of the atlas are the hosts of data and information of our predecessors', of which, *The Paleogeographical Atlas of China* (Cartographical Publishing House, 1985) with professor Wang Hongzhen as chief compiler, is used as a basis for the Tectonic Evolution Map of this atlas; parts of *An Outline of Regional Geology of China* (Geological Publishing House, 1994) and *Geological Map of China* (1 : 5 000 000) (Geological Publishing House, 1990) with professor Cheng Yuqi as Editor in chief for both of the books, are cited; and for that part of Mineral Resources of this atlas, the following references are quoted:

Reserves Balance-Sheet of China compiled by the National Committee of Reserves of China (now called as the National Committee of Mineral Resources of China ——Translator), set forth in 1993;

Map of Mineral Resources of China (1 : 5 000 000) *and Its Directions* (Geological Publishing House, 1992), co-compiled by Geological Publishing House, Chinese Institute of Gelogy and Mineral Resources Information and Institute of Mineral Deposits, Chinese Academy of Geo logical Sciences (CAGS);

Mineral Deposits of China (Volume I, II, III; Geological Publishing House, 1994) with professor Song Shuhe as chief compiler;

Zhai Guangming's *The Recordings of Petroleum Geology of China* (Petroleum Industry Press, 1987), etc..

Major references are listed at the end of this atlas, with yet more reference materials not enumerated one by one owing to the limited space of this book.

The compilation of the present atlas was given support and assistance from all walks of life and personages of various circles : professor He Guoqi of Beijing University, a geologist of tectonics, carefully and critically went over the book on a map-by-map basis, rendering instructive suggestion and important correction; senior engineer Jiang Daming, Yan Fengzeng, Yang Jiankun, Zhang Yanshi, senior economist Li Shizhen, economist Zhao Hua of GH, senior engineer Wu Shangquan, Li Weiming, Dong Xiaohui of Institute of Gold Geology of GH, all offered their valuable comments and suggestions; National Committee of Mineral Resources of China, the Chinese Institute of Geology and Mineral Resources Information, Institute of Geology of CAGS, Tianjin Geological Academy of MMI, and Institute of Gold Geology of GH, provided a vast amount of data and information; the Department of Graphic Engineering of Beijing Changdi Co. Ltd. did correction work to electronic images; Senior Engineer Xu Niansheng of GH finished translation work from Chinese into English; Mao Tingke and Peng Lisheng of the Chinese Institute of Geology and Mineral Resources Information and Xiang Yongsheng, Qi Jingzhong, Wang Xiuyun, Zhang Fuze, Lin Shuben, Zhao Chunxiang, Zhu Dengfeng, Chen Jingyu, Zhang Yingjie, et al. gave a great deal of help in the collection and arrangement of data and information and in compilation of texts and maps.

We, hereby, extend our heart-felt thanks to all the above-mentioned specialists, advisers, organizations and units who rendered assistance and support in various aspects in the course of compilation of this atlas.

The presentation of the present atlas should be regarded only as a tryout in that the crust evolution of China and the characteristics of distribution of mineral resources are described in the form of serial maps, using the new hypothesis of pulsation of the Earth put forth by Mr Jiang Zhi as the guiding line. In order not to miss the opportunity wherein this atlas can participate in academic exchanges in the forthcoming 30th International Geological Congress, it seems that defects or mistakes can hardly be avoided owing to the hasty compilation along with the limitation of the theoretical level and insufficient appreciation of the data and information on the part of the compiling staff. And finally criticism and comments are welcome from our readers.

April, 1996, Compilers

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区 图
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南海诸岛
South China Sea Is.
1: 24 000 000

中 国 政 区 图

中国位于亚洲东部，太平洋西岸。疆域南起曾母暗沙，北至漠河附近的黑龙江上；西起帕米尔高原，东到黑龙江和乌苏里江汇流处。陆上有15个邻国，自东北部按逆时针方向，依次为朝鲜、俄罗斯、蒙古、哈萨克斯坦、吉尔吉斯斯坦、塔吉克斯坦、阿富汗、巴基斯坦、印度、尼泊尔、锡金、不丹、缅甸、老挝、越南。陆界总长2万多公里。东、南部隔黄海、东海、南海与日本、菲律宾、马来西亚、印度尼西亚及文莱等国家和地区相望。大陆海岸线1.8万多公里。全国面积约960万平方公里，是亚洲面积最大的国家。人口约12亿，在世界各国中居第一位。中国是统一的多民族国家，共有56个民族，其中汉族约占总人口的94%。

