



Annual Report in 2011

**Institute of Geology
Chinese Academy of Geological Sciences
(CAGS)**





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Preface

The Institute of Geology was formally established in 1956 and is affiliated with the Chinese Academy of Geological Sciences (CAGS) under the Ministry of Land and Resources of China (MLR). As a national public scientific research institution, the Institute of Geology is an integral part of the national scientific and technological innovation system and is mainly engaged in national fundamental, public, strategic and frontier geological survey and geoscience research.

During the past 50 years, the scientific research personnel has focused on the frontiers of geosciences and conducted fundamental geological surveys and geoscience research, in line with the nation's development objectives. Numerous research results have been achieved in resolving key geological problems, improving resource exploration, the introduction and development of new and high geoscience technology, and research on geoscience theories. To date, the Institute has built itself into a comprehensive geoscience research institution with a wide range of research fields, an optimized personnel structure, and advanced equipment. The Institute has shaped research fields and directions, competitive both at home and abroad, in regional geology and geological mapping, tectonics, the origin and evolution of life, stratigraphy, Precambrian geology, ultrahigh pressure metamorphism, igneous petrology, mineralogy, geochemistry and Earth materials science, continental dynamics and mantle dynamics, metallogenic geological settings and regional metallogeny, lithospheric structure and geodynamics, isotope geology, etc. The Institute has become an important national basis for the fostering of high-level talents in the fields of geological survey and geoscience research.

The Institute has attached great importance to international academic exchanges and cooperation and established cooperation with more than 50 scientific research institutions and universities in more than 20 countries and regions, including the United States, Russia, France, the UK, Germany, Republic of Korea, Japan, etc. The research teams of the Institute have also kept long-standing and successful cooperation with numerous international scientific research organizations, with more than 20 experts from the Institute holding important posts in related international academic organizations and projects. Four foreign experts have won the Chinese Government's "Friendship Award" due to their long-term and outstanding cooperation with the Institute.

Entering the twenty-first century and in particular during the past 5 years, the Institute has gained notable progress in scientific research, personnel training and international cooperation, with increasing cooperation and exchange activities, expanded fields of cooperation, abundant output of new research results and an increased number of papers published in "Nature", "Science" and other high-impact international journals. In view of this new situation and in order to publish in a timely manner the annual progress and achievements of the Institute to enhance its international standing and recognition, it was decided that an English version of the Institute's Annual Report is published in 2010.

Similar to the 2010 Annual Report, the current report includes the following 7 parts: (1) Introduction to the Institute; (2) Ongoing Research Projects; (3) Research Achievements and Important Progress; (4) International Cooperation and Academic Exchange; (5) Important Academic Activities in 2011; (6) Invitation to Foreign Researchers and Education; (7) Publications.

Finally, we express our sincere gratitude to colleagues from related research departments and centers of the Institute for their support and efforts of drafting and providing related materials during the compilation of this report – a written record of the hard work of the Institute's scientific research personnel for the year 2011. We also thank Ms. WANG Chen for her efforts of translating parts of the report from Chinese into English.

The Editorial Board of
the Annual Report (English Version) of the Institute of Geology,
Chinese Academy of Geological Sciences
April 20, 2012



1. Brief Introduction to the Institute of Geology

The Institute of Geology, Chinese Academy of Geological Sciences (CAGS), was formally established in April 1956 but can be historically traced back to the former Central Geological Survey as early as the 1910s. As a national public scientific research institution, the Institute of Geology is an integral part of the national scientific and technological innovation system, providing technological support for the national geoscience research and investigation of geology and mineral resources. The Institute is mainly engaged in national, fundamental, public, and strategic geoscience frontier research and basic geological survey. It is one of the important national research bases of the solid earth sciences, the application of earth science-related technologies, and the fostering of high-level scientists.

Since its establishment in the 1950s, the Institute has made considerable contributions to the national economic growth by providing scientific and technological advice to major issues of social relevance such as mineral resources, environmental protection, and large-scale construction projects. The Institute is also recognized for theoretical advancements in the geosciences by means of basic research in frontier disciplines. Seventeen scientists, such as Huang Jiqing, Xie Jiarong, Sun Yunzhu, Cheng Yuqi, Li Chunyu, etc., were elected to the Chinese Academy of Sciences (CAS) or the Chinese Academy of Engineering (CAE). With its competitive research team and remarkable scientific achievements, the Institute strives to enhance its domestic and international reputation in the geoscience community.

At present, the Institute has 213 staff, including 5 Academicians of CAS, 65 Research Fellows, and 60 Associate Research Fellows. Among the staff 115 researchers have doctoral degrees, and 24 have master degrees. Among the senior researchers, there are 22 advisers of doctoral candidates and 44 advisers of master candidates.

By the end of December 2011, the Institute has won 159 science and technology awards at national, provincial and ministerial levels, among which there are 24 prizes of the National Science Conference Award for the year of 1978, 17 prizes of the National Natural Science Award and the National Science and Technology Progress Award (1 special prize, 2 first prizes, 10 second prizes, 3 third prizes and 1 fourth prize), 122 prizes of the Science and Technology Progress Award at Provincial and Ministerial levels (13 first prizes, 42 second prizes, 53 third prizes and 13 fourth prizes). Since 1981, more than 3000 research papers and 110 monographs were published. Since 1991, 4 researchers have won the Prize for Scientific and Technological Achievement and the Prize for Scientific and Technological Progress of the Ho Leung Ho Lee Foundation, 6 researchers have won the J. S. Lee Honorary Prize for Geoscience, and 4 researchers have won the National Science Fund for Distinguished Young Scholars.



Fig. 1. The main building of the Institute



Organizational Framework

The structure of the Institute is as follows:

Administrative Departments

General Office
Science and Technology Department
Service and Security Department
Financial Department

Research Divisions

Division of Regional Geology and Mapping
Division of Tectonics
Division of Stratigraphy and Paleontology
Division of Metamorphic Rocks and Precambrian Geology
Division of Igneous Rocks
Laboratory for Continental Dynamics
Laboratory of Isotope Geology
Lithosphere Research Center
Beijing SHRIMP Center
Mineral and Energy Resources Center

Key Laboratories

State Key Laboratory of Continental Tectonics and Dynamics
Laboratory of Isotope Geology, Ministry of Land and Resources
Key Laboratory of Stratigraphy and Paleontology, Ministry of Land and Resources
Key Laboratory of Earthprobe and Geodynamics, Ministry of Land and Resources

Technical Support Organizations

Commission for the Geological Map of China (CGMC)
Center for Stratigraphy and Paleontology (CGS)

Affiliated Academic Organizations

China Commission of International Continental Scientific Drilling
Commission of Regional Geology and Mineralization, Geological Society of China
Commission of Geological Mapping, Geological Society of China
Commission of Stratigraphy and Paleontology, Geological Society of China
Commission of Petrology, Geological Society of China
Commission of Isotope Geology, Geological Society of China
Commission of Metamorphism, Mineralogy and Geochemistry, Geological Society of China



Peer-reviewed Publication

Acta Petrologica et Mineralogica

Research Fields

Regional geology, mapping and related database construction
Regional and global tectonics
Origin and evolution of life, paleontological and stratigraphic correlation
Precambrian geology and early crustal evolution
Cenozoic geology and modern geological and ecological environments
Ultrahigh pressure metamorphism and metamorphic belts
Petrology, mineralogy, and earth materials science
Continental dynamics and mantle dynamics
Geological setting of mineralization and regional mineralization
Deep geophysical probing, lithospheric structure and geodynamics
Isotope geology theory, methods and applications



2. Ongoing Research Projects

The Institute undertook 133 research projects in 2011 which are listed below.

2. 1 Projects funded by the National Natural Science Foundation of China

Key Projects:

No.	Project Leader	Project Title	Duration	E-mail Address of Leader
1	GAO Rui	Lithospheric structure of the western Qinling orogenic belt and deep crustal deformation along the northeastern margin of the Qinghai-Tibet Plateau	2009—2012	ruigao126@126.com
2	HOU Zengqian	Porphyry Cu deposits in continental settings, China: Geodynamics and genetic models	2008-2011	houzengqian@126.com
3	HOU Zengqian	Himalayan Pb-Zn-Cu-Ag ore deposits along the eastern and northern margins of Tibet: Ore-forming system and mechanism	2010-2013	houzengqian@126.com
4	LIU Fulai	Dynamic process of differential subduction and exhumation of crustal slices in the Sulu-Dabie HP-UHP metamorphic terrane	2008-2011	lf0225@sina.com
5	LIU Yongqing	Response of late Mesozoic biota evolution and environment to craton break-up of North China	2010-2013	Liuyongqing@cags.ac.cn
6	WANG Tao	Mechanisms, timing and geodynamics of Mesozoic crustal thinning in the North China Craton	2008-2011	taowang@cags.ac.cn
7	XU Zhiqin	Continental dynamics and resource effects of the Qinghai-Tibet Plateau	2010-2012	xzq@ccsd.cn
8	YANG Jingsui	Unusual minerals in ophiolitic mantle rocks and chromite and deep geological processes	2010-2013	yangjingsui@yahoo.com.cn
9	JIAN Ping	Geochemistry and chronology of ophiolites distributed in the eastern Junggar, Xinjiang and central-south Mongolia	2011-2014	jianping_510@yahoo.com.cn

General Projects:

No.	Project Leader	Project Title	Duration	E-mail Address of Leader
1	HE Rizheng	Study of seismic structure and geodynamics of mantle-derived volcanic rocks in northern Tibet	2010-2012	rizheng_cn@sina.com
2	HE Zhengjun	Syntectonic sedimentary response of the Shangyi Basin in northwest Hebei during the late Jurassic	2009-2011	zjhecags@126.com
3	JIN Xiaochi	Restoration, subdivision and correlation of middle-late Permian carbonate successions of the Baoshan Block, western Yunnan	2009-2011	jinxchi@cags.ac.cn
4	LI Qiusheng	Active seismic interaction studies on the basement structure of the Qiangtang Basin, Tibet Plateau	2009-2011	liqiusheng@cags.ac.cn
5	LI Zhaoli	Helium isotope geochemistry of eclogite from oceanic or continental subduction	2010-2012	lizhaoli3@tom.com
6	LV Junchang	Study of dinosaur fauna in western Henan	2009-2011	lujc2008@126.com
7	PAN Xiaofei	Genesis and formation of Bairendaba Ag-Pb-Zn deposits in Daxing'anling: Evidence from alteration, mineralization zoning and ore-forming fluids	2009-2011	pan_smile0551@sina.com
8	WANG Yong	Detailed study of Cenozoic strata from the western Kunlun foreland basin and its constraints on the timing of uplift of northwestern Qinghai-Tibet	2009-2011	wangyong@cags.ac.cn
9	YAN Quanren	Ultramafic and mafic complexes exhumed by the Xianshuhe Fault: New insights into the timing and affinity of the basement in the Songpan-Ganzi Block	2009-2011	qryan@cags.ac.cn



