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中国重要经济区和城市群地质环境图集

中国地质调查局 编著

长江中游城市群

THE GEO-ENVIRONMENT ATLAS OF IMPORTANT ECONOMIC ZONE AND CITY GROUP IN CHINA

THE CITY GROUP OF THE MIDDLE YANGTZE RIVER

中国地质大学出版社
CHINA UNIVERSITY OF GEOSCIENCES PRESS

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内 容 提 要

本书是“长江中游城市群地质环境调查与区划”计划项目包含的“长江中游城市群地质环境调查与区划综合研究”“武汉城市圈地质环境调查与区划”“长株潭城市群地质环境调查与区划”“昌九工业走廊地质环境调查与区划”“鄱阳湖生态经济区地质环境综合调查”和“长江中游城市群活动构造与地壳稳定性评价”6个工作项目的研究成果之一。图集汇集了长江中游城市群以往地学研究成果以及近年地质大调查成果，涵盖了基础地质、第四系地质、水文地质、工程地质和环境地质等内容。图集内容包括长江中游城市群序图、地质环境图和专题评价图三大类，是长江中游城市群主体功能区划、城镇布局、国土规划、产业结构调整、资源优化配置以及重大工程建设等的重要基础资料。

本图集可供从事基础地质、水文地质、工程地质和环境地质等专业的教学和科研人员，以及制订相关政策的政府部门参考。

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中国重要经济区和城市群地质环境图集

长江中游城市群

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The Geo-Environment Atlas of Important Economic Zone and City Group in China

The City Group of the Middle Yangtze River

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前　言

进入21世纪以来，我国实施区域发展总体战略，先后批准和实施了一批重要经济区和城市群区域发展规划，使城镇化、工业化水平迅速提高，国土开发强度进一步加大。区域发展总体战略要求统筹谋划国土开发、利用、保护和整治，着力优化产业发展、城镇体系和基础设施空间分布格局。国土资源部中国地质调查局为了服务国家经济社会发展大战略，更加紧密地与经济和社会发展相结合，更加主动地为经济和社会发展服务，组织开展了重要经济区和城市群地质环境调查评价。

2001年，国土资源部中国地质调查局启动了环渤海经济区的地质环境调查评价工作试点，通过八年多的努力，完成了3个层面的调查，即区域1：25万地质环境调查，天津滨海新区、曹妃甸等重点地区1：5万调查，海岸带侵蚀淤积、地面沉降、活动断裂等重大环境地质问题专题调查；搭建了1个地质环境综合信息平台，服务经济社会发展成效显著。同时，环渤海经济区试点工作探索的“3+1”工作模式以及部省合作机制、供需互动机制、产学研结合机制，为其他经济区和城市群地质环境调查提供了宝贵的示范经验。2009年以来，先后启动了长三角、珠三角、海峡西岸、北部湾、长江中游、关中、中原、长吉图、成渝等重要经济区和城市群地质环境调查评价工作。

《中国重要经济区和城市群地质环境图集》重点反映了1：25万区域地质环境调查成果，是“重要经济区和城市群地质环境调查评价”的重要成果之一，以重要经济区和城市群为单元出版，主要图件包含三大类：序图、地质环境图、专题评价图。序图内容包括重要经济区和城市群区位、遥感影像、行政区划、区域规划、水系等。地质环境图主要内容包括地质构造、第四纪地质、地形地貌、水文地质、工程地质、环境地质。专题评价图根据经济区和城市群特点编制，主要内容包括地面沉降、土壤环境质量、地下水污染、应急水源地、地热、地质遗迹等，最后编制地学规划建议图。

《中国重要经济区和城市群地质环境图集》的出版，充分体现了国家地质工作的公益性、基础性作用。该图集可以为主体功能区规划、优化国土空间布局、新型城镇化建设、产业结构调整、资源优化配置以及重大工程建设等提供重要地学基础资料，将取得显著社会经济效益。

《中国重要经济区和城市群地质环境图集》的出版，得到了相关部门领导的大力支持，同时也得到了很多专家学者的指导和建议，在此一并表示感谢。由于编者水平有限，难免存在疏漏和不足，恳请读者赐教，以便修改完善。

编委会

2014年12月12日

PREFACE

Since 21st century, the regional development strategy in China has been implemented, and a number of important economic zones and urban agglomerations of regional development planning have been approved. Therefore, urbanization and industrialization level increases rapidly and land development increases further. The overall strategy for regional development need overall planning of land development, exploit, protection and remediation, focus on the optimization of industrial development, urban system and infrastructure spatial distribution. In order to serve the national economic and social development strategies, more closely integrated with the economic and social development, actively to serve the economic and social development, China Geological Survey (CGS) of The Ministry of Land and Resources organized to carry out geological environment investigation and evaluation of the important economic zone and urban agglomeration.

In 2001, CGS launched the pilot work of geological environment investigation and evaluation of Circum-Bohai-Sea economic zone. Through 8 years' effort, 3 aspects of investigation has been completed, namely the 1∶250 000 regional geological environment investigation, Tianjin Coastal New Area investigation, Caofeidian and other keyareas of 1∶50 000 investigation, major environmental geological problems investigation such as coastal erosion and sedimentation, ground subsidence, active fault. And one geological environment comprehensive information platform has been built, developing economic and social services with remarkable results. At the same time, the experimental work of "3+1"operating mode and mechanism of ministry and province cooperation, supply and demand interaction, production and research in Circum-Bohai-Sea economic zone, which provide valuable experience for other economic zones and urban agglomerations. Since 2009, the geological environment investigation and evaluation work the Yangtze River Delta, Pearl River Delta, the West Coast of the Straitand, the Beibu Gulf, the Middle Yangtze River, Guanzhong, Central Plains, Chang-Ji-Tu, Chengdu-Chongqing economic zone and other important urban agglomerations have been started.