到1995年底，全国共有北京、天津、上海3个直辖市，河北、山西、辽宁、吉林、黑龙江、江苏、浙江、安徽、福建、台湾、江西、山东、河南、湖北、湖南、广东、海南、四川、贵州、云南、陕西、甘肃、青海23个省，内蒙古、广西、西藏、宁夏、新疆5个自治区。

名称	简称	名称	简称	名称	简称	名称	简称
北京市	京	上海市	沪或申	河南省	豫	云南省	滇或云
天津市	津	江苏省	苏	湖北省	鄂	西藏自治区	藏
河北省	冀	浙江省	浙	湖南省	湘	陕西省	陕或秦
山西省	晋	安徽省	皖	广东省	粤	甘肃省	甘或陇
内蒙古自治区	内蒙古	福建省	闽	广西壮族自治区	桂	青海省	青
辽宁省	辽	台湾省	台	海南省	琼	宁夏回族自治区	宁
吉林省	吉	江西省	赣	四川省	川或蜀	新疆维吾尔自治区	新
黑龙江省	黑	山东省	鲁	贵州省	黔或贵		

中国隐生代古构造与矿产分布

隐生代（2559Ma 以前）是中国最古老的大陆地壳发育时期，华北地台、扬子地台、塔里木地台均发育了不同规模的陆核。此期间，华北地台完成了第一次克拉通化。盘古纪及以前（2945Ma 以前），形成一些麻粒岩-花岗岩杂岩体，并有海底火山活动。大量的含铁硅质岩在该期形成。迁西运动（2900Ma）使一些分散的小块陆片增生，岩石深变质，地壳逐步增厚，形成原始陆壳。泰山纪（2945—2559Ma），地壳分异成稳定的花岗片麻岩穹隆和绿岩性质的活动盆地或岛弧带。盆地沉积主要为基性和中酸性火山碎屑以及少量火山熔岩，夹浅海正常沉积。阜平运动（2600Ma）晚期，稳定的穹隆之间发生褶皱、拼贴、垫托，海盆、海槽逐次封闭，穹隆区不断扩大，并相继固结。华南区最早的陆核可能在隐生代晚期发育于上扬子地区和康滇地区。在地壳很薄的环境下，有强烈的海底火山活动，随之有 TTG 岩套和花岗片麻岩穹隆的形成，陆核周边地壳不断增生。塔里木区目前已知最古老的地层年龄为 3263Ma（胡霭琴等，1991），产出于塔里木北缘库鲁克塔格。阿尔金山北坡也有太古宙地层出露，原岩均以火山岩、火山碎屑岩为主，并有陆源碎屑建造产出，表明塔里木地区在隐生代已有古老的陆核发育。此外，东北佳木斯地区可能在该阶段也形成了陆核。

中国隐生代形成的矿产主要为铁，其次为磷、石墨、白云母，另外尚有菱镁矿、玻璃硅质原料等。矿床集中分布在华北地台，均属产于中深变质岩中的矿床。

铁矿主要分布在华北地台北缘的吉南—辽东、冀北—辽西、内蒙古南部，地台南缘的秦岭北坡（许昌、霍邱地区），以及鲁中南、太行山地区。矿床点多面广，规模大小不一，储量占全国储量的 50%以上。矿床赋存围岩有鞍山群、龙岗群、迁西群和单塔子群、密云群、集宁群、乌拉山群、秦岭群、太华群、登封群、霍邱群等。其变质程度多属角闪岩相，一部分属麻粒岩相或绿片岩相，且多遭受不同程度的混合岩化作用。其原岩为沉积岩，形成于活动性较强、持续下沉而其沉降速度有所不同的海盆地的不同部位。矿石以发育长带状、条纹状、细纹状构造为特征，被称为条带状磁铁石英岩型铁矿，其中绝大多数为贫铁矿石，是我国最主要的铁矿类型。

磷矿主要分布在地台克拉通内的华北、辽宁南部、山东等陆核区。这些古陆核系由绿岩-花岗岩地体和深变质的高级区组成，磷矿产于绿岩建造内，而不产于高级区。矿床产于阜平群下部变质岩层中，原岩建造以基性到酸性火山岩为主，夹有沉积岩，没有或很少有碳酸盐岩。该类磷矿与绿岩带内的基性火山岩和超镁铁质、镁铁质岩有关，故被称为“绿岩带型磷矿床”，属于低品位易选磷灰石矿。