10	YANG Zhiming	Gold enrichment mechanism during magmatic-hydrothermal processes at the Bilihe gold deposit in Mongolia: Constraints on the genesis of Au-rich porphyry copper deposits	2010-2012	cagszym@yahoo.com.cn
11	YUAN Chongxi	Research on fossil mammals from the Lujiatun area, western Liaoning Province and its relative strata	2010-2012	yuanchongxi@cags.ac.cn
12	ZHANG Zeming	Metamorphism and geodynamics of the northeastern Lhasa Terrane, Tibet	2010-2012	zzm2111@sina.com
13	ZHENG Hongwei	3-D velocity structure of the crust and upper mantle in southeast China and geodynamic model	2010-2012	zhenghongwei004@sina.com
14	ZHOU Xiwen	Study on metamorphic evolution and anatexis of the khondalite series in the Helanshan region	2009-2011	xwzhou@cags.ac.cn
15	ZHU Xiangkun	Constraints of Fe and Mg isotopes on the origin of the Bayan Obo ore deposit, Inner Mongolia	2010-2012	xkzhu0824@gmail.com
16	DONG Chunyan	Some key geological problems in the early Precambrian Daqingshan area, Khondalite Belt, western North China Craton: SHRIMP geochronology and geochemistry	2011-2013	dongchunyan@sina.com
17	GUO Lei	Temporal constraints and mechanism of the late Mesozoic tectonic transition from contraction to extension in the Daqing Shan and adjacent areas	2011-2013	guolei_cn@sina.com
18	LIANG Fenghua	Rheological character of mantle rocks from the Luobusha ophiolite, Tibet: Implications for the genetic mechanism of chromitite	2011-2013	liang_fenghua@yahoo.com.cn
19	LI Zhihong	Character of Fe isotopes and ore-forming mechanism for Xuanlong type iron ore deposit	2011-2013	lizh1129@cags.ac.cn
20	YIN Chongyu	Restudy of the problematic fossil Tianzhushania in the early Ediacaran (Sinian) period	2011-2013	chongyuyin@cags.ac.cn
21	YOU Hailu	Dinosaurs and age-refining of the Early Cretaceous Hekou Group in the Lanzhou Basin, Gansu Province	2011-2013	youthailu@gmail.com
22	TIAN Shugang	Carboniferous-Permian reefs and their building conditions in Eastern Inner Mongolia	2011-2013	sgtian@cags.ac.cn
23	MENG Fancong	Genesis of jadeitite from the Polar Urals, Russia	2011-2013	mengfancong@yeah.net
24	REN Liudong	Metamorphic geology of the Mashan Complex and comparison with the Prydz Belt of Antarctica	2011-2013	ldren@cags.ac.cn
25	ZHANG Yuxu	Tectonic setting and orefield structure of the Bayan Obo Ore Deposit	2011-2013	zhangyuxugeo@163.com
26	ZHANG Jianxin	Relationship between high-pressure granulite and ultrahigh pressure eclogite in collisional orogens and their geodynamic significance	2011-2013	zjx66@yeah.net
27	ZHAI Qingguo	Basic dikes and the Gondwana northern margin breakup event in the Qiangtang area, Qinghai-Tibet Plateau	2011-2013	zhaiqingguo@126.com
28	WANG Yanbin	Geochemical record of boron-enriched rocks, unusually rich in boron, from Larsen ann Hills, East Antarctica	2011-2013	yanbinw@cags.ac.cn
29	ZENG Lingsen	The nature of Cenozoic crustal anatexis in the Namche Barwa Massif, Tibet, and tectonophysical implications	2011-2013	changting1970@yahoo.com

2.2 Projects funded by the Ministry of Science and Technology and the Ministry of Finance

No.	Project Leader	Project Title	Duration	E-mail Address of Leader
1	GAO Jinxi, XU Jiren	Chinese continental scientific drilling: Long-term geophysical observations and research on deep boreholes	2009-2011	gaojinxi@cags.ac.cn ; xujiren@ccsd.cn
2	LI Qiusheng	Three-dimensional deep structure of central-east Asia	2009-2011	liqiusheng@cags.ac.cn
3	HOU Zengqian	Continental convergence and metallogenesis south of the Tibet Plateau	2011-2015	houzengqian@126.com
4	JIANG Mei	Survey of a seismic reflection profile across Longmen Mountain and interpretation of deep geological structures	2008-2011	mjmiej@gmail.com
5	LI Haibing	Structure and tectonic evolution of the earthquake fault zones and the recurrence interval of large earthquakes as part of the Wenchuan Earthquake Fault Scientific Drilling Project	2008-2011	lihaibing06@yahoo.com.cn



6	LI Haibing	Core documentation and scientific experiment/test	2008-2011	lihaibing06@yahoo.com.cn
7	LI Jinyi	Major fault systems and their disturbance of previous tectonic and metallogenic frameworks	2007-2011	jyli2003@126.com
8	LIU Dunyi	Micro-scale and in-situ analytical methodology of light isotopes using SHRIMP IIe-MC and its model applications	2010-2012	liudunyi@bjshrmp.cn
9	LIU Dunyi	SHRIMP zircon geochronology of Apollo lunar samples and lunar meteorites	2009-2011	liudunyi@bjshrmp.cn
10	SU Dechen	Information integration and data sharing in the Wenchuan Earthquake Fault Scientific Drilling Project	2008-2011	sudechen@gmail.com
11	XU Zhiqin	Synthetic study on the tectonic background and earthquake mechanism of the Wenchuan earthquake	2008-2011	xzq@ccsd.cn
12	XU Zhiqin	Geological survey of the scientific drilling site selection for the Wenchuan Earthquake Scientific Drilling Project	2008-2011	xzq@ccsd.cn
13	YANG Wencai	VSP seismic profiles and construction of 3D velocity models at the drill site	2008-2011	yangwencai@ccsd.cn
14	ZENG Lingsen	Geochemical nature and thermal history of the seismogenic zone of the 2008 Wenchuan Earthquake	2008-2011	changting1970@yahoo.com
15	YANG Tiannan	Sanjiang Tethyan multiple orogenesis and metallogenesis	2009-2013	yangtn@cags.ac.cn
16	PAN Xiaofei	Metallogenic rules and prospecting model of the Jian-Dexing Cu-Mo polymetallic belt	2011-2014	pan_smile0551@sina.com
17	YAN Zhen	Deep prospecting model, exploration technology integration and demonstration of porphyry CuMoAu deposits in the Shanyang-Zhashui ore district, Shanxi Province	2011-2014	yanzhen@mail.iggcas.ac.cn
18	LIU Dunyi	R & D of new models of TOF-SIMS for isotope geology	2011-2016	liudunyi@bjshrmp.cn
19	YANG Zhiming	Metallogenic rules and prospecting models of continental porphyry deposits in China	2010-2013	cagszym@yahoo.com.cn
20	ZHU Xiangkun	Application of isotopic tools in geosciences and preparation of reference materials for isotopic measurements	2010-2013	xkzhu0824@gmail.com
21	ZHANG Jianxin	Evolution and interaction between the Tarim block and surrounding orogenic systems	2010-2013	zjx66@yeah.net
22	DING Xiaozhong	Geological records and maps of China and tectonic map of Eurasia	2010-2012	xiaozhongding@sina.com
23	YANG Jingsui	Pilot research on scientific drilling site-selection of the Luobusa chromite, Tibet	2010-2012	yangjingsui@yahoo.com.cn
24	XU Zhiqin	China continental scientific drilling site-selection and drilling experimental integration research	2010-2012	xzq@ccsd.cn
25	WU Cailai, XUE Huamin	Pilot research of scientific drilling site-selection of the eastern mineralization congregate area, China	2010-2012	wucailai@hotmail.com huaiminx@sina.com.cn
26	ZHANG Zeming	Pre-research of scientific drilling site-selection of the Laiyang basin, Shandong – the northern boundary of the Yangtze plate	2010-2012	zzm2111@sina.com
27	GAO Rui	Experiments by seismic deep reflection profiling technologies and research into the structure of the crust	2010-2012	ruigao126@126.com
28	LU Zhanwu	Deep probing technology and tests of integrated technology of geophysical cross-sections	2010-2012	luzhanwu78@163.com
29	LI Qiusheng	Broadband seismic observations and crust-mantle velocity research	2010-2012	liqiusheng@cags.ac.cn
30	HE Rizheng	Multiscale imaging techniques and central-eastern China crust-mantle velocity and research on density imaging	2010-2012	herizheng@cags.ac.cn

2.3 Projects Sponsored by China Geological Survey

No.	Project Leader	Project Title	Duration	E-mail Address of Leader
1	CHEN Wen	The application of isotope thermochronology in research on uplift history of the Tianshan Mountain	2011-2013	chenwenfi@vip.sina.com
2	CHEN Wen	Preparation of reference materials for Ar-Ar dating of Paleozoic mica samples	2011-2013	chenwenfi@vip.sina.com
3	CHI Zhenqing	Tracking and deployment studying on basic geological survey	2011-2012	zqchi@263.net
4	GAO Jinxi, JIN Xiaochi	Lithofacies and paleogeographic maps of China	2009-2011	jinxchi@cags.ac.cn
5	GAO Linzhi	Neoproterozoic stratigraphic framework in China and global correlation	2011-2013	gaolzhi@cags.ac.cn

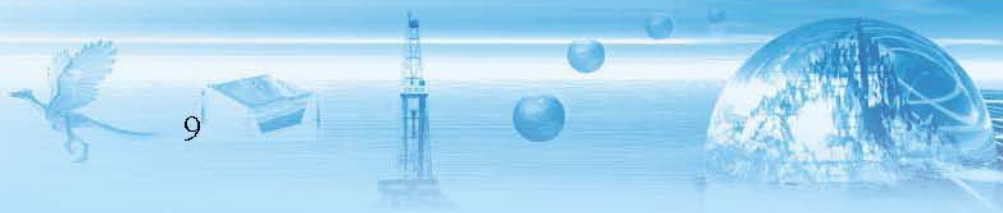


6	JIAN Ping	Petrological classification, SHRIMP zircon dating and tectonic setting of the Beishan ophiolites, NW China	2011-2013	jianp-1021@263.net
7	JIN Xiaochi	Devonian to Triassic paleogeography and paleotectonics of southern Asia with compilation of related maps	2011-2013	jinxchi@cags.ac.cn
8	JI Qiang	The Cretaceous dinosaur biota and paleogeography and taphonomy of the Jiaolai basin, Shandong Province, eastern China	2011-2013	jirod@cags.ac.cn
9	JI Shaochen	Rheological and seismic properties of the lithosphere beneath the southeast Tibet plateau	2011-2013	scji@live.com
10	JI Shu'an	Late Paleozoic – Mesozoic terrestrial vertebrates, stratigraphy and paleogeography of western China	2011-2013	jishu_an@sina.com
11	JI Shu'an	Study on the checklist for national key fossils and protective techniques	2011-2013	jishu_an@sina.com
12	JI Zhansheng	Study of the paleogeography and geological evolution of the western part of the Qinghai-Tibet Plateau during the Late Permian-Late Triassic	2011-2013	jizhansheng@vip.sina.com
13	HOU Zengqian	Genetic links between collisional processes and ore formation in the Tibetan collisional orogen	2009-2011	houzengqian@126.com
14	LI Haibing	Large-scale active faults and their earthquake activities along the northern and eastern boundary of the Tibetan Plateau	2011-2013	lihaibing06@yahoo.com.cn
15	LI Jinyi	Systematic investigations and research on the major tectonic framework of the Xin'an-Mongolian Orogenic Belt	2010-2012	jyli2003@126.com
16	LI Jinyi	Reconstruction of rifting and re-amalgamating processes of major continental blocks of China since the late Precambrian and its constraints on metallogenesis	2011-2013	jyli2003@126.com
17	LI Tingdong	Comprehensive integration of the Divisions of Geological Structure and Regional Geological Survey of China	2008-2015	ltdong@163.com xiaozhongding@sina.com
18	LIU Fulai	Protolith age, metamorphism and partial melting of the khondalite series in the Sino-Korean and Yangtze cratons	2011-2013	lf0225@sina.com
19	LIU Fulai	Comparison of metamorphic basement between the western Yangtze block and the SE Tibet Plateau	2011-2013	lf0225@sina.com
20	LIU Pengju	Systematic evolution and international correlation of the Ediacaran biotas in China	2011-2013	pengju@cags.ac.cn
21	LIU Yan	Tectonic evolution of the Qiangtang terrane, central Tibet	2011-2013	yanliu0315@yahoo.com.cn
22	LIU Yanxue	Sedimentary evolution and tectonic background of the Permian basins in northern Xinjiang and Inner Mongolia	2011-2013	lyxue@sohu.com
23	LIU Yongqing	A survey on Mesozoic basins and energy resources in the Xingmeng Orogen	2010-2012	Liuyongqing@cags.ac.cn
24	LU Minjie	Metallogenic regularities and the advantages of mineral resource potential analysis in the Andes metallogenic belt, Latin America	2011-2013	luminjie55@yahoo.com.cn
25	LU Minjie	Integration of 3D geological mapping achievements and construction of a platform	2011-2013	luminjie55@yahoo.com.cn
26	MENG Fancong	Early Paleozoic plate tectonic system and orogenic geodynamics of the Central Orogen western segment (Kunlun)	2011-2013	mengfancong@yeah.net
27	NIU Baogui	IGMA 5000 improvements and database maintenance	2011-2013	bgniuv@cags.ac.cn
28	QI Xuexiang	Evolution of a large tectonic belt in southeastern Tibet and its implications on mineral resources	2011-2013	qxuex2005@163.com
29	REN Jishun	Asian tectonic research and integration of significant geological results	2011-2013	renjishun@cags.ac.cn
30	REN Liudong	Global correlation of Neoproterozoic sequences in Asia	2011-2013	ldren@cags.ac.cn
31	SU Dechen	Northeastern and eastern margins of the Tibetan Plateau and dynamics of its foreland basins	2011-2013	sudechen@163.com
32	TANG Suohan	Preparation of reference material for Nd and Pb isotope ratio measurements	2011-2013	tangsuohan@yahoo.com.cn
33	WANG Jun	Establishment and perfection of international standards for small-scale geology map database	2011-2013	wangj29@126.com
34	WANG Jun	Study of deep processes and mineralization of the West Pacific continental margins	2011-2013	wj257@126.com
35	WANG Tao	Study and mapping of Mesozoic granitoids in Asia	2010-2012	taowang@cags.ac.cn
36	WANG Tao	Study of some problems of Mesozoic granites in Asia and compilation of a granite map	2011-2013	taowang@cags.ac.cn
37	WANG Yanbin	Nature, genesis and mineral resources of the crust in Gondwana-related areas of East Antarctica and the Himalaya area as examples	2011-2013	yanbinw@cags.ac.cn
38	WANG Yong	Climate change along the monsoon margin of eastern China since the last interglacial	2010-2012	wangyong@cags.ac.cn
39	WANG Yong	Establishment and detailed correlation of Quaternary standard stratigraphic columns in different structural units of China	2011-2013	wangyong@cags.ac.cn
40	WAN Yusheng	Identification and research on early Archean continental crust in the North China Craton	2011-2013	wanyusheng@bjshrimp.cn