"*The Geo-Environment Atlas of Important Economic Zone and City Group in China*" mainly reflect the geological environment achievements of 1∶250 000 regional investigation, which is one of the important achievements of "Geological Environment Survey and Evaluation in the Important Economic Zone and Urban Agglomeration", and published in an important economic zone and the city group as the unit of publication. The main map contains three categories: sequence diagrams, geological environment maps, thematic evaluation map. Sequence diagrams include the location map of important economic zone and city group, remote sensing image, administrative division, regional planning, river system etc. The main contents of geological environment map include geological structure, topography and geomorphology, Quaternary geology, hydrogeology, engineering geology, environmental geology. Thematic maps based on the evaluation of economic zone and urban agglomeration characteristics, the main contents include the surface subsidence, soil environmental quality, pollution of groundwater, emergency water source, geothermal and geological relics.And finally we compile the earth science planning proposals map.

The publication of "*The Geo-Environment Atlas of Important Economic Zone and City Group in China*" reflects the public welfare, the basic role of national geological work. The atlas can provide important basic geological data for the main functional area planning, optimization of land and space layout, new urban industrial structure adjustment, optimum distribution of resources, and major construction projects , which will achieve significant social and economic benefits.

The publication of "*The Geo-Environment Atlas of Important Economic Zone and City Group in China*" received not only strong support from the leades of related departments, but also the guidance and advice from many experts and scholars, thanks to all. The ability of editor is limited, there are some inevitably omissions and deficiencies.We invite the readers to enlighten, so we can revise and improve the Atlas.

Editorial Committee

2014/12/12

地理底图图例

省级行政中心

地级行政中心

县(市、区)行政中心

乡镇级行政中心

村庄

高铁

铁路

G30 高速路、在建高速路及编号

G108 国道、在建国道及编号

S108 省道、在建省道及编号

国界

香港特别行政区界

省级界

地级界

县级界

工作区范围界

常年河及湖泊

运河、渠道

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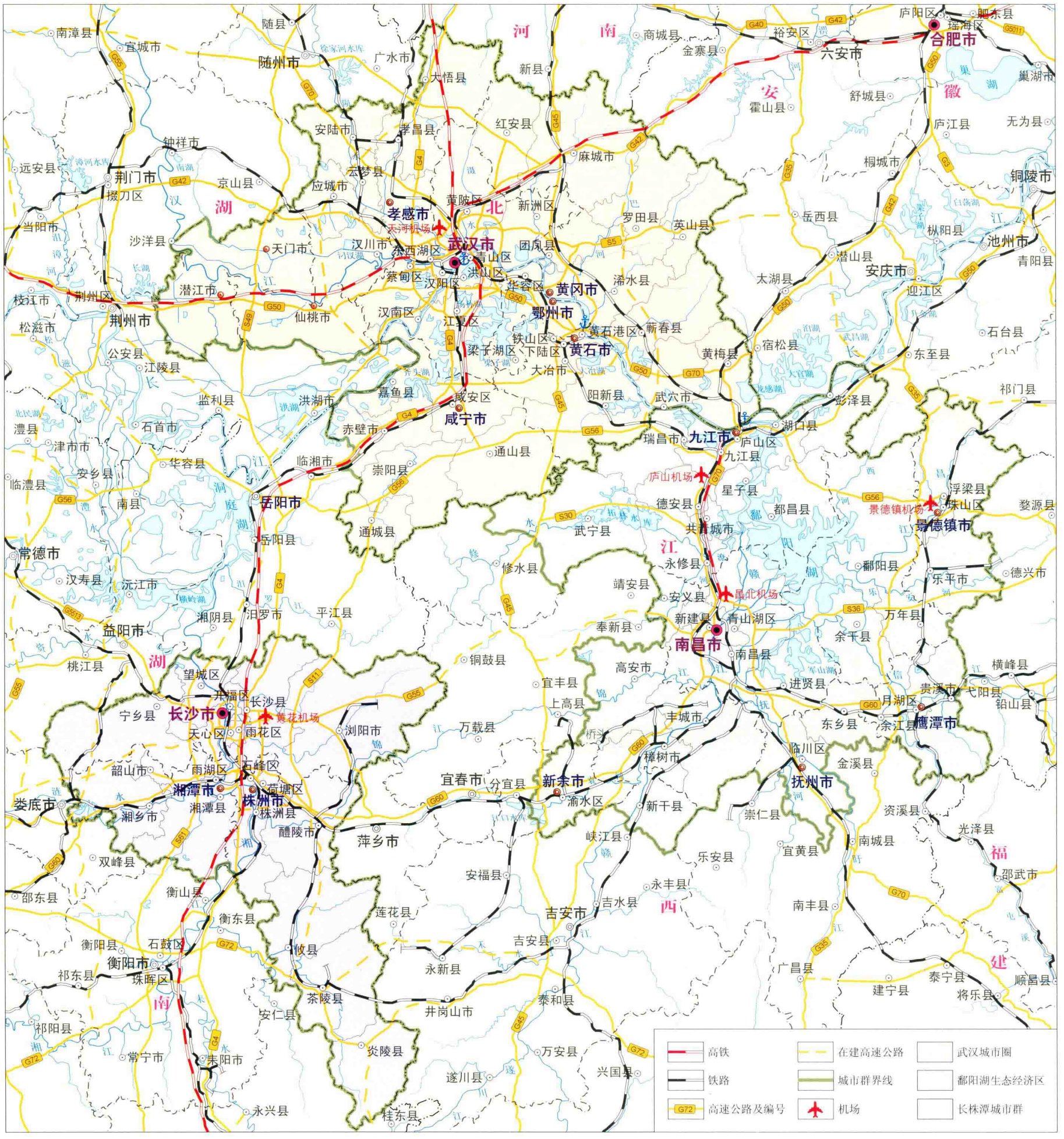