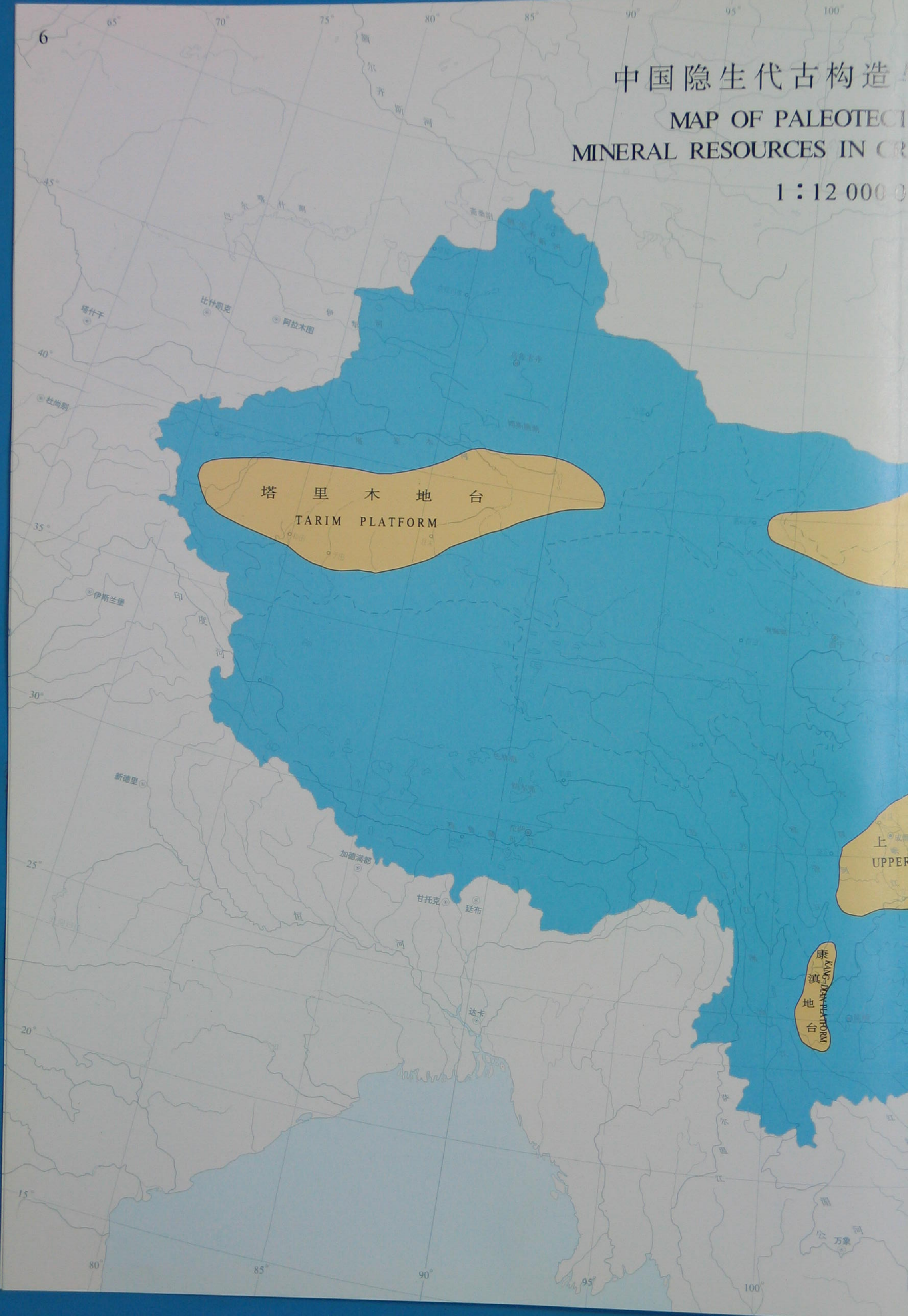
石墨矿主要产于内部相对稳定的陆核区，矿体常受一定层位控制，呈层状、似层状、透镜状。含矿岩石主要为石墨片岩和石墨片麻岩，其次为石墨透辉岩（大理岩）及石墨变粒岩，系区域变质作用的产物。矿床原岩建造多属粘土-碳酸盐-基性火山岩，下粗上细。石墨层多赋存于上部富碳酸盐部位。原岩沉积于近陆源浅海区，还原条件良好，普遍含硫、钛。此类矿床受混合岩化作用，常形成粗鳞片石墨矿。