41	WU Cai	The magmatism of Paleozoic-Mesozoic granites in the Central Orogenic Belt of China and constraints on ore-forming processes	2011-2013	wucalai@yahoo.com
42	XIAO Xuchang	Tectonic environment of the main ophiolites in the western region of China	2009-2013	xxchg@public.bta.net.cn
43	XUE Huamin	Phanerozoic magmatism and metallogenesis in the Yangtze block	2011-2013	huaminx@sina.com.cn
44	XUE Huamin	Magmatism and metallogenetic response to Neoproterozoic convergence and separation of land blocks along the southeastern margin of the Yangtze craton	2011-2013	huaminx@sina.com.cn
45	XU Zhiqin	Collisional orogeny and dynamics of the Tibetan Plateau	2011-2013	xzq@ccsd.cn
46	XU Zhiqin	Tectonic framework of the Central Orogenic Belt, convergence between the NCB and the SCB, and synthetic studies of CCSD cores	2011-2013	xzq@ccsd.cn
47	YANG Chonghui	Geological evolution and mineral resources of some critical events in the Neoproterozoic of the North China Craton	2011-2013	chhyang@cags.ac.cn
48	YANG Jingsui	Geological setting and origin of the ophiolite and chromitite in the Yarlung Zangbu suture	2011-2013	yangjingsui@yahoo.com.cn
49	YANG Jingsui	The Sumdo high pressure-ultrahigh pressure metamorphic belt in the Lhasa Block of the Qinghai-Tibetan plateau and Indosinian movement	2011-2013	yangjingsui@yahoo.com.cn
50	YANG Tiannan	Collisional deformation and lead-zinc polymetallic mineralization background of Cenozoic in Sanjiang area of Southwest China	2011-2013	yangtn@cags.ac.cn
51	YANG Wencai	Location of deep oil and gas prospective areas in the Tarim basin	2011-2013	yangwencai@ccsd.cn
52	YAN Quanren	Depositional sequences in the Mesozoic basins on the eastern margin of the Yangtze Block, South China: Their response to tectono-thermal and metallogenic events	2010-2012	qryan@cags.ac.cn
53	YAN Zhen	Tectonic setting, plate tectonic regime and metallogenic background of the junction between the Qinling, Qilian and Kunlun orogenic belts, Chinese Central Orogenic Belt	2011-2013	yanzhen@mail.iggcas.ac.cn
54	YAO Jianxin	Paleozoic- Triassic sea facies stratigraphic division and correlation in the Yangtze platform	2011-2013	yaojianxin@gmail.com
55	YAO Jianxin	Perfection and correlation of the stratigraphic system of different regions	2011-2015	yaojianxin@gmail.com
56	YOU Guoqing	The tectonic division of China and its application in the regional geology of China	2011-2013	youchina@126.com
57	YU Changqing	Geophysical survey in the eastern and southeastern Tibetan Plateau	2011-2013	yucq@tom.com
58	ZENG Lingsen	Crustal anatexis along the Himalayan orogenic belt and its dynamic effects	2011-2013	changting1970@yahoo.com
59	ZHANG Jianxin	Accretion-collision orogeny and geodynamics in the western segment of the Chinese Central Orogen (Altun-Qilian-Western Qinling)	2011-2013	zjx66@yeah.net
60	ZHANG Zeming	Metamorphism and tectonic evolution of the southern Tibetan Plateau	2011-2013	zzm2111@sina.com
61	ZHANG Zeming	Petrotectonic units and composite orogenic process of the eastern Central China Orogen (East Qinling - Dabie - Sulu)	2011-2013	zzm2111@sina.com
62	ZHAO Ziran	Pan-African continental assembly and dispersion process and geodynamic setting in northeast China	2011-2013	ziranzhao@cags.ac.cn
63	ZHOU Xiwen	The basic framework of China's early Precambrian continental crust amalgamation and ore-forming constraints	2011-2013	xwzhou@cags.ac.cn
64	ZHU Xiangkun	Application of the Fe isotope system in economic geology	2011-2013	xiangkun@cags.ac.cn
65	ZHU Xiangkun	Evolution of Proterozoic environments and formation of sedimentary ore deposits	2011-2013	xiangkun@cags.ac.cn

Note: Names in capital letter are the family names of the project leaders.





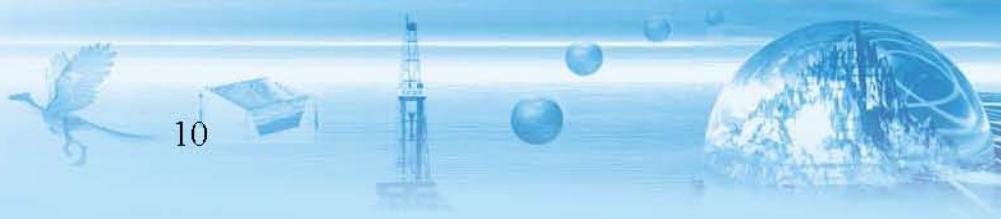
2.4 Introduction of major programs and projects

Specially-Funded Program on National Key Scientific Instruments and Equipment Development: New models of TOF-SIMS for Isotope Geology (Chief investigator LIU Dunyi, YANG Zhiqin, FAN Runlong, LONG Tao, XIE Hangqiang et al.)

The Specially-Funded Program on National Key Scientific Instruments and Equipment Development --"New models of TOF-SIMS for Isotope Geology" (Project leader: Prof. Liu Dunyi, Fund: 74 million yuan, Project duration: 5 years), is undertaken by the Beijing SHRIMP Centre, in cooperation with the Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Jilin University, and the Institute of Mineral Resources, Chinese Academy of Geological Sciences, has been approved by the Ministry of Science and Technology in October 2011.

The aims of the project includes developing a new TOF-SIMS (Time of Flight-Secondary Ion Mass Spectrometer) technology for high-precision isotope abundance analysis and setting up of two instruments--TOF-SIMS-SI (for stable isotope measurements) and TOF-SIMS-REE (for rare Earth element measurements), supporting the latest research focus, such as lithogenesis, mineral deposit genesis, global climate change and evolution of the Moon and Planets.

The successful development of new TOF-SIMS shall be a milestone in mass spectrometer development, promoting China's R & D capacity of mass spectrometers. Its application will enable new developments in micro-scale in-situ geochemistry and cosmochemistry.





3. Research Achievements and Important Progress

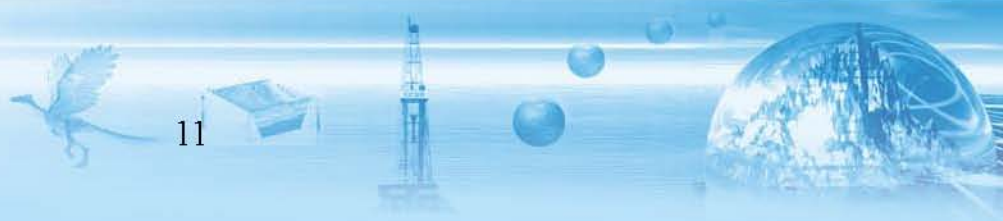
3.1 Results of Natural Science Foundation Projects completed in 2011

Temporal-spatial distribution, genesis and tectonic implications of two stage alkaline granites on the southern margin of the Altai orogen (Project Leader: TONG Ying)

On the southern margin of the Altai orogen, zircons of the Bulgen and Takeshiken alkali-rich plutons were dated and showed that they are sourced from two stages of alkaline magma. The early alkaline magma of the Bulgen belt (~350 Ma) is older than that of the Ulungur belt (~310 Ma), but the late stage alkaline magmas in both belts were synchronous (~280 Ma). The Bulgen granite has high LILE, HFSE (Th, Zr, Hf, Nb and Ce) with pronounced negative anomalies in Eu, Ba, Sr, P and Ti and records high $\epsilon\text{Nd}(t)$ values of +6.3 to +6.4 and young model ages (TDM) of ca. 600 Ma. Combined with the characters of early-middle Paleozoic granitoids and regional geological evidence, it is suggested that the Bulgen granite formed in a post-orogenic extensional setting, and major tectonic movements in this region ceased after the early Carboniferous. The granite melts did not originate from partial melting of a supra-subduction zone but from the addition of juvenile mantle-derived material with negligible involvement of older crust. Although the Bulgen granite is about 40 Ma older than the Ulungur granite and has higher Nb contents; both exhibit similar features in petrology, geochemistry, Nd isotopes and zircon Hf isotopic compositions. There is little magmatic activity from 350 Ma to 280 Ma in these areas. The above evidence indicates that all stages of alkaline granites in the Bulgen and Ulungur belts were emplaced in a successive post-orogenic setting, rather than a multi-period extension - compression - extension setting. Although different blocks of northern Xinjiang and adjacent areas evolved in different tectonic settings during Carboniferous, the entire region evolved synchronously after the Late Carboniferous (~305 Ma), and turned into a post-collision (post-orogenic) setting in the Permian.

Chronological framework of granitoids in central Inner Mongolia and South Mongolia and their magma genesis (Project Leader: SHI Yuruo)

Widely distributed granitoids in central Inner Mongolia and southern Mongolia were emplaced during six major episodes: 491-417 Ma as intrusions of quartz-diorite, granodiorite, tonalite, trondhjemite, and biotite-monzogranite; 390-387 Ma as intrusions of syenite, monzonite, A-type granite and diorite; 353-302 Ma as quartz-diorite, tonalite, monzogranite, and garnet-bearing granite; 294-260 Ma as alkaline granite and diorite; 238-204 Ma as monzogranite, A-type granite, muscovite-biotite-granite, and granodiorite; <200 Ma as monzogranite and syenogranite. These granitoids are products of subduction/accretion in the Paleo-Asian Ocean, that evolved during a long and complicated accretionary history: subduction in two different directions in the Ordovician, collage/accretion in the Silurian, regional extension on the northern margin of the North China Craton in the Devonian, subduction again in the Carboniferous and, finally, extension in the northern fold belt in the Permian. Closure of the Paleo-Asian Ocean occurred during the Late Permian to Early Triassic.





Moho seismic reflection features and their significance for deep mineralization beneath the Luzong basin (Project Leader: LU Zhanwu)

Processing of deep seismic reflection data beneath the Luzong basin revealed Moho distribution characteristics of the basin and fine structure of the lower crust of the Luohe Mine. Deep processes of magma transport, based on an understanding of the fine structure of the Moho and crust, combined with other geological and geophysical data, were discussed. We found that, from the Yangtze River to the Dabie Mountains, the Moho becomes deeper from around 30 km to 33 km, and the Moho offset is about 3 km below the Luohe Mine. Luohe iron is located in a structural transformation belt, corresponding to the Moho offset. A near-transparent, weak reflection region beneath the Luohe fault may signify an upwelling and eruption channel of fluids and magma of the mantle. Multi-period extension and extrusion caused complications in the Moho structure. Mantle magmatic and hydrothermal upwelling through the discontinuous Moho and collected in middle crust via magma channels in the lower crust. Under certain conditions, magma moved into the upper crust and erupted partially on the surface along the north-east Luohe fault. This constitutes a complete transport system of material and energy from the deep crust to the near-surface. These results have important implications for understanding deep processes of mineralization in the Luzong volcanic basin.