资料截止日期：2014年4月

资料来源：武汉地质调查中心

编　　图：邵长生　陈立德

1 : 2 570 000　0　25.7　51.4　77.1　102.8 km

1.1长江中游城市群交通位置图说明

1.1.1 区位概况

2007年12月，国务院批准武汉城市圈和长株潭城市群为全国资源节约型和环境友好型社会建设综合配套改革实验区，2009年12月12日，国务院批准环鄱阳湖生态经济区为国家级经济区，至此，以武汉城市圈、长株潭城市群和鄱阳湖生态经济区为核心的长江中游城市群形成。

长江中游城市群包括武汉城市圈、长株潭城市群、鄱阳湖生态经济区，地跨湖北、湖南和江西3个省，总面积$13.72\times10^4km^2$，核心区$1.76\times10^4km^2$。其中，武汉城市圈指以武汉为圆心，周边100km范围内的黄石、鄂州、黄冈、孝感、咸宁、仙桃、潜江、天门8个城市，面积$5.8\times10^4km^2$，其中核心区8 500km^2；长株潭城市群包括长沙、株洲、湘潭3市，面积$2.8\times10^4km^2$，其中核心区6 100km^2。鄱阳湖生态经济区包括南昌、景德镇、鹰潭3市，以及九江、新余、抚州、宜春、上饶、吉安的部分县(市或区)，共38个县(市、区)，国土面积$5.12\times10^4km^2$。

1.1.2 交通概况

1.1.2.1 铁路

长江中游城市群内，主要客运铁路包括：

(1)纵向，京广铁路、京九铁路、武广高铁。

(2)横向，合(肥)武(汉)客专线、汉宜铁路、湘黔线、浙赣线。

1.1.2.2 公路

长江中游城市群内公路网密集，主要过境高速公路包括G4京港澳高速、G45大广高速、G70福银高速、G60沪昆高速、G50沪渝高速、G42沪蓉高速、G56杭瑞高速、G35济广高速和G72泉南高速等，另外还有各省级高速和主要城市环城高速等。主要国道有G105、G106、G107、G206、G316、G318、G319和G320等。

1.1.2.3 航空

长江中游城市群内大型国际机场有3个，为武汉天河机场(4F级)、长沙黄花机场(4E级)和南昌昌北机场(4E级)，支线机场有九江庐山机场和景德镇罗家机场。

1.1.2.4 水运港口

长江中游城市群内主要水路通道是以长江干线为主轴，以汉江、湘江、赣江等高等级航道为干线，以江汉运河、洞庭湖、鄱阳湖水系其他航道为补充的主干结合、布局合理的内河航道体系。区内主要港口有武汉港(含阳逻新港)、黄石港、九江港、长沙港和南昌港。

1.1 Instructions of the Traffic and Position Map of the City Group of the Middle Yangtze River

1.1.1 The Location

In December 2007 the State Council approves Wuhan Urban Circle and Chang-Zhu-Tan Metropolis as a trial model for the national resource-saving and environment-friendly social construction of comprehensive reform.On December 12,2009 the State Council approves the Poyang Lake Ecological Economic Zone as a national economic zone.So far, (Wuhan Urban Circle and Chang-Zhu-Tan metropolis and the Poyang Lake Ecological Economic Zone being the core) an urban agglomeration in the City Group of the Middle Yangtze River has been formed.

The City Group of the Middle Yangtze River includs the Wuhan Urban Circle and Chang-Zhu-Tan Metropolic, Poyang Lake Ecological Economic Zone.With a total area of $13.72\times10^4km^2$, it covers three provinces which are Hubei, Hunan and Jiangxi.Within the 100km scale it covers Huangshi, Ezhou, Huanggang, Xiaogan, Xianning, Xiantao, Qianjiang, Tianmen with an area of $5.8\times10^4km^2$, and the core area is 8 500km^2. The Chang-Zhu-Tan Metropolis includes Changsha, Zhuzhou and Xiangtan, and the area is $2.8\times10^4km^2$, the core area is 6 100km^2. The Poyang Lake Ecological Economic Zone includes Nanchang, Jingdezheng, Yingtan.Besides, it includes parts of the counties (city, district) of Jiujiang, Xinyu, Fuzhou, Yichun, Shangrao, Ji'an, and the area is $5.12\times10^4km^2$.

1.1.2 The traffic

1.1.2.1 Railways

Within the City Group of the Middle Yangze River, the main passenger railways include:

(1) Longitudinal: Beijing-Guangzhou railway, Beijing-Kowloon railway, Wuhan-Guangzhou high speed train.

(2) Horizontal: Hefei-Wuhan railway, Wuhan-Yichang railway, Xiangqian railway, Zhegan railway.

1.1.2.2 Road

The City Group of the Middle Yangtze River has a dense road network which includes: G4 Beijing-Honkong-Macao highway, G45 Daqing-Guazhou highway, G70 Fuzhou-Yinchuan highway, G60 Shanghai-Kunming highway, G50 Shanghai-Chongqin highway, G42 Shanghai-Chengdu highway, G56 Hangzhou-Ruili highway, G53 Jinan-Guangzhou highway and G72 Quanzhou-Nanning highway etc.In addition, there are provincial highways and major inner-citiy highways etc.The main national highways are G105, G106, G107, G206, G316, G318, G319 and G320 etc.