白云母矿主要分布在华北和内蒙古南部。矿床产于变质岩层中的伟晶岩内。含矿伟晶岩与围岩接触关系较清楚，常呈板状、透镜状、脉状，成群出现，构成伟晶岩带或伟晶岩田。大块白云母产于伟晶岩脉的上盘，或岩脉的膨胀部分，或分异良好的岩脉内的石英白云母带中。

菱镁矿和玻璃质原料均系沉积变质成因。

PALEOTECTONICS AND MINERAL RESOURCES IN CRYPTOZOIC ERA OF CHINA

Cryptozoic Era (prior to the period of time dated back to 2 559 Ma) proved to be a time span wherein the crust of the most ancient continent of China got developed, with continental nuclei of various scales all developed in North China, Yangtze and Tarim Platforms. During this period, cratonization was completed for the first time in North China Platform. In Pan' gu Period or earlier (prior to the period of time dated back to 2 945 Ma), some complexes comprising granulite-granite were formed, to the accompaniment of submarine volcanic activities. And hosts of ferriferous siliceous rocks came into being in this period. Qianxi Movement taking place some 2 900 Ma ago made some of the scattered small continental segments accrete, and in the meanwhile rocks were subjected to kata-metamorphism and the Earth crust got progressively thickened, resulting in primitive continental crust. In Taishan Period (2 945 — 2 559 Ma ago), the Earth crust was differentiated into stable granite-gneiss domes and active basins or island-arc belts of greenstone nature. Sediments of the basins consist mainly of basic and


中国隐生代古构造
MAP OF PALEOTEC
MINERAL RESOURCES IN C
1:12 000 0
塔里木地台
TARIM PLATFORM
上
UPPER
康滇地台
KANG-DIAN PLATFORM
塔什干
比什凯克
阿拉木图
杜尚别
伊斯兰堡
新德里
加德满都
甘托克
廷布
达卡
万象
额尔齐斯河
印度河
恒河


矿产分布图
ONICS AND
PTOZOIC OF CHINA
华 北 地 台
NORTH CHINA PLATFORM
扬 子 地 台
R YANGTZE PLATFORM
北京
天津
沈阳
济南
太原
呼和浩特
平壤
汉城
东京
台湾岛
海南岛
舟山群岛
西沙群岛
中沙群岛
南沙群岛
东沙群岛
吕宋岛

intermediate — acidic pyroclastic rocks and minor volcanic lavas, intercalated with neritic normal deposits. In the late stage of Fuping Movement (2 600 Ma ago), folding, matching, cushioning took place among the stable domes, and sea basins and oceanocrustal geosynclines were closed one by one, and dome areas incessantly got enlarged and consolidated in succession. The earliest continental nuclei of South China were probably developed in Upper Yangtze and Kang-Dian regions ("Kang", an abbreviation for a historical province in China, now is cancelled and merged separately into Sichuan, Qinghai Provinces and Xizang (Tibet) Autonomous Region in 50'; Dian, short for Yunnan Province——Translator) in Late Cryptozoic Era. And in the case when the Earth crust turned up very thin, there were intensive submarine volcanic activities, followed subsequently by the formation of TTG rock suites and granite-gneiss domes, with peripheral crust of the continental nuclei continuously accreted. In Tarim region, the most ancient stratum, whose stratigraphical age has been known up to the present as 3 263 Ma (Hu Aiqin et al., 1991), is distributed in Kuruktag along the north margin of this region. Archean strata are also found outcroping in the north slope of the Altun Mts., and their protoliths are all composed mainly of volcanic rocks and pyroclastic rocks, along with terrigenous clastic formations, indicating that in Tarim region ancient continental nucleus began to develop in Cryptozoic Era. On top of this, continental nucleus probably took shape in Jiamusi Area in Northeast China in this particular stage as well.

Mineral resources formed in Cryptozoic of China consist largely of iron ore, followed next by phosphorus, graphite, muscovite, and additionally, magnesite, glassy siliceous raw material etc., concentrated in North China Platform in terms of their distribution, all belonging to those occurring in meso-metamorphic and kata-metamorphic rocks.