Re-study of metazoan fossils in phosphate layers of the Doushantuo stage (Project Leader: LIU Pengju)

Due to the rarity of metazoan fossils of the Doushantuo stage, samples were collected and were treated by acid maceration. Abundant specimens of possible metazoans and embryos were found. We achieved some important progress as follows: 1) tubular microfossils of possible metazoan origin were first found in the Yangtze Gorges area, including a new genus; 2) tubular microfossils were divided into two types, the genus *Ramitubus* (with dichotomous branching) showing a tabulate coral affinity, others (without branching) showing more similar to filamentous cyanobacteria; 3) some new data of phosphatized globular fossils from the Weng'an biota were also found, including globular fossils with a boudinage structure and transitional forms between *Parapandorina* and *Megaclonophycus*. These new data suggest that some characteristics of globular fossils cannot be interpreted as metazoan eggs and embryos though the interpretation of globular fossils from Ediacaran Weng'an biota, because embryos remains the best hypothesis articulated so far; 4) a SHRIMP zircon age (614 ± 7.6 Ma) was obtained from a horizon beneath the exposed surface in the middle of the Doushantuo Formation in the Zhangcunping area. This age indicates that the Weng'an biota should be younger than 614 ± 7.6 Ma.

Research on Upper Permian to Early Jurassic stratigraphy and paleontology of the Coqen Basin (Project Leader: JI Zhansheng)

In the Coqen Basin, Tibet, the Upper Permian was previously thought to be a terrestrial facies, represented by the Jianzha'nong or Dibucuo Formation, and the Triassic - Lower Jurassic was not deposited, i.e. the Coqen Basin was thought to be a land or arc-back uplift area in the late Permian-early Jurassic. This land was previously named the Gangdese Old Land. Because of the missing strata, the Coqen Basin was considered not to have any gas-petroleum potential. However, our research shows that late Permian to late Triassic marine deposits did exist in the Coqen Basin as shown by the discovery of several fossils. Hence the Upper Paleozoic-Lower Mesozoic systems in the Coqen Basin are potential sedimentary formations for the exploration of oil and gas resources.



Bimodal metavolcanic rocks of the Suizhou Group in Suizhou-Zaoyang, Hubei, and the crustal-mantle reaction on the northeastern margin of the Yangtze Craton in the Neoproterozoic (Project Leader: XUE Huaimin)

Precambrian rocks exposed in the Suizhou-Zaoyang area (northern margin of the Yangtze Craton), include Neoproterozoic volcano-sedimentary strata (Suizhou Group) and a voluminous Neoproterozoic ultramafic-mafic sill swarm. The Suizhou Group is composed of felsic and mafic metavolcanic rocks as well as metasediments. The ultramafic-mafic sill swarm is predominantly composed of two-pyroxene troctolite, with minor gabbro-norite and pyroxenite. The emplacement ages of rhyodacitic tuff, meta-trachyandesite and high-SiO₂ rhyolite of the Suizhou Group, accurately dated on zircons using SHRIMP and LA-ICP-MS techniques, are 763 ± 7 Ma, 741 ± 7 Ma and 714 ± 3 Ma, respectively. The emplacement ages of two-pyroxene troctolite and gabbro-norite of the ultramafic-mafic sill swarm are 632 ± 6 Ma and 624 ± 3 Ma, respectively. Detrital zircon ages of sedimentary rocks of the Suizhou Group concentrate in the Paleoproterozoic and Neoproterozoic and are sourced from the Yangtze Craton. The youngest zircon age is similar to ages for volcanic activity in the Suizhou area, and this implies partial recycling of juvenile volcanic rocks. The Suizhou Group magmatic rocks evolved towards SiO₂-rich and alkaline compositions with time. The ages and rock compositions of the Suizhou Group all indicate that it belongs to products of Nanhua rifting. The Nd isotopic composition of metabasalts and metarhyodacites of the bimodal volcanic rocks are significantly different, namely the $\epsilon_{\text{Nd}}(t)$ values of the former are all greater than 0, with highest value up to +4.7, whereas the $\epsilon_{\text{Nd}}(t)$ values for the latter range from -5.6 to -8.5, indicating a crustal magma source. The Neoproterozoic magma source in this region changed to predominant depleted mantle with time.

Temporal-spatial evolution of fluid characteristics of the the Namche Barwa complex (Project Leader: ZHANG Zeming)

The Himalaya is the youngest, largest, and most active collisional orogenic belt in the world, and formed by the collision of India and the Eurasian plate. The Namche Barwa area is located in the eastern Himalayan syntaxis and was subjected to multiple phases of intense deformation, metamorphism and partial melting, as well as rapid uplift and exhumation. It is a natural laboratory for studying deep crustal fluids, the evolution of a collisional orogen and plate tectonics. Therefore, the Namche Barwa complex with high-pressure granulites and possible eclogite is a potential window to explore geological processes occurring in the lower crust. We undertook comprehensive investigations of structural geology, petrology, geochemistry and geochronology of the various metamorphic rocks and fluid carriers, including fluid inclusions, fluid-bearing minerals, nominally anhydrous minerals, and various veins. The aims of this project were to reveal the composition, characteristics and movement, of fluids to explore the temporal evolution of metamorphism and fluid activity, to reconstruct the pressure-temperature-time-fluid path of the Namche Barwa complex, and fluid-rock interaction under high pressure and high temperature metamorphic conditions, and the fluid control on metamorphic reactions, material transformation, partial melting and magma activity.





Constraints on sedimentary provenance of Devonian structural settings in the East Qinling belt (Project Leader: YAN Zhen)

The provenance of the Devonian System in the East Qinling was studied by systematic paleocurrent data and high-precision source analysis (heavy mineral assemblage, mineral chemistry, and detrital zircon and apatite ages) of sandstone samples from different areas. Compared with petrological, mineralogical, geochemical and isotopic age data from adjacent tectonic belts, the age of the Liuling Group is redefined according to the youngest detrital apatite ages from Devonian sediments in the East Qinling. This may reflect the source and related characters and tectonic environments of the Devonian System in the East Qinling, which can provide essential data for studying the tectonic evolution of the Qinling orogenic belt and interaction processes between the North China and Yangtze plates.

Constraints of lawsonite-bearing eclogites and related rocks in the old subduction zone of north Qilian and north Altun (Project Leader: ZHANG Jianxin)

This project focused on eclogites and associated rocks in the north Qilian and north Altun HP/LT metamorphic belt, in combination with studies on the north Qaidam-south Altun ultrahigh pressure metamorphic belt, and yielded the following important results: 1) Based on field mapping, we established the field relationship between lawsonite-bearing eclogites and eclogitic metasedimentary rocks in the north Qilian Mountains. 2) Geobarometry and geothermometry studies show that peak metamorphic conditions of the eclogitic metasedimentary rocks were $T = 450-560\text{ }^{\circ}\text{C}$ and $P = 1.9-2.4\text{ GPa}$, consistent with those of adjacent eclogites. Petrological, geochemical and chronological data suggest that the eclogitic metasediments were derived from a mixture of Proterozoic continental crust and juvenile early Paleozoic oceanic crust/or island arc material. The new results imply that subduction erosion of the active continental margin occurred, because these metasediments, possibly formed in a fore-arc basin, were transported to 60-70 km depth in the subduction zone prior to their exhumation. 3) The lawsonite-bearing eclogites and carpholite-bearing high pressure metasedimentary rocks indicate the existence of a cold subduction zone gradient, and cold subduction brought a large amount of H_2O into the deep mantle in the early Paleozoic. The HP/LT metamorphic belt is associated with ophiolite, a subduction-accretion complex, an island arc, and a back-arc basin, suggesting that the north Qilian is a typical early Paleozoic accretional orogen. 4) We recognized coesite in eclogites of the north Qaidam and discussed the relationship between ultrahigh eclogite and high pressure granulite.

Zircon U-Pb chronology and crustal evolution of the Larsemann Hills and adjacent areas, Antarctica (Project Leader: WANG Yanbin)

Granulite-facies rocks and granites in the Larsemann Hills and adjacent areas in Prydz Bay, Antarctica, represent important assemblages for investigating the development of high-grade metamorphic terrains in East Antarctica. Zircons from various rocks covering the Larsemann Hills and adjacent areas were analyzed for U-Pb ages and Hf isotopes, using in-situ SHRIMP and LA-ICP-MS techniques, to evaluate the terrane-scale crustal evolution and correlation between these terranes. The age data from the Prydz Bay area indicate multiple geological events at 2.8, 2.65, 2.53, 2.51, 1.13, 1.0, 0.606, and 0.53 Ga, respectively. The 2.8, 2.65, 2.53, 2.51, 1.13, and 0.53 Ga zircons have positive initial Hf values, suggesting derivation from juvenile crust. The Hf model ages of 3.0-3.8, 1.8-2.4 and 0.617-0.890 Ga imply rapid crustal generation in response to depleted mantle input. The data reveal that crust-generation in parts of Gondwana was limited to major pulses at 1.8 and 3.0 Ga ago, and that zircons crystallized during repeated crustal reworking at 500-650 and 900-1200 Ma ago. The Grenville-age igneous and



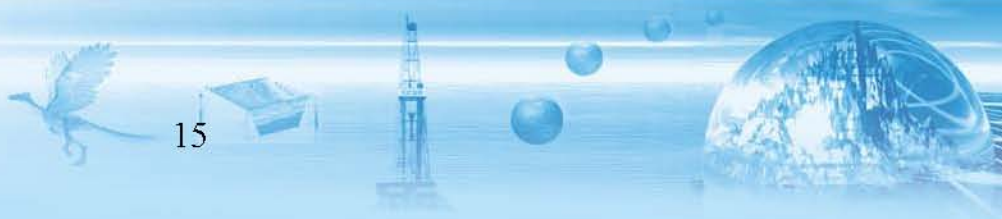
metamorphic event reflects juvenile crustal additions and melting of old and supracrustal rocks. The Pan-African thermal event is regarded as a time of crustal recycling, involving anatexis of metasedimentary precursors. The significance of this orogenic belt affected by Grenville-age and Pan-African events has been evaluated, such as the degree of crustal recycling or the importance and timing of juvenile (mantle-derived) contributions to the crust. The study provided an important temporal framework for correlation with other parts of a complex mosaic of metamorphic terranes in East Antarctica. These new data lead to revised models for Gondwana assembly.

Research on the apatite (U-Th)/He dating method (Project Leader: ZHANG Yan)

Apatite (U-Th)/He dating is a low-temperature thermochronology technique that developed rapidly during the last 10 years. We established this method in our laboratory, which is the first one in China. The most important work of this method is to measure the contents of ^{238}U , ^{232}Th , ^{147}Sm and ^4He in minerals. We have established a method of measuring the ^4He content that is different from foreign (U-Th)/He laboratories, based on the existing instrument. In addition, we also established a method of measuring ^{238}U , ^{232}Th and ^{147}Sm contents in apatite with ICP-MS, using spiked and unspiked methods. In order to prove its feasibility, we measured ^{238}U , ^{232}Th , ^{147}Sm and ^4He contents in a Durango apatite which is used as an analytical standard in several foreign (U-Th)/He laboratories. From the ^{238}U , ^{232}Th , ^{147}Sm and ^4He data we obtained its (U-Th)/He age as 30.1 ± 0.5 Ma (1σ) which is within error of 31.02 ± 1.01 Ma (1σ) obtained by McDowell (2005). The above results show that our method of measuring ^{238}U , ^{232}Th , ^{147}Sm and ^4He contents is feasible. At the same time, a detailed procedure to calculate the helium diffusion parameter and its closure temperature of apatite has been worked out.