1.1.2.3 Airports

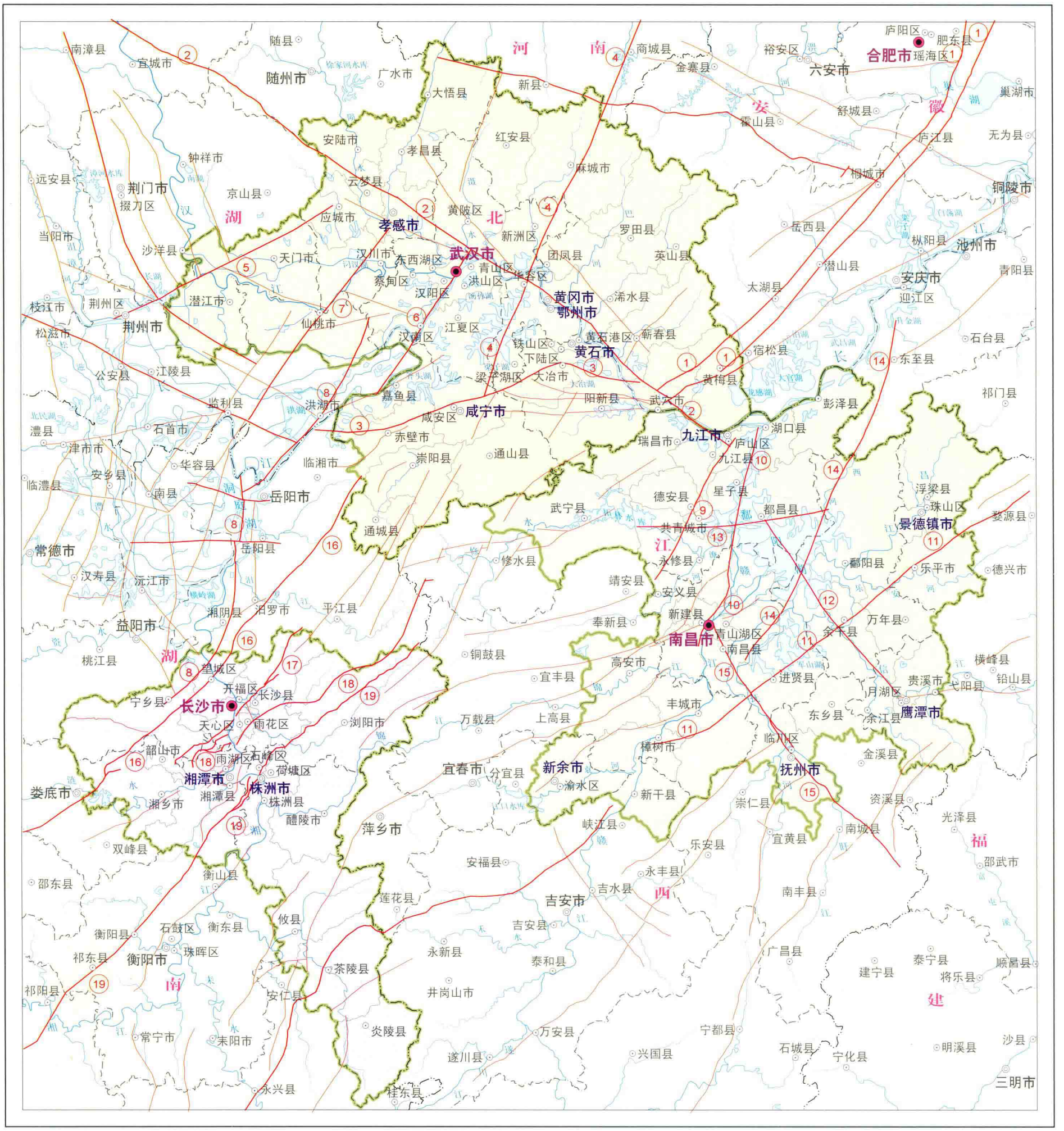
The City Group of the Middle Yangtze River has three international airports, including Wuhan Tianhe Airport (4F), Changsha Huanghua Airport (4E) and Nanchang Changbei Airport (4E).The other smaller airports include Jiujiang Lushan Airport and Jingdezheng Luojia Airport.

1.1.2.4 Shipping ports

The main waterway in the City Group of the Middle Yangtze River is based on the Yangtze River.The Hanjiang River, the Xiangjiang River, the Ganjiang River and other waterway functions as the main line, are supported by Jianghan Canal, Dongting Lake, Poyang Lake water system.This shipping system is a combination of major rivers and tributaries with reasonable layout.The major ports is Wuhan Port (including New Yangluo Port), Huangshi Port, Jiujiang Port, Changsha Port and Nanchang Port.

长江中游城市群主要断裂分布图

The Main Faults Map of the City Group of the Middle Yangtze River



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编　　图：陈州丰　齐　信　邵长生　陈立德

1 : 2 570 000　0　25.7　51.4　77.1　102.8 km

⑪ 断裂编号

控制性断裂

一般性断裂

① 郯城-庐江断裂带

② 襄樊-广济断裂

③ 咸宁-灵乡断裂

④ 麻城-团风断裂

⑤ 潜北断裂

⑥ 武汉-嘉鱼断裂

⑦ 沔阳断裂

⑧ 沙湖-湘阴断裂

⑨ 九江-德安断裂

⑩ 赣江断裂

⑪ 余干-进贤断裂

⑫ 信江断裂

⑬ 永修-都昌断裂

⑭ 东至-青岚断裂

⑮ 扶河断裂

⑯ 公田-宁乡断裂

⑰ 葫芦坡-金盆岭-炮台子断裂

⑱ 施家冲-新开铺-磊石塘断裂

⑲ 庙湾-罗家屋场断裂

1.2 长江中游城市群主要断裂分布图说明

(1) 郯城-庐江断裂：总长2 000km以上，武汉城市圈南西边缘出露约45km。区内断裂走向为近北东向，沿大别山东南端分布，向南终止于长江北岸；南端可见两条近平行的断裂，分别称池太断裂、嘉庐断裂，构成北东向潜山盆地北西边缘、主要阶地边缘。它在中国东部中生代以来构造演变中具有重要作用。