Iron ore is principally spread in such places as Jinan — Liaodong (South jilin Province—East Liaodong Province——Translator), Jibei-Laoxi (North Jilin Province and West Liaoning Province ——Translator) areas, Southern Inner Mongolian Autonomous Region in the northern margin of North China Platform, northerrn slope of Qinling Mts. in the Southern margin of North China Platform (Xuchang in Henan Province and Huoqiu in Anhui Province——Translator), and central-southern Shandong Province and Taihang mountainous areas. Numerous in ore spots, extensive in area and various in sizes, this kind of mineral resources turns out to be the most important type of iron ore, whose reserves takes up more than half of the total reserves of the country, of which the overwhelming majority is low-grade iron ore. Country rocks include Anshan Group, Longgang Group, Qianxi Group and Dantazi Group, Miyun Group, Ji' ning Group, Wulashan Group, Qinling Group, Taihua Group, Dengfeng Group, Huoqiu Group etc.. Their metamorphic degrees mostly belong to amphibolite facies, partially to granulite facies or greenschist facies, and furthermore, most of the groups have been subjected to migmatization of various degrees. The protoliths were sedimentary rocks formed at different positions of sea basins which were relatively mobile and kept downgoing with different subsiding velocities in different positions. Iron ores are characteristic of their longbanded, streaky or thread-shaped structures, and are customarily called banded magnetite quartzite-typed iron ore.

Phosphorus ore is basically distributed in continental nucleus regions such as North China, South Liaoning Province and Shandong Province, all within the range of platform craton. These ancient continental nuclei are composed of greenstone — granite terranes and kata-metamorphic high-grade terrains, and this kind of ore occurs in greenstone formation instead of kata-metamorphic high-grade terrains. Phosphorus ore deposits are present in the beds of metamorphic rocks in the lower Fuping Group, with protolithic formations made up mainly of basic — acidic volcanic rocks, intercalated with sedimentary rocks (Occasionally carbonate rocks). As this type of phosphorus ore deposits is related to basic volcanic rocks and ultramafic, mafic rocks within greenstone belts, it is called "greenstone-type phosporus ore deposit", being considered as low-grade and easily-dressed apatiteore.

Graphite occurs largely in continental nucleus regions whose interior has lbeen relatively stable. Ore bodies often occur in certain horizons, being bedded, stratifoid or podiform in shape, and ore-bearing rocks consist mainly of graphitic schist and graphitic gneiss and secondarily of graphitic diopsidite (marble) and graphitic leptynite, being the products of regional metamorphism. Protolith formations of the ore deposits are composed mostly of clay-carbonate-basic volcanic rocks, with grain-size decreasing upwards. In most cases, graphite layers are found occurring on the upper positions where carbonate is rich, and protoliths were deposited in the peri-terrigenous neritic regions (good in reduction conditions) and with ubiquitous S and Ti. Having gone through migmatization, this type of ore deposits quite often occurs as coarse scale-like graphite ore.

Muscovite ore is distributed mainly in North China and Southern Inner Mongolian Autonomous Region, occurring in pegmatite within metamorphic rock beds. Ore-bearing pegmatite, which has a distinct contact relationship with country rocks, often are tabular, lenticular, vein-like or swarms in shape, forming pegmatite belt or pegmatite field. Big lumps of muscovite are seen present in the hanging wall of pegmatite veins, or in the swelling part, or in quartz muscovite belt of rock veins well differentiated.

Magnesite and glassy siliceous raw materials are of sedimento-metamorphic origin.

中国早始生代古构造与矿产分布

早始生代（2559—1794Ma），中国陆壳范围进一步扩大，华北区地壳向刚性演化。五台大纪早期（五台期），陆核上断裂活动增强，与之相伴发育若干巨型盆地，以地台中部北东向延伸的五台—吕梁火山-沉积盆地规模最大，已具有陆槽性质。五台运动（2500Ma 左右）使早期陆槽闭合。滹沱期（2500—1794Ma），裂谷作用再次发生，形成了"S"型的五台燕辽陆槽。该阶段地壳活动相对减弱，但仍具较强的活动性。沉积建造以陆源碎屑和碳酸盐为主，沉积分异强烈，并存在基性火山活动。吕梁运动（1800Ma 左右）使陆槽闭合，华北地台第二次克拉通化完成。华南区，在上扬子、康滇古陆核的西部，海槽活动强烈，形成火山岩、火山碎屑和陆源沉积建造，并有超基性、基性和中酸性岩浆侵入活动，推测西侧有向东的洋壳俯冲带发育。塔里木区，在古陆核的周围，广泛发育海槽沉积区，以沉积巨厚的陆源碎屑岩夹碳酸盐建造为特点，仅在南部边缘有较多的火山活动。东北区，五台期在佳木斯陆核内和边缘出现了活动型的陆槽，五台运动使陆核进一步固化。吕梁期，在佳木斯等陆核边缘和额尔古纳地区，发育大陆边缘沉积。吕梁运动使地层褶皱变质，并伴有花岗质岩浆侵入活动，使陆核进一步固结，扩大为原始古陆。秦岭、祁连和柴达木地区，以活动的海槽型沉积发育为特征，一些地区可能形成了陆核和陆块。