Paleomagnetic research on the time of closure of the Paleo-Asian Ocean in central Inner Mongolia (Project Leader: LI Pengwu)

Samples for paleomagnetic analysis were collected from the Upper Carboniferous-Early Permian Baoligemiao Formation and the Upper Carboniferous Jiujuzi Formation, respectively located at Baiyinwula, Sonid Zuoqi, and Anqinggou, Aohan Qi. These samples have features of multi-component magnetization. A high-temperature remnant magnetization component was separated and is predominantly carried by hematite: the tilt-corrected mean direction is $D=159.3$, $I=-33.1$, $\alpha_{95}=8.7$ for the Baoligemiao Formation and $D=328.8$, $I=31.3$, $\alpha_{95}=5.7$ for the Jiujuzi Formation, indicating that central Inner Mongolia was located in a paleolatitudinal position of $17-18^\circ$ during the Late Carboniferous – Early Permian. Combining these new paleomagnetic data with previously published results and paleobiological and paleoclimatic data from adjacent regions, it is inferred that central Inner Mongolia was closely related to, or even a part of, the North China Block, that is, central Inner Mongolia was located near the North China Block and far from the Siberian Block during the Late Carboniferous and Early Permian. Using the available paleomagnetic data, a comparative analysis of paleolatitudes and latitudinal displacements of the North China and Siberian blocks was made to determine the collision and amalgamation history of the two blocks in the central Asian region and the corresponding closure time of the Central Asian Ocean. The available paleomagnetic data as well as the closure time of the Paleo-Asian Ocean suggest that ultrahigh pressure metamorphism in the Sulu-Dabie region must have been closely related to intense compression after collision between the Siberian and North China blocks. Collision of the continents is the main tectonic cause of end-Permian mass extinctions.





Deep seismic structure of the central Qiangtang uplift and its relation with two adjacent basins (Project Leader: HE Rizheng)

38 stations were deployed along latitude 88.5 °E across the entire Qiangtang terrane from the Bangong-Nujiang to Jinshajiang sutures during the last two years. Waveform data of 6000 teleseismic earthquakes, about 15 GB were obtained. Based on our multidisciplinary results, we picked and processed some existing data such as waveform from INDEPTH III. Our results show that the central uplift of Qiangtang is controlled by lithospheric deep faults. The South Qiangtang basin and North Qiangtang basin show significant differences in their velocity according to the teleseismic tomography and receiver function images. Teleseismic tomographic images show that the Indian lithospheric mantle was subducted beneath the deformed Tibetan plateau, and its frontier extends up to latitude 34 °E.

3.2 Results of completed projects in the National Key Technologies R&D Program in 2011

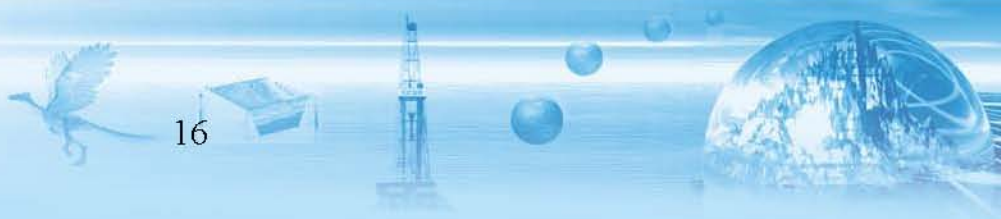
Research and development of core technologies and key components of a Secondary Ion Mass Spectrometer (Project Leader: LIU Dunyi)

The project “Research and Development of Core Technology and Key Components for Secondary Ion Mass Spectrometer”, funded through the National Key Technologies R&D Program, was undertaken by the Beijing SHRIMP Center in cooperation with the National Institute of Metrology, Fudan University, the Dalian Institute of Chemical Physics, the Chinese Academy of Sciences, and the Beijing Purkinje General Instrument Co. Ltd, was successfully completed on June 21st, 2011.

The Secondary Ion Mass Spectrometer (SIMS) is the most sensitive of all commonly employed surface analytical instruments and is capable of sub-nanometer depth resolution at <1 ppm concentration. SIMS relies on the physical phenomenon of “sputtering” to produce analytical ions. The sample is bombarded with a beam of high energy particles produced by a primary ion source. The particular advantage of SIMS is the very high accuracy and sensitivity of the method for a number of elements compared to other in-situ and micro-scale analytical methods, especially in research fields of the geological sciences. However, the development and production of a large mass spectrometer in China is relatively slow, and we necessarily depend on imports. Motivated by the demand to produce our own SIMS, the Beijing SHRIMP Center submitted a proposal aimed at designing, developing and testing the core technologies and key components of a Secondary Ion Mass Spectrometer.

During the past 4 years, with great efforts made by the project team, 19 new technologies/ products/devices and computer software programs, such as an innovative duoplasmatron source, were developed, and five of these are already successfully applied in related fields. The project team also obtained 24 domestic patents of invention and 6 international patents of invention, published 29 research papers, including 5 papers in international journals.

As leading institution, the Beijing SHRIMP Center was in charge to implement the entire project and coordinate it with its collaborators. The Centre completed the job successfully, which was appraised by both sponsors and experts. Team members of the Center have built a research platform for a large mass spectrometer, a testing platform for the ion source, as well as a testing platform for an automated sample stage and 3D micro-focusing system. A newly developed primary gas ion source has been installed in our current SHRIMP II facility, successfully improved the performance of the instrument, and created more machine time for our users, which indicates that the performance of our new ion source compares very favourably with the world-class commercially manufactured duoplasmatron source.





This project also made substantial intellectual progress in several aspects. We employed and trained excellent personnel both in the fields of theory and technology. We also set up a technical specification system on research and development of mass spectrometers, promoted the building of an experimental platform and a high-technology research base in mass spectrometry. The results of the project established a foundation for the development of SIMS in China, and will provide a better understanding of mineral resources and other fundamental research fields in the geo- and environmental sciences.



Fig. 3.2.1 The SHRIMP II instrument



Fig. 3.2.2 The SHIMP Remote Operation System Workstation established at Nanjing University

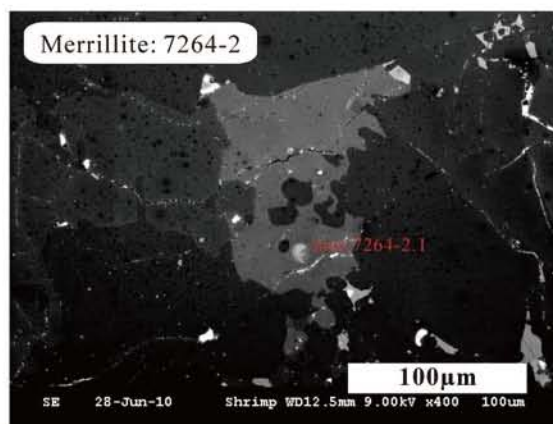
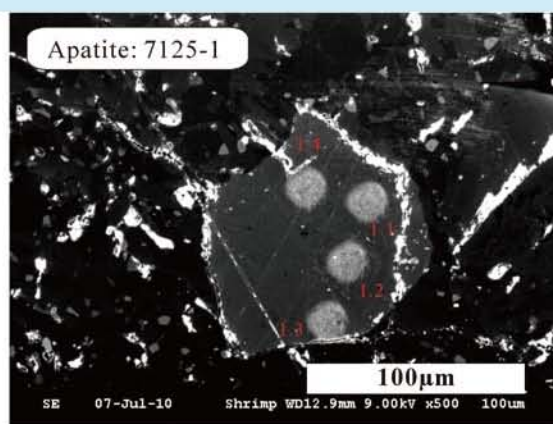
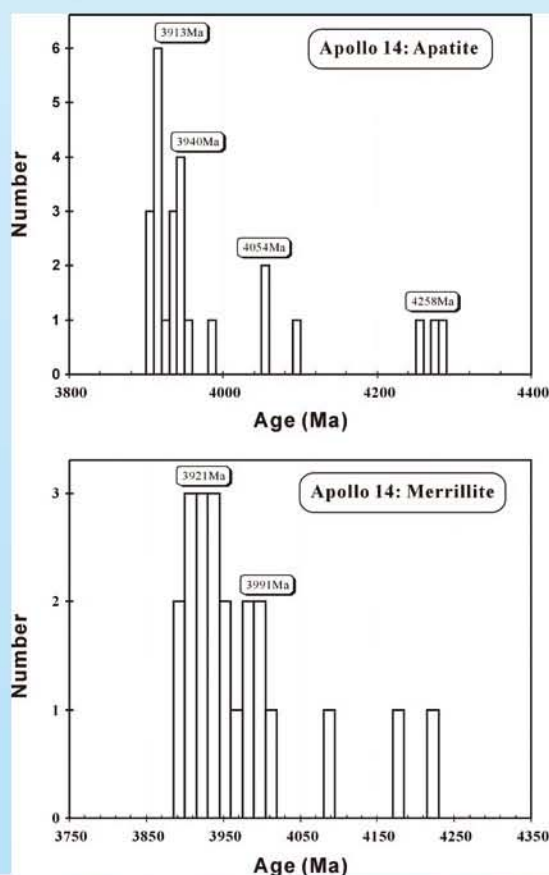


Fig. 3.2.3 Apatite- and merrillite-U-Pb datings of lunar samples from the Apollo 14 mission



Metallogenetic and geological settings and Pb-Zn-Ag-Cu-Au resource assessment of the West Qinling (Project Leader: WANG Zongqi, YAN Zhen, WANG Tao et al.)

We have discovered numerous microfossils from apparently unfossiliferous or doubtful metastrata, and also obtained geochronological data. We developed a new tectonic evolutionary framework for the Qinling orogen and adjacent areas, established new divisions of the tectonic units for the orogen; proposed a new understanding of temporal and spacial correspondence between accretion and the collisional orogen and the dominant metallogenetic systems. We recognized two volcanogenic massive sulfide metallogenetic belts in the South and North Qinling, two kinds of porphyritic Cu-Mo metallogenetic belts and two kinds of orogenic Au metallogenetic belts in the Central and South Qinling. We propose a new model for Paleozoic arc-basin systems and Mesozoic structural- hydrothermal metallogenetic systems in the northern Dabashan, Qinling. We reclassified the predominant metallogenetic deposit types in the western Qinling, put forward 23 potential metallogenetic prospective areas in various classes, delineated 4 prospecting target areas, and obtained potential copper reserves of 240000 t, and established Pb-Zn reserves of 610000 t.

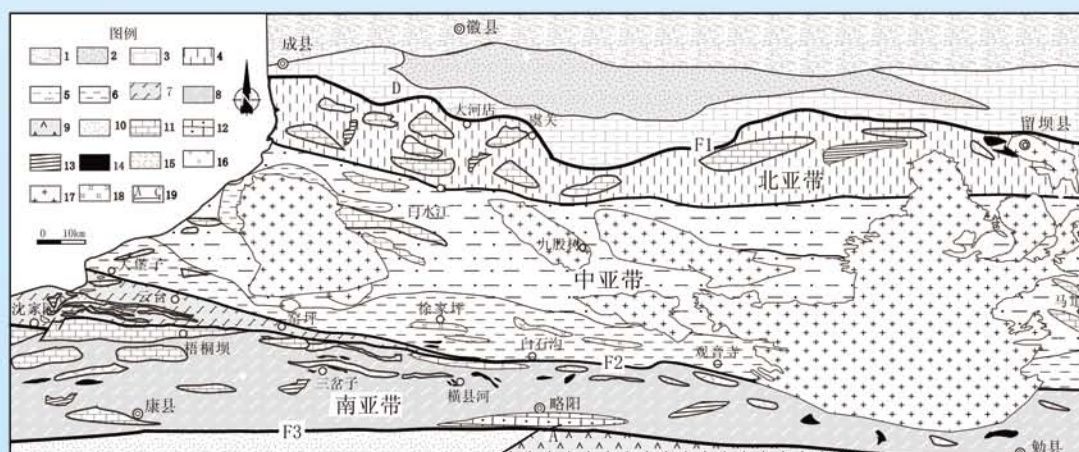


Fig.3.2.4 Geological sketch map of the Baishuijiang Group mélangé, southern Qinling