(2) 襄樊-广济断裂：该断裂是一条多旋回基底性断裂，西延与青峰断裂相接，故又称青峰襄樊广济断裂。总体走向北西，倾北东，全长达1 000km以上，武汉城市圈分布其南东段，长约260km。它是控制秦岭褶皱系和扬子准地台两大地质构造单元的分界，断裂南北无论在沉积建造、岩性组合、变质作用还是地壳形变特征方面均有明显的差异。长江中游城市群区内断裂经云梦、孝感、武汉、黄冈终至武穴(原广济)，有认为延至九江。该断裂在第四纪以来断裂继承性活动明显，并控制孝感—江埠和武汉以东长江第四纪槽地的形成。沿断裂带有地震活动和地下热水分布或温泉出露。

(3) 咸宁-灵乡断裂：东起太子山，经灵乡、咸宁、蒲圻延入湖南境内，全长135km，基本位于武汉城市圈区域内。断裂早期活动控制江汉盆地东南部边界。断裂在地貌上形成低凹地带，控制灵乡火山岩分布呈北东走向，倾向北西。据冶金部门资料，其断距可达千米，断裂形成时代为中新生代，晚近期有继承性活动表现，并伴有地震发生。

(4) 麻城-团风断裂：该断裂是江汉盆地东部一条规模宏大的区域性基底断裂，走向北北东，断面倾向西。它横穿中央造山带，北起河南固始，经商城过鄂豫边境，区内经麻城、团风南延，经梁子湖至咸宁，全长280km。断裂历经多次活动，是学术界公认的长期活动性断裂。断裂经历了多次力学性质的转化，压剪—张剪—压剪形变遗迹丰富。早期为压性，白垩纪—古近纪地质时期在区域引张作用的影响下，控制麻城新洲盆地的形成及红层沉积。第四纪以来断裂继承性活动较为明显，地震活动比较频繁。据地震局水准测量，麻城团风断裂现今表现为右旋张剪性错动，东盘上升速率约为1.5mm/a，西盘错速约为2mm/a。

(5) 潜北断裂：属江汉盆地一条较大的隐伏断裂，走向北东，全长约90km，基本位于武汉城市圈内，濒西边缘，大致展布于沙市、渔新、皂市一线。它横切北西—北北西向大洪山断褶带及其老构造乐乡关地垒、汉水地堑，造成潜江组与古生界接触。断裂主要活动时期为中新生代，控制潜江凹陷白垩纪—古近纪沉积。第四纪以来继承性活动明显，控制江汉平原强烈沉降区北部边界，断裂两侧第四系厚度差异明显。断裂带北侧经钻孔揭露，下古生界赋存有地下热水，水温65℃，涌水量逾2 900m^3/d。

(6) 武汉-嘉鱼断裂：断裂大体沿长江展布，走向北东30°，长约70km，均位于武汉城市圈内。在武汉处于龟、蛇两山之间，切穿泥盆纪—早三叠世地层。航磁反应明显，第四纪以来控制着长江槽谷的生成发展。沿断裂带有地震活动。

(7) 沔阳断裂：走向北北东，长约100km，武汉城市圈内长70km。它是控制沔阳凹陷和洪湖凸起的西界。重力资料显示，重力密集梯度带与断裂走向一致。断裂南延很可能与湖南境内的砖桥钱粮湖断裂相连，并控制尺八坳陷带的西界。第四纪以来继承性活动明显，航卫片上线性影像清晰，地貌上也有反映，如汉江河道汉川至沔阳段走势与断裂走向一致。1930年10月沔阳发生过5级地震，可能与该断裂近期活动有关。

(8) 沙湖-湘阴断裂：走向北北东，总长约220km，在武汉城市圈南边缘出露其北端25km，长株潭城市群北边缘出露其南端30km，是一条规模较大的隐伏断裂，控制江汉断坳的东部边界，并控制断裂两侧白垩系—古近系沉积。断裂主要活动时期为中新生代，第四纪以来继承性活动明显，并控制江汉平原强烈沉降区东部边界。有迹象表明该断裂近期仍在持续活动。

(9) 九江-德安断裂：长约105km，基本位于鄱阳湖生态经济区内。走向北北东，倾向285°。中更新世末、晚更新世末、全新世均有活动，其东侧庐山断块强烈抬升，现代侵蚀作用强烈，地貌反差明显。中更新统网纹红土砾石层中小断层成组发育，据最新统计资料，走向以北西为主、北东次之，显示右扭应力场特征。控制隘口(星子县)、威家(九江市庐山区)温泉的出露。历史上曾发生强震数次，现代弱震频繁。

(10) 赣江断裂：又称湖口南昌断裂，属于湖口新干断裂的北段(南昌以北)，长约120km，均位于鄱阳湖经济区内。走向北北东，倾向280°～285°。全新世以来发生过活动，但活动性不明显。总体上控制赣江河谷的发育，构成鄱阳湖盆地外泄通道。

(11) 余干-进贤断裂：长度超过190km，走向北东。有全新世活动迹象，为乐平—余干一带平原与岗地、丘陵之分界。控制进贤、钟陵一带冲洪积扇的分布，以及进贤一带中更新统进贤组的发育。丰城—清江段赣江河谷可能受其控制。余干发生历史地震16次。

(12) 信江断裂：信江断裂长132km，走向北西，倾向南东。全新世有活动。航卫片反应明显，控制信江下游河谷及康山以北之水下河道发育。滨湖一带，断裂东侧全新统近代湖冲积层覆盖在残积物之上，无更新统沉积，地形反差明显。乐平的塔前、月湖温泉受北东向断裂控制。

(13) 永修-都昌断裂：也称柘林都昌断裂，长约120km，近东西走向，倾向60°。晚更新世末以来活动，地形反差明显，沿断裂有三角形断面山断续分布。

(14) 东至青岚断裂：也称油墩青岚湖断裂、波阳青岚断裂，长135km，走向北北东—北东，倾向南东，中更新世末—晚更新世末有活动。北段多见直线形沟谷和三角形断面山，南段控制下中更新统九江组、进贤组沉积，二者上下叠置；中更新世以后南侧抬升为岗地。中更新统网纹红土砾石层中普遍出现断层、节理。