早始生代形成的矿产主要有铜、石墨、菱镁矿、硼，其次为铁、金、磷、滑石和玻璃硅质原料，另外尚有少量的镍、钴、铅、白云母和石材，集中分布于佳木斯海槽、华北地台及其内部的五台燕辽陆槽、秦岭海槽、康滇地台及其以西的西扬子海槽。矿床多与海相中基性火山活动有关，沉积和区域变质作用是其主要成因。

佳木斯海槽成矿带：呈南北向延伸，主要形成沉积-区域变质型石墨矿，另有硅铁建造中的磁铁石英岩型铁矿和金矿产出。

华北地台成矿区：所形成的矿产主要分布在胶东、阴山和龙首山区等陆表浅海盆地，主要有富镁质碳酸盐岩型热液交代滑石矿和菱镁矿、变质粘土岩-碳酸盐岩-基性火山岩建造中的石墨矿；碎屑岩-碳酸盐岩夹火山岩、硅铁质岩建造中的铁矿、磷矿和石材。另外，在区域变质、混合岩化和韧性剪切作用下，在太古宇绿岩层中有金矿形成（红花沟、排山楼金矿）。

五台燕辽陆槽成矿带：呈北东-南西向带状延伸，以北东端的吉南辽东地区矿化最集中。该矿化集中区主要有变质碎屑岩-碳酸盐岩-（夹）基性火山岩建造中的菱镁矿、硼矿、金矿、铅矿和碳酸盐岩型铁矿，另有赋存于辉长岩体内的岩浆深部熔离-复式贯入矿床——吉林赤柏松镍矿床。在该陆槽西南段的东分枝山西中条山一带，海底钙碱性偏碱性次火山喷出-沉积活动强烈，围绕构造控制的火山活动中心，常形成构造控制明显与层控明显的细脉浸染型到浸染层状以铜为主的局部兼有钴矿化的矿床。另外，在该陆槽区，尤其是山西五台—吕梁地区和河南平顶山地区，形成了硅铁建造中的磁铁石英岩型铁矿。

秦岭海槽—大别地台成矿带：总体上呈北西-南东延伸。矿产主要有产于中间隆起区的沉积变质型石墨矿和伟晶岩型白云母矿，产于变质碎屑岩-碳酸盐岩-（夹）火山岩建造中的磷矿、菱镁矿、玻璃硅质原料等。另外，在大别地台的西缘有与蛇纹岩相伴生的镍矿产出。

西扬子海槽—康滇地台成矿带：呈近南北向延伸。主要有石墨和铜矿。其中石墨矿产于地台内部变质岩和哀牢山群之中，属沉积-变质成因；铜矿主要分布于海槽区的优地槽带，为海相火山岩型铁铜矿床（大红山式铜矿），矿体产于钠质凝灰岩、凝灰质白云质大理岩中。

PALEOTECTONICS AND MINERAL RESOURCES IN EARLY EOZOIC OF CHINA

The range of continental crust of China in Early Eozoic (2 559— 1 794 Ma) was further extended, with the Earth crust of North China terrain begun evolving into rigidity. In the early stage of Wutai Super-Period (Wutai Period), fault activities on continental nucleus were enhanced, resulting in the development of a number of mega-basins, of which Wutai-Lüliang volcano-sedimentary basin trending NE in the central platform, looking like something of a continent-crustal geosyncline, was the greatest. Wutai Movement (dated back to 2 500 Ma±) made the early continent-crustal geosyncline closed. In Hutuo (dated back to 2 500 — 1 794 Ma), rifting took place once again, forming "S" typed Wutai-Yan-Liao (Yanshan-Liaoning) Continent-crustal Geosyncline. During this period of time crustal mobility was relatively reduced, but still mobile to certain extent. Sedimentary formation mainly comprises terrigenous fragments and carbonate, with intensive sedimentary differentiation and