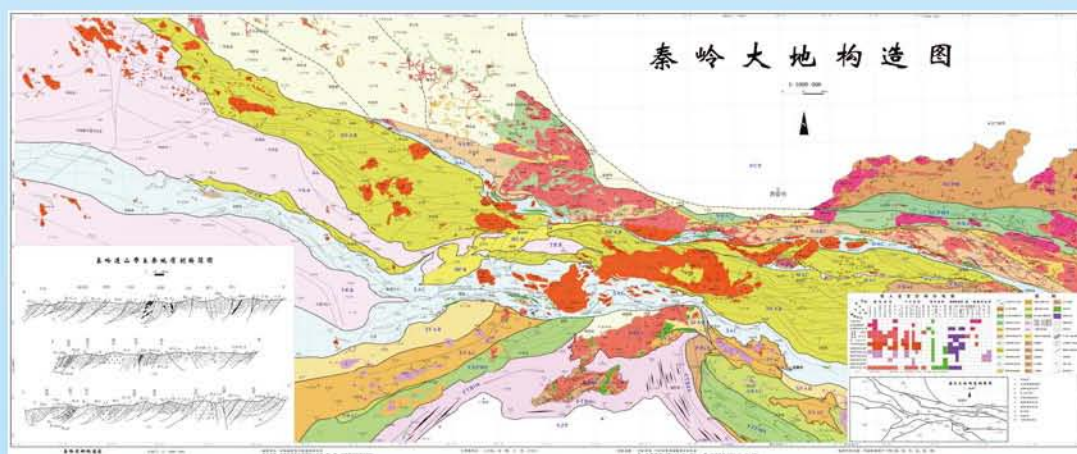


Fig.3.2.5 Map of new tectonic divisions for the Qinling orogen

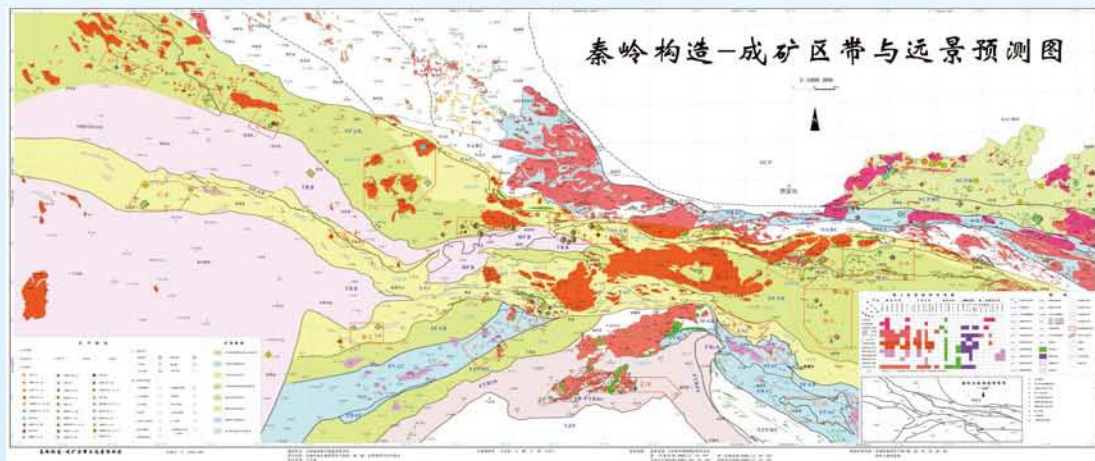


Fig. 3.2.6 Potential metallogenic prospecting map of the Qinling tectonic belt

Integrative assessment of Cu-Pb-Zn-Ag deposits and application to the northern segment of the Sanjiang area (Project Leaders: HOU Zengqian, SONG Yucai et al.)

We have established a model of two ocean basins and double subduction for the Paleo-Tethys of the northern segment of the Sanjiang area; we identified and summarized the Pb-Zn-Ag volcanogenic massive sulfide metallogenic belts, porphyritic Fe metallogenic belts, porphyritic Cu-Mo metallogenic belts and sediment-hosted base metal belts as well as their metallogenic rules; we established regional mineral quantitative prospecting methods, proposed two prospecting techniques for deposits formed during continental collision, which have been validated in the prospecting and target areas; we proposed 23 potential metallogenic prospecting areas.

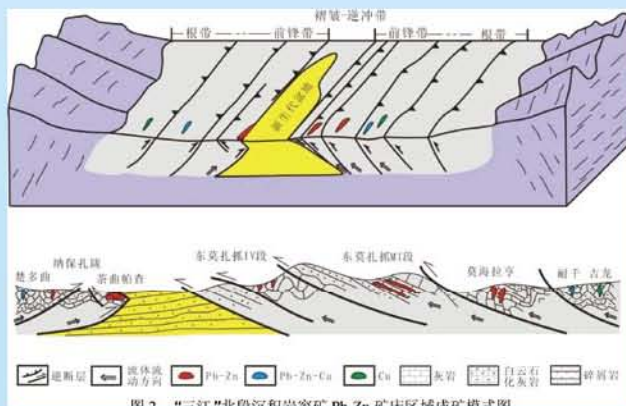


Fig. 3.2.7 Potential Cu-Mo and Pb-Zn metallogenetic prospecting areas in the northern segment of Sanjiang.

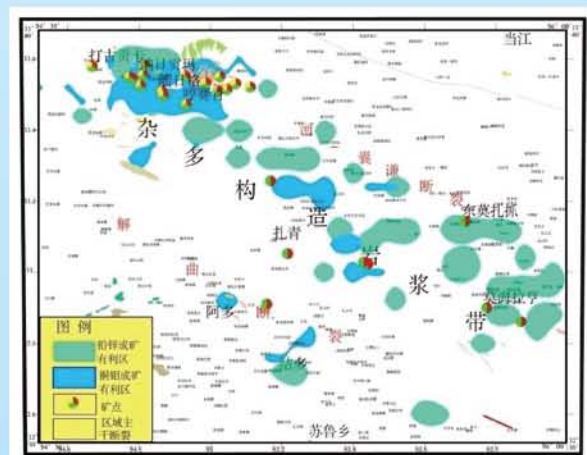


Fig. 3.2.8 Metallogenetic model of sediment-hosted Pb-Zn deposits in the northern segment of Sanjiang.



Basic geological research and mapping for China petroleum and gas (Project Leaders: LI Tingdong and YOU Guoqing)

We obtained several basic research results by compiling lithofacies paleogeographic and industrial situation maps of China oil-gas deposits along with many more achievements in related technologies and computer software development, of which three achievements have been applied by PetroChina, SINOPEC, and other departments.



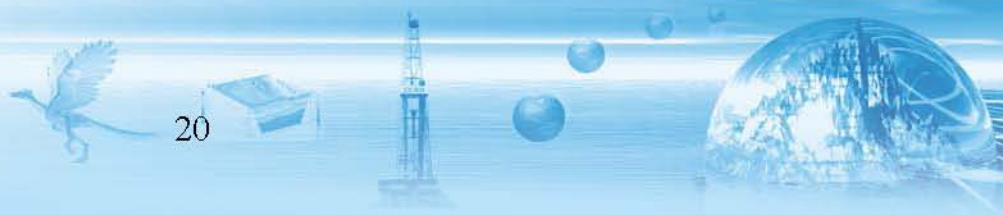
Fig. 3.2.9 Field investigation of Ordovician strata in southern China



Fig. 3.2.10 Workshop on technical mapping methods and studies

Huge fault systems and rebuilding of ancient metallogenic tectonic regimes (Project Leader: LI Jinyi)

We proposed a new concept of “Deformational Systems”; by applying this concept, we recognized huge Cenozoic and pre-Cenozoic fault systems and proposed a new scheme for crustal structures in Central Asia. We confirmed that closure of the Paleozoic ocean basins in Central Asia occurred in the Late Carboniferous, and we obtained paleomagnetic data for the Late Devonian in western Junggar and of late Early Carboniferous and Late Jurassic strata, which provided strong evidence for reconstruction of late Paleozoic ocean-continent settings. We constructed a new model for global ocean-continent distribution in the late Paleozoic; we defined the location of Central Asian metallogenic zones in the global ocean-continent distribution in the late Paleozoic.



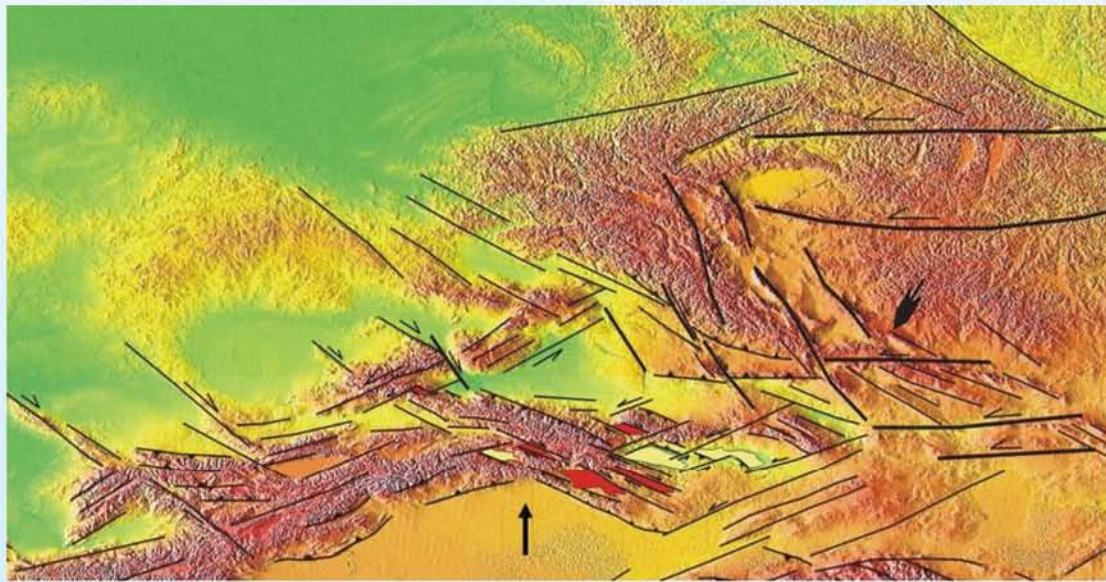


Fig. 3.2.11 Map showing two sets of the huge Cenozoic fault systems in Central Asia. Narrow lines show the fault system caused by older, nearly S-N directed compression; heavy lines show the fault system caused by younger NNE-SSW directed compression. The difference of the main stress directions in the two fault systems reveals that the main compressional stress direction has rotated clockwise about by 15° in the Cenozoic.

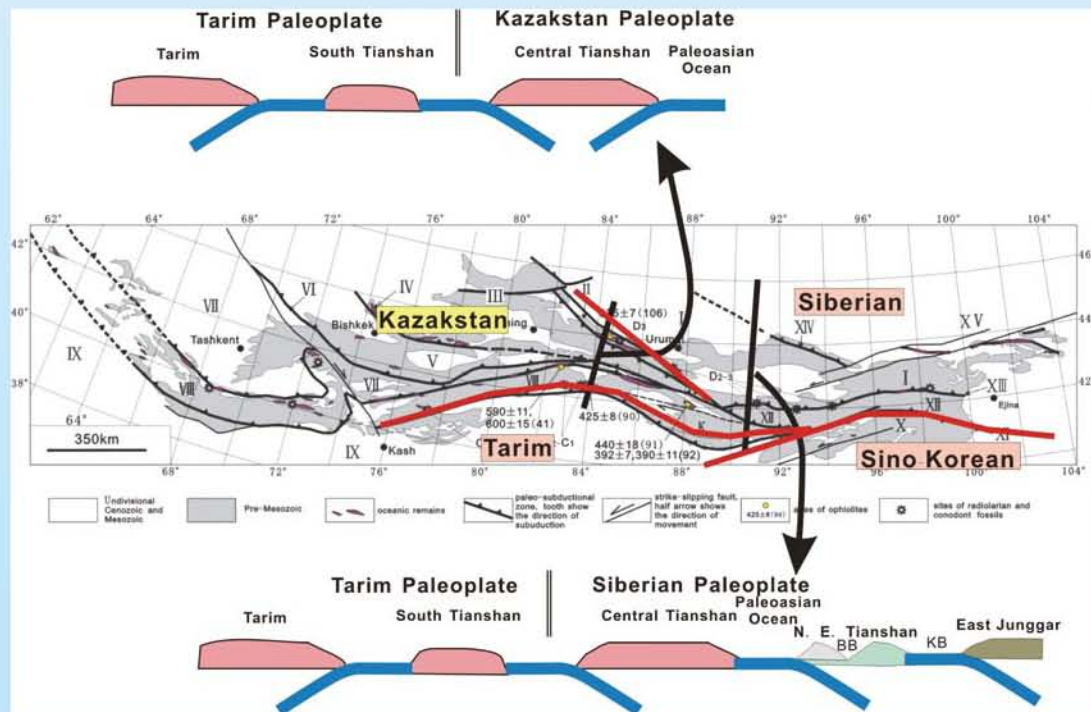


Fig. 3.2.12 Sketch map showing relationship between the Kazakhstan, Siberia, Tarim, and Sino-Korean plates and the Tianshan Mountains. The Tianshan Mountains lie in the convergent area of the Kazakhstan, Siberia, Tarim and Sino-Korean plates. The West Tianshan belongs to the old Kazakhstan plate. Both the southern and northern parts of the West Tianshan are the accretionary margins of the old Kazakhstan plate and converged near latitude 89°E . The East Tianshan mainly belongs to the accretionary margin of the Siberian plate. The East Tianshan collided with the Tarim plate along its southern margin, i.e. in the South Tianshan (located in the area between the East Tianshan uplifted belt and the Kuluktug), and was amalgamated with the Kazakhstan plate along the Kawabulak fault.