(15) 扶河断裂：也称莲塘抚州断裂，长107km，走向北西，倾向北东，全新世活动痕迹发育。航卫片异常反应明显，控制抚河下游河谷的发育。军山湖、青岚湖等北西向溺谷型湖湾可能与其有关。南昌市古近系、新近系红层有北西向的富水带。

(16) 公田-宁乡断裂：长约120km，断裂走向北东，倾向北西，倾角30°～45°。沿断裂带北段汨罗组与新开铺组呈直线状接触，南段白沙井组与橘子洲组接触，且物探异常。据钻探查明，断裂北西侧第四系厚80～125m，南东侧厚20～40m，反映两盘垂直断距达40～110m，并且是一条活化的基底断裂。它控制区内铜官沉降和长沙株洲的抬升隆起，据历史记载，沿断裂及交汇带附近多次发生过地震。

(17) 葫芦坡-金盆岭-炮台子断裂：长约60km，属长沙岳麓山活动断裂带，断裂走向北东，倾向北西。断裂带上第四纪地层褶皱明显，应属断裂在第四纪活动迹象。断裂对地下水富水性控制明显，北西盘含水性明显富于南东盘，两者分界线沿断裂带线状分布。

(18) 施家冲-新开铺-磊石塘断裂：长约50km，走向北东。第四纪以来活动明显，断裂带内小断裂极其发育，并对第四纪沉积有明显控制作用，是挽近构造活动的重要表现。

(19) 庙湾-罗家屋场断裂：全长约250km，在长株潭城市群范围内长约190km，走向北东。该断裂切割第四系新开铺组，并使其与白垩系断层接触，断面倾向东，倾角75°，呈正断层，断层上盘新开铺层引张下陷且有轻微液化。而产生轻微拖曳现象，但后期又有挤压作用叠加，致使早期张性破碎带内形成小型柔曲与构造片理。

1.2 Instructions of the Main Faults Map of the City Group of the Middle Yangtze River

(1) Tancheng-Lujiang fault: The Tancheng-Lujiang fault, over 2 000km long, has a 45km exposed area along the edge of Wuhan Urban Circle.It is nearly NE trending, and extends through the south of Dabie Mountain, all along to the north bank of the Yangtze River.On the north of the fault lie two nearly parallel distributed faults, (which) are called Chitai fault and Jialu fault and compose the edge of the main terrace or the northwest edge of Qianshan Basin which is NE trending. It has played an important role during the tectonic evolution in East China since Mesozoic Era.

(2) Xiangfan-Guangji fault: Xiangfan-Guangji fault is a multi-cycle basal fracture, and it connectes Qingfeng fault to the west, so it is also called Qingfeng-Xiangfan-Guangji fault.The general trend is NW, and tendency is NE, the total length is more than 1 000km, Wuhan Urban Circle distributes in the SE segment of this fracture with about 260km long. It is the boundary that controls the two geological tectonic units of Qinling Fold System and Yangtze Para-platform.And north and south parts of the fracture have obvious differences in sedimentary formation, lithologic combination, metamorphism and crustal deformation characteristics.The fractures in the City Group of Middle Yangze River go through Yunmeng, Xiaogan, Wuhan, Huanggang, and finally reach Wuxue (formerly called Guangji) though someone considers that it extends to Jiujiang.The inherited activity of this fracture is obvious since the Quaternary, and controls the formation of Yangtze River Quaternary trough to the east of Xiaogan-Jiangbu and Wuhan.And along the fracture there exposed seismic activities and underground hot water distribution or hot spring.

(3) Xianning-Lingxiang fault: In the east, it starts from Taizi Mountain then goes to Hunan Province, by way of Lingxiang, Xianning and Puyin.The overall length is 135km. Most of the faults is located within Wuhan Urban Circle.The early fault controls the southeast boundary of Hanjiang Basin.The fault becomes low concave zones, and controls distribution of Lingxiang Volcanic Rock, along NE, dips as NW.According to data of metallurgy department, the longest fault length can be over one kilometer.It formed in Meso-Cenozoic.In Neoid, there were inheritated activities of fault, and be accompanied by earthquakes.

(4) Macheng-Tuanfeng fault: Macheng-Tuanfeng fault is a large basement fault in the east of Jianghan Basin, the trend is NNE, and the dip of sections is W.It crosses the Central Orogenic Belt and its north is Gushi, Henan Province.The fault crosses the border of Hubei and Henan by Shangcheng, The fault extends south by Macheng and Tuanfeng.It crosses Liangzihu to Xianning, and the overall length is 280km.The fault goes through lots of activities and it is acknowledged as a long-term active fracture in academia.The fault goes through multiple mechanical transformation and there are abundant remains of compression shear-tension shear-compression shear in deformation.The fault is compressional in early time, and in Cretaceous-Paleogene age, under the influence of the regional extension force, the fault controlled the formation of the red layer deposition in Macheng-Xinzhou Basin.The fault's inheritance activities are more obvious and earthquake activities are more frequently since Quaternary.According to the seismological bureau's leveling, Macheng-Tuanfeng fault now shows the dextral rupture shear, and the rising rate of the east plate is about 1.5mm/a, the displacement rate of the west plate is about 2mm/a.

(5) Qianbei fault: Qianbei fault is a big buried fault, part of the Jianghan Basin.Its trend is NE, and total length is 90km, and it is basically located in Wuhan Urban Circle near the western edge of rough distribution in Shashi, Yuxin, Zaoshi line.It crosscuts NW—NNW fault-fold belt in Dahongshan Mountain of bruchfalten and the old horst conformation in Lexiangguan, the Hanjiang River Graben, resulting in Qianjiang Formation in contact with the Paleozoic.Main activities of this fault are during the Cenozoic, controlling the deposition of the Qianjiang Depression in Cretaceous-Paleogene.Since the Quaternary inheritated activities are significant, and control the northern boundary of the settlement area of Jianghan Plain.The thickness difference between the two sides of the fault is obvious.Drilling revealed that on.The north side of the fault occurred underground hot water in lower paleozoic, which temperature is 65℃, water inflow per day is over 2 900m^3.