3.3 Other important progress

The Beijing SHRIMP Center was declared to be one of the “National Science and Technology Infrastructure” centers

The Beijing SHRIMP Center of the Institute of Geology was declared by the Ministry of Science and Technology of China (MOST) and the Ministry of Finance of China (MF) to be one of the centers of “National Science and Technology Infrastructure” on November 9, 2011. It is the institute’s second National Research Center after accreditation of the State Key Laboratory of Continental Tectonics and Dynamics.

The National Science and Technology Infrastructure Program is one of the key programs funded by the Chinese Ministries of Science and Technology and Finance since 2005 in response to the national S&T planning within the 11th Five-Year Plan. The program provides shared resources and conditions for scientific research and technical development and gives powerful support to national S&T development.

In August 2011 the Beijing SHRIMP Center passed the examination with the assessment result “Excellent (A)” and obtained funds from MOST and MF for its operation in the entire year. The accreditation of the Beijing SHRIMP Center is a reflection of the entire team’s dedication and innovation in the past ten years with the concept of “openness, sharing and high efficiency.

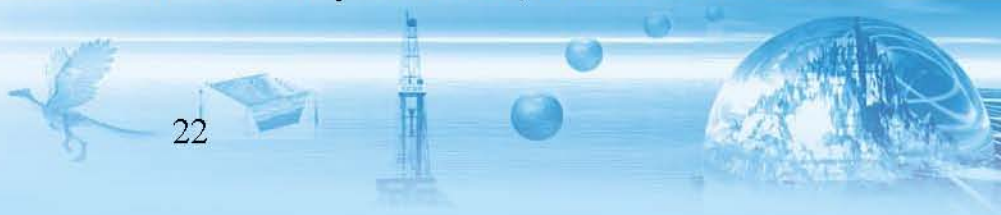
Discovery of the earliest Eutherian mammal *Juramaia sinensis*

The origin of placental mammals is the most important event in mammalian evolutionary history because placentals make up more than 90 % of all living mammals. Placental mammals are characterized by a placenta that provides nourishment to unborn young and are the world’s most diverse mammal group. When, where, and how eutherians (including placentals) originated in Earth’s history are some of the most important questions to understand the evolution of life.

Chinese and American paleontologists (Zhe-Xi Luo, Chong-Xi Yuan, Qing-Jin Meng & Qiang Ji) reported the discovery of a remarkably well-preserved fossil from Jianchang County, Liaoning Province of China in a paper published in the journal *Nature*. Named *Juramaia sinensis*, this fossil from the 160 Ma old Tiaojishan Formation, represents the earliest-known fossil of the eutherian-placental lineage. It shows that a new milestone in mammal evolution was reached 35 million years earlier than the previous Cretaceous record. This discovery fills an important gap in the fossil record and helps to calibrate modern, DNA-based methods of dating the mammalian evolution. The age of *Juramaia* helps to establish the date when eutherian mammals diverged from other mammals such as metatherians and monotremes.

This Jurassic fossil provides new information about the earliest ancestors of today’s placental mammals. By the scientists’ analyses, *Juramaia* is either a great-grand-aunt, or a great-grandmother, of all placental mammals thriving today. The fossil has an incomplete skull, about 22 mm long, part of the skeleton and, remarkably, impressions of residual soft tissues such as hair. It was an insectivorous mammal as indicated by its teeth and is estimated to have had a body mass of 13 grams.

Most importantly, *Juramaia*’s complete forelimb and hand bones enabled paleontologists to recognize that it was a climbing mammal. This shows that the earliest eutherian evolution is correlated with new adaptations. Eutherian mammals were a new lineage for the Jurassic Period. The adaptive features of the eutherians may have helped the new lineage to survive in a Jurassic ecosystem dominated by dinosaurs and other vertebrates. The ability to explore the trees and to escape to the canopy might have allowed eutherians to exploit a new niche, inaccessible and



untapped by the majority of Jurassic mammals that lived exclusively on the ground.

The fossil was studied by a team of Chinese and American scientists including Dr. Zhe-Xi Luo of Carnegie Museum of Natural History (Pittsburgh, USA), Drs. Chong-Xi Yuan and Qiang Ji of the Chinese Academy of Geological Sciences (Beijing), and Dr. Qing-Jin Meng of the Beijing Museum of Natural History, where the holotype specimen of *Juramaia sinensis* is deposited. This research was supported by the National Natural Sciences Foundation of China to Dr. Chong-Xi Yuan, Project 973 of the Ministry of Science and Technology of China to Dr. Qiang Ji, the Chinese Academy of Geological Sciences to Dr. Chong-Xi Yuan, and the National Science Foundation of USA to Dr. Zhe-Xi Luo.



Fig. 3.3.1 Holotype specimen of *Juramaia sinensis*

Unravel the mystery of the pterosaur sex and reproduction

Pterosaurs are a group of flying reptiles which are the earliest vertebrates known to have evolved powered flight. Their wings were formed by a membrane of skin, muscle, and other tissues stretching from the legs to a dramatically lengthened fourth finger. However, the incompleteness of the fossil record has had a greater impact on our knowledge of their diversity, phylogeny and evolutionary history, leaving many questions still unresolved.

Thanks to the new discovery of an adult female pterosaur fossil preserved together with her egg, it provides the direct evidence of sex in pterosaurs and insights into the reproductive biology of these extinct fliers. The specimen discovered by Dr. Lü et al. from the Middle-Late Jurassic Tiaojishan Formation, which is estimated to



Fig. 3.3.2. A female *Darwinopterus* skeleton with her egg preserved (upper) and the close-up of her egg (lower)



Fig. 3.3.3. Sex-related features of *Darwinopterus*. The male (right) and the female (left). [Offered by Mark Witton, University of Portsmouth]

approximately 160 million years old. The discovery helped us learn more about male *Darwinopterus* by comparing previously discovered fossils with the new female fossil. The new find confirms that males had relatively small pelvises and large cranial crests. The females, on the other hand, had much larger pelvises but no cranial crests.

Detailed study of the fossilized egg imply that the pterosaur's reproductive strategies were not like those of birds, as most researchers had previously suspected, but more like those of crocodiles or other reptiles. The study indicates that the egg is relatively small compared to the pterosaur's body and that it was likely soft and covered in a parchment-like shell, similar to the pterosaur embryo found before. The eggs could significantly uptake of water after oviposition from their environment, and they likely increased in size and mass during this period. This means that the adult did not have to invest so much water in the egg, which could have been quite advantageous: Less material investment in the egg and less mass to carry around while the egg was being produced in the female's body. This also suggests that Darwinopterus females buried their eggs like reptiles, paying little attention to them as they absorbed nutrients from the ground.

3.4 Important Scientific Rewards

One project won the top grade award of the National Science and Technology Advancement: "Geological theory innovation and great ore-prospecting breakthrough of Qinghai-Tibet Plateau" undertaken by ZHANG Hongtao, PAN Guitang and HOU Zengqian et al.

One project won the second grade award of the National Natural Science Foundation: "Terrane amalgamation, collision and uplift in the Qinghai-Tibet Plateau", undertaken by YANG Jingsui, XU Zhiqin, LI Haibing, ZHANG Jianxin, WU Cailai.

One project won the second grade award of the Ministry of Land and Resources, China: "1:1000000 scale geological map spacial data base" undertaken by DING Xiaozhong, LI Tingdong, ZENG Yong, YAO Dongsheng, ZHANG Qinghe, GENG Shufang, JU Yuanjing, HAN Kunying, LIU Yanxue, CHEN Anshu

Two research results were recognized as "Top Ten Scientific Achievements of the Chinese Academy of Geologic Sciences in 2011":

Top 5: Applications of in-situ oxygen isotope methodology in research of paleoclimate change (LIU Dunyi et al.)

Sponsored by the Ministry of Science and Technology and using a SHRIMP e-MC instrument with high precision and high resolution, in-situ micro-scale oxygen isotopic measurements were made on more than 200 conodont microfossils from 49 layers near the Permian-Triassic boundary of the Wenbudangsang profile, Tibet. The oxygen isotopic ratios show a sudden drop from 20.9 ‰ to 19.03 ‰ at the boundary between the Permian and Triassic, which corresponds to an important event of global warming that occurred at the end of the Permian. The average surface layer temperature of paleo-seawater of the Tethys ocean situated middle to high latitudes changed considerably. It rose abruptly by about 8.2°C and provides significant evidence for the largest biological mass extinction event in the Phanerozoic. This result is an important case study of quantitative analyses on paleoclimate change.

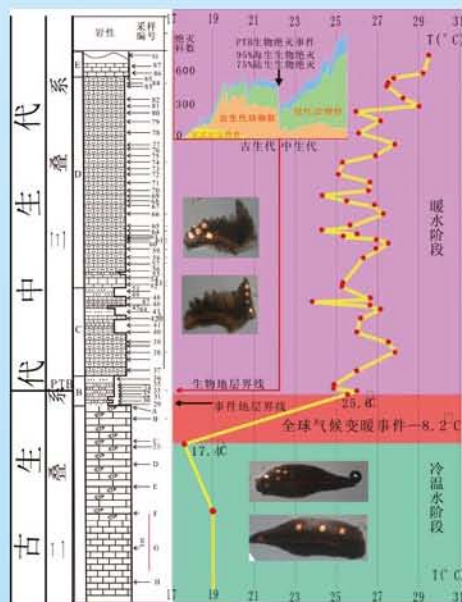


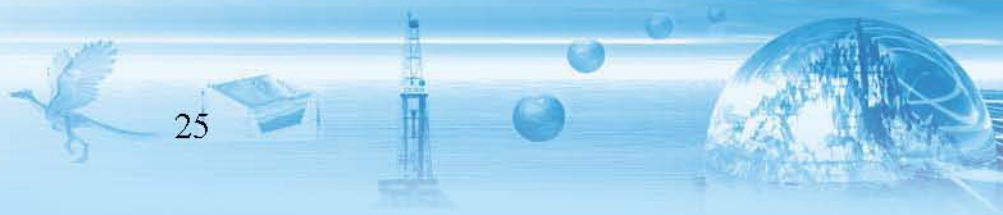
Fig. 3.4.1 The Permian-Triassic boundary section (left) and corresponding paleo-temperature curve obtained from in-situ oxygen isotopic ratios of conodonts



Top 6: New discoveries in paleontologic fossil studies (JI Qiang, LV Junchang and TANG Feng)

Sponsored by the Ministry of Science and Technology, China Geological Survey, and the National Natural Science Foundation of China, Ji, Lü and Tang of the Stratigraphic and Paleontology Laboratory, CAGS, achieved significant progress in their research on the Mesozoic and Neoproterozoic evolution of life. The related results were published in the journals *Nature*, *Science* and *Evolution and Development* in 2011.