(6) Wuhan-Jiayu fault: Wuhan-Jiayu fault distributes along the Yangtze River.Its trend is NE30° and it is about 70km long.It is located in Wuhan Urban Circle and between Guishan Mountain and Sheshan Mountain.It cuts through the Devonian-Early Triassic strata.Aeromagnetic reaction is obvious.Since the Quaternary, this fault starts to control the development of Yangtze Valley.There are earthquakes along the fracture.

(7) Mianyang fault: The trend of Mianyang fault is NNE, about 100km long, and about 70km is in Wuhan Urban Circle.It is the west border that controls Mianyang Depression and Honghu Salient.Gravity data shows that the trend of gravity dense gradient zone is consistent with the fault trend.South extension of the fault is likely to link with Zhuanqiao-Qianliang Lake fault in Hunan and controls the western boundary of the Chiba Depression Zone.Since

the Quaternary, inherited activities are obvious, the linear image on aerial and satellite photos is clear, there are reactions on the landscape' too.For instance, the trend of Hanchuan to Mianyang section of Hanjiang River is consistent with the fault trend.In October, 1930, M5 earthquake occurred in Mianyang, it may be related to the recent activities of the fault.

(8) Shahu-Xiangyin fault: The Shahu-Xiangyin fault trend in NNE, totaling 220km.Its northern tip exposes 25km in the southern edge of the Wuhan Urban Circle, and its southern tip exposed 30km in the northern edge of the Chang-Zhu-Tan Metropolis.It's a large-scale concealed fault which controls the eastern boundary of the Jianghan fault-Depression and the Cretaceous-Paleogene deposition in its both sides.The major periods of fault activities are in the Middle Cenozoic.Since the Quaternary, inherated activities of fault are obvious.It controls the eastern boundary of the strong subsidence area of the Jianghan Plain.There are signs that the fracture activity continues recently.

(9) Jiujiang-De'an fault: Jiujiang-De'an fault is about 105km long, which is basically located in the Poyang Lake ecological economic zone.Its trend is NEE and tendency is 285°.It is active in the end of the Middle Pleistocene, Late Pleistocene, Holocene.On the eastern side of the Jiujiang-De'an fault, the Lushan Block uplift greatly, its modern erosion is stronger with significant contrasting landform.Small medium-sized develop in group in the reticulate red laterite gravel layer of the Middle Pleistocene.According to the latest statistics, their main strike is NW and NE is second to it, which show right torsion stress field characteristics.This fault controls the outcrop of the hot springs in Aikou (Xingzi county) and Weijia (Lushan District of Jiujiang City).Several strong earthquakes occurred in history, the modern weak earthquakes are frequent.

(10) Ganjiang fault: Ganjiang fault, also known as Hukou-Nanchang fault, belonging to the north part of Hukou-Xingan fault (the north part of Nanchang), about 120km long, is located in the economic zone of Poyang Lake.Its strike is NNE, tendency is 280°-285°. It occurs activities since Holocene, but the activities are not obvious.It controls the development of Ganjiang River Valley in general, constituting the Poyang Lake basin leakage channels.

(11) Yugan-Jinxian fault: Yugan-Jinxian fault is over 190km long, NE trending.It is likely that it had moved during the Holocene, which separated the plain and hills in the area of Yugan-Jinxian.The distribution of alluvial-proluvial fan in Jinxian-Zhongling and the development of Middle Pleistocene Jinxian Formation in Jinxian are controlled by this fault, and maybe also the Ganjiang River Valley in Fengcheng-Qingjiang.There are 16 historical earthquakes occurred in Yugan.

(12) Xinjiang fault: Xinjiang fault is 132km long, trend NW and dips SE.Activities appeared in Holocene.The statellite imageries reflect it's characteristics obviously.Along the shore, saprolite is covered with Holocene modern times lake alluvium at the east of fracture, and there is no Pleistocene sedimentation, the terrin contrasts distinctly.Taqian and Yuehu hot spring in Leping are controlled by NE trending fault.

(13) Yongxiu-Duchang fault: It's known as Tuolin-Duchang fault, with a length of 120km, nearly east-west, tendency to 60°. Since the Late Pleistocene there shows activity with obvious terrain contrasts, and discontinuous distribution along the fracture with triangular cross-section mountain.

(14) Dongzhi-Qinglan fault: The Dongzhi-Qinglan fault is also called Youdun-Qinglan Lake fault or Boyang-Qinglan fault, which is 135km long.Its trend is NNE-NE and tendency is SE.It is active in the end of the Middle Pleistocene, Late Pleistocene.Straight valleys and triangular section of mountain are common in its north part.Besides, its south part controls the deposition of the Jiujiang Formation and Jinxian Formation, which were overlapped in the Lower and Middle Pleistocene.After the Middle Pleistocene, it uplifts to become mound. Faults and joints were widespreaded in the reticulate red laterite gravel layer of the Middle Pleistocene.

(15) Fuhe River fault: This fault, towords north-west, is 107km long, dips to north-east, shows traces of the holocene activities, and also known as Liantang-Fuzhou fault.According to the obvious and abnormal reflection, it controls the development of valley in the lower reaches of Fuhe River.It may relate to those drowned-valley type of lakes like Junshan Lake, Qinglan Lake.There are groundwater-enriched belts towards north-west in the red layers of Paleogene and Neogene in Nanchang.

(16) Gongtian-Ningxiang fault: The Gongtian-Ningxiang fault is about 120km.The trend is NE and the tendency is NW with the dip of 30°-45°.Along the north section of the fault, the Miluo Formation and the Xinkaipu Formation are showed with the direct striation contact while the south section of the Baishajing Formation and the Juzizhou Formation contact with the geophysical anomaly.According to the drilling, the thickness of the Quaternary in the northern west of the fault is 80-125m, and the southern-east is 20-40m, reflecting the vertical separation of the two walls is 40-110m, while the fault is a activated basement fault.The fault controls the Tongguan Settlement and the Changsha-Zhuzhou Uplift. According to the historical records, a great deal of earthquaks occurred along the fault zone and near the zone of convergence.

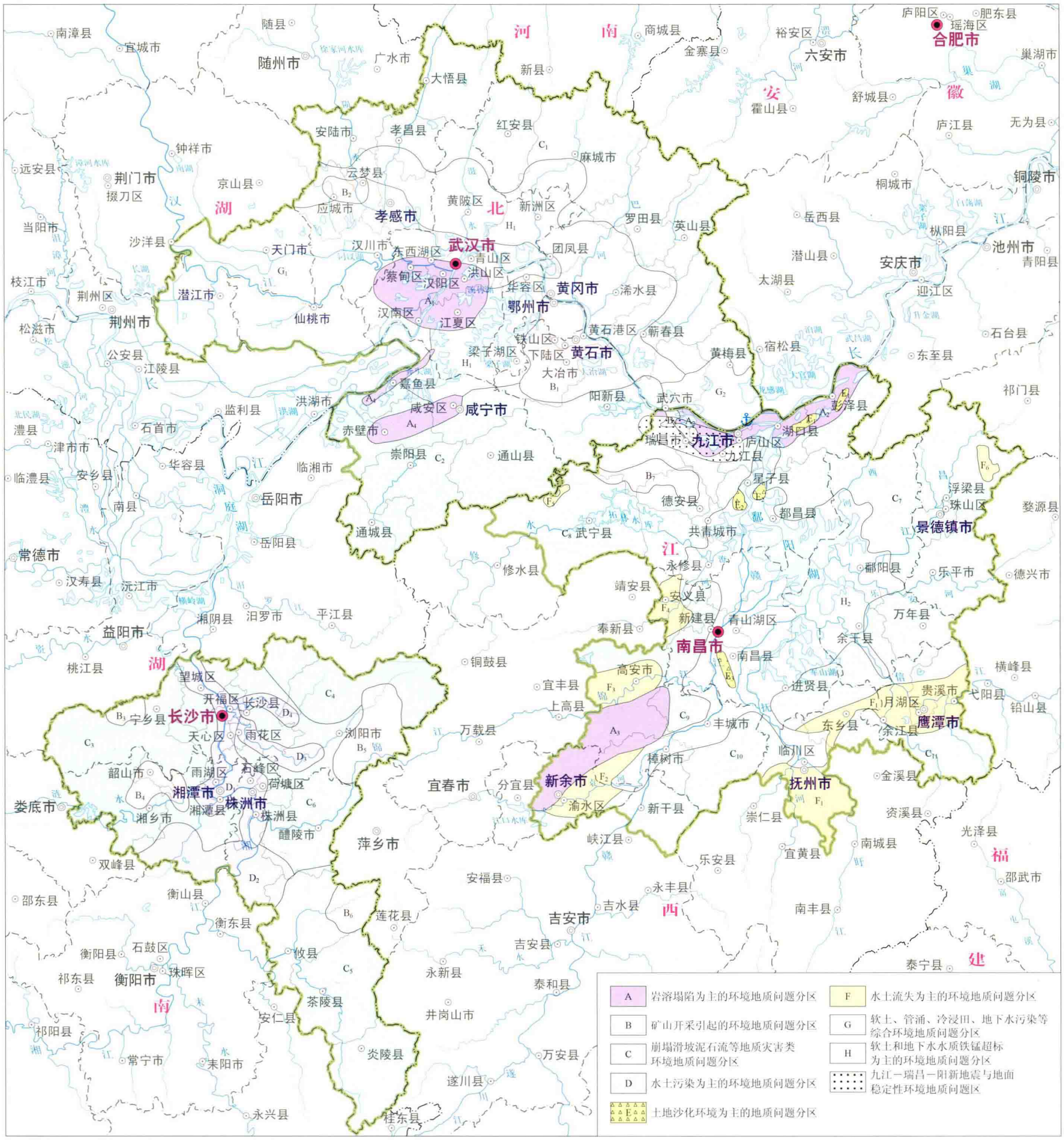
(17) Hulupo-Jinpenling-Paotaizi fault: The Hulupo-Jinpenling-Paotaizi fault is 60km long, which belongs to Changsha-Yuelu Mountain active fault zone.This fault is NE trending, NW dip.The fold of Quaternary strata is obvious in this fault, which should belong to fracture activities in the Quaternary.This fault has the obvious control on rich aqueous of groundwater, the rich aqueous of northwest area was significantly higher than that of southeast part, the dividing line between the two shows linear distribution along the fault zone.

(18) Shijiachong-Xinkaipu-Leishitang fault: It's about 50km long, and the tendency is NE.Since the Quaternary activity, small fracture appears in the fault zone, and has obvious control on the Quaternary sedimentary, which is an important performance in recent tectonic activity.

(19) Miaowan-Luojiawuchang fault: The length of active fault from Miaowan to Luojiawuchang is about 190km, the trend is NE.The fault cuts the rock of Quaternary Xinkaipu Formatin, and results in its contact with Cretaceous fault, whose section inclination is E, and inclination angle is 75°.It's a normal fault, the Xinkaipu Formation of fault hanging wall expands and sinks having slight liquefaction, and produce a mild drag phenomenon, but later have squeezed superpostion, which makes small flexure and schistosity construction in the early extensional fracture zone.

长江中游城市群主要环境地质问题分区图

The Main Environmental Geological Problems Partition Map of the City Group of the Middle Yangtze River



资料截止日期：2014年4月

资料来源：武汉地调中心收集

编　　图：陈立德　邵长生　陈小婷

1 : 2 570 000　0　25.7　51.4　77.1　102.8 km