“*Juramaia sinensis* gen. sp. nov.”, represents the earliest-known fossil of the eutherian-placental lineage and shows that a new milestone in mammal evolution was reached 35 million years earlier than the previous Cretaceous record. This new discovery fills an important gap in the fossil record and helps to calibrate modern DNA-based methods of dating mammalian evolution. The age of *Juramaia* helps to establish the date when eutherian mammals diverged from other mammals. The nearly complete skeleton of a female *Darwinopterus* together with her egg provides direct evidence for sexing these extinct flying reptiles, resolves the key issue of pterodactyl gender and also provides information on pterosaur’s reproduction and taphonomy. A 580 Ma old fossil, named *Eoandromeda octobrachiata*, was found in Guizhou, South China, and is believed to be the ancestor of modern ocean dwellers known as comb jellies (ctenophores). This oldest known metazoan fossil may lead to rewriting of the animal tree.





4. International Cooperation and Academic Exchange

4.1 Attendance at International Conferences

ZHANG Zeming attended the 2011 ICDP-SAG meeting (Idaho, USA)

ZHANG Zeming, one of the members of the Science Advisory Group (SAG) of the International Continental Scientific Drilling Program (ICDP), attended the 2011 ICDP-SAG meeting held on April 27-April 31 in Sun Valley, Idaho, USA. The meeting mainly revolved around reviewing proposals submitted by scientists around the world for scientific drilling programs and related scientific research programs.

LIU Fulai worked at J.W. Goethe University, Germany, and attended the 2011 Annual Goldschmidt Conference in Prague, Czechoslovakia)

Having been invited by Dr. Axel Gerdes of Institute of Geoscience, J. W. Goethe University, Frankfurt am Main, LIU Fulai visited the above institute and undertook U-Pb dating and trace element analyses of monazite, xenotime, thorite, etc. from July 22 to August 31, 2011. During this period, LIU Fulai also attended the 2011 Annual Goldschmidt Conference held on August 13-20, 2011, in Prague, Czechoslovakia. His oral presentation was on “U-Pb dating, and Lu-Hf property of zircon from granitic leucosome within orthogneiss from Sulu UHP terrane, eastern China”.

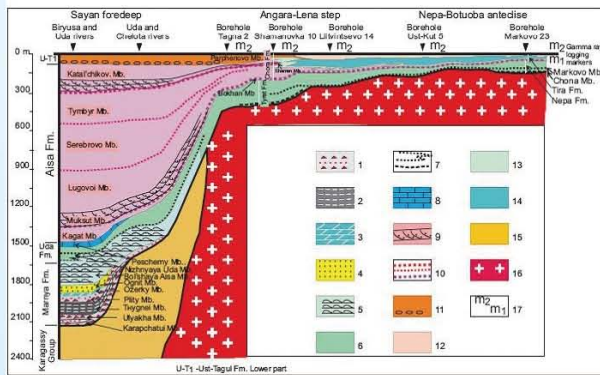


Fig. 4.1.1 LIU Fulai at Goldschmidt-2011.

YIN Chongyu, GAO Linzhi, and LIU Pengju attended the international symposium “Neoproterozoic sedimentary basins: stratigraphy geodynamics and petroleum potential”(Novosibirsk, Russia)

Invited by Dr. Dmitriy Grazhdankin of the Institute of Petroleum Geology and Geophysics, Siberian Branch of the Russian Academy of Sciences (SB, RAS) and Secretary-General of the Organizing Committee, YIN Chongyu, GAO Linzhi, and LIU Pengju attended the international symposium “Neoproterozoic sedimentary basins: stratigraphy geodynamics and petroleum potential” held on July 29 - August 2, 2011, in Novosibirsk, Russia. They also participated in a geological excursion to the Uda River area, Nizhneudinsk, Russia, from August 3 to August 14, 2011.





LI Haibing and SI Jialiang attended the 2011 Annual Conference of the Asia-Oceania Geosciences Society (Taipei, Taiwan)

LI Haibing and SI Jialiang attended the 2011 Annual Conference of the Asia-Oceania Geosciences Society, held on August 5-15, 2011, in Taipei, Taiwan. The conference focused on the latest research achievements in the Asia-Oceania region and future development and attracted more than 1,000 scientists from around the world.



JIN Xiaochi attended the International Congress on the Carboniferous and Permian (Perth, Austrilia)

The International Congress on the Carboniferous and Permian was held on July 3-8, 2011 at the University of Western Australia, in Perth, Australia. The congress included two field excursions: Permian, Carboniferous and Upper Devonian geology of the northern Canning Basin, Western Australia, and Permian–Carboniferous geology of the northern Perth and Southern Carnarvon Basins, Western Australia. Two hundred and two scholars from twenty-six countries attended the congress. JIN Xiaochi co-chaired a session on “Carboniferous–Permian basin studies” together with E. Tohver from Perth, and presented a talk entitled “The Permian of the Baoshan Block, western Yunnan, China: sedimentary development and basin configuration”.



Fig. 4.1.6 Outcrop of the Tournaisian Moogoee limestone about 10 km southeast of Moogooree Station, Northern Camarvon Basin.



Fig. 4.1.7 Pleistocene Pinnacles in the Nambung National Park, a kind of carbonate sedimentary product whose origin remains being debated.

WANG Tao attended the “International field workshop on the Precambrian evolution of Korea, and East Asian tectonics” (Korea)

As Secretary-General and one of the core members of the International Precambrian Research Center of China (IPRCC), WANG Tao attended the “International field workshop on the Precambrian evolution of Korea, and East Asian tectonics” held on September 19-24, 2011, in South Korea. This was an international academic exchange of great significance on the agenda of the “Annual Programme of Work (2011)” made by the first meeting of the core members of IPRCC in October, 2010, in Beijing, and aspects of Precambrian geology worldwide with emphasis in Korea were presented and discussed. This was followed by a well-attended excursion to visit Neo- to Palaeoproterozoic localities in South Korea and discuss geological relationships between Korea and China.



Fig. 4.1.8a Group photo of the field workshop in South Korea.



Fig. 4.1.8b Visit Korea SHINPT center after the symposium.





ZHU Xiangkun and ZENG Lingsen attended the 2011 Annual Goldschmidt Conference (Prague, Czechoslovakia)

ZHU Xiangkun and ZENG Lingsen attended the 2011 Annual Goldschmidt Conference held on August 13-20, 2011, in Prague, Czechoslovakia, to display the latest achievements in research on the Himalayan Orogen, non-traditional stable isotope geochemistry, and other fields. The Goldschmidt Conference is held each year and is known as the “Olympics of Geochemistry”.

ZENG Lingsen presented a talk on “Concurrence of mid-Miocene High Sr/Y granite and leucogranite in the Yardoi Gneiss Dome, Tethyan Himalaya, southern Tibet” and ZHU Xiangkun contributed two oral presentations on “Fe Isotope evidence for mantle metasomatism in the lithospheric mantle of eastern China” and “Isotope fractionation of transition metals by higher plants”.



Fig. 4.1.9 Session co-chaired by ZENG Lingsen and two other scientists.

YANG Jingsui, ZHANG Zeming, ZHANG Jianxin, and HE Zhenyu attended the 9th International Eclogite Conference and Examination of High-Pressure/ Ultrahigh-Pressure Rocks in the Bohemian Massif (Mariánské Lázně, Czechoslovakia)

YANG Jingsui, ZHANG Zeming, ZHANG Jianxin, and Dr. HE Zhenyu attended the 9th International Eclogite Conference and Examination of High-Pressure/ Ultrahigh-Pressure Rocks in the Bohemian Massif held in Mariánské Lázně, Czechoslovakia, on August 4-13, 2011. About 200 scientists from around the world attended the conference, and YANG Jingsui was invited to chair one of the scientific sessions.



Fig. 4.1.10 Outside the conference venue.



Fig. 4.1.11 ZHANG Zeming(right) on the field trip to Zöblitz.



A delegation headed by LI Haibing attended the Workshop on Earthquake Fault Drilling (Kyoto, Japan)

A delegation consisting of six members of the Wenchuan Project Team (LI Haibing, SU Dechen, and YU Changqing, SI Jialiang and PEI Junling, and postgraduate WANG Huan) visited the Disaster Prevention Research Institute, Kyoto University, Japan, on March 2-6, 2011. The delegation, together with the Disaster Prevention Research Institute and National Central University of Taiwan, held a Workshop on Earthquake Fault Drilling and conducted a field excursion to the Nojima Fault (the main fault where the 1995 Hanshin Earthquake occurred).



Fig. 4.1.12 LI Haibing exchanging opinions with Jim Mori.



Fig. 4.1.13 Visit to the Nojima Fault.

YANG Jingsui, CAO Hui, and CAI Zhihui attended the meeting “CorseAlp 2011” (Montpellier, France)

Invited by Prof. Malaviellie, Director of Laboratoire de Géophysique, Tectonique et Sédimentologie, CNRS, Université de Montpellier II, YANG Jingsui, CAO Hui, and CAI Zhihui visited the Université de Montpellier II and attended the meeting “CorseAlp 2011” held on April 9-24, 2011.

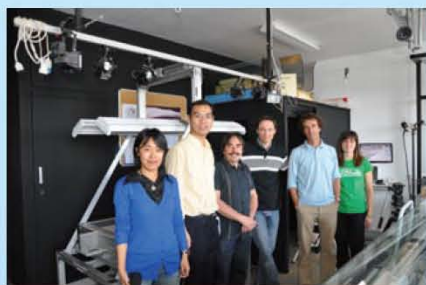


Fig. 4.1.14 CAO Hui and CAI Zhihui at the laboratory of Université de Montpellier II



Fig. 4.1.15 Group photo of CorseAlp 2011.



LI Qiusheng and WANG Jun attended the “International Conference of Geology, Tectonics and Minerageny of Central Asia” (St.Petersburg, Russia)

Invited by the A. P. Karpinsky Russian Geological Research Institute, VSEGEI (All-Russian Institute of Geological Research), Vice President WANG Xiaolie of the Chinese Academy of Geological Sciences headed an eight-member delegation (LI Qiusheng and WANG Jun of the Institute of Geology included) to attend the “International Conference of Geology, Tectonics and Minerageny of Central Asia” held on June 5-12, 2011 at VSEGEI in St. Petersburg, Russia.



Fig. 4.1.16 Visit to the geological museum of VSEGEI.



Fig. 4.1.17 Academic exchange between LI Qiusheng and the experts of VSEGEI.

GAO Rui and LU Zhanwu attended the AGU Fall Meeting (San Francisco, USA)

GAO Rui and LU Zhanwu attended the AGU Fall Meeting held in San Francisco, USA, in December, 2011. GAO Rui, together with Larry Brown of Cornell University, co-chaired the AGU-Sinoprobe Session. LU Zhanwu gave two oral presentations on “New results of the crustal structure and variation of Moho in central Tibet revealed by a deep seismic reflection profile” and “New deep seismic reflection profiles in the Himalaya-Karakoram-Tibet (HKT) area: Imaging the subduction of the Indian Plate”. After the meeting, GAO and LU visited Stanford University, Cornell University, the University of Oklahoma, the State University of California in Los Angeles, and the University of Texas at Austin for discussions on cooperative research.

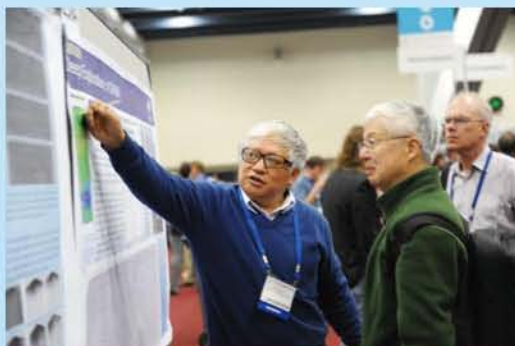


Fig. 4.1.18 Poster presentation at the AGU Fall Meeting 2011.



Fig. 4.1.19 GAO Rui, together with Larry Brown, co-chairing the AGU-Sinoprobe session.



4.2 Overseas visits

WANG Yanbin participated in China's 27th Scientific Investigation in the Antarctic (the Antarctic)

WANG Yanbin participated in China's 27th Scientific Investigation of the Antarctic held from November 21, 2010 to March 15, 2011. During this investigation, he carried out the project "Crustal evolution of the Larsemann Hills and adjacent region, East Antarctica: U-Pb and Hf isotope studies of zircons Antarctica", which was of great scientific significance.



Fig. 4.2.1 Flag of the Institute of Geology in the Antarctic.



Fig. 4.2.2 Camping in the Antarctic.

XU Jiren, FU Derong, and PI Jinyun visited the Institute of Earth Science and Engineering (IESE) (Auckland, New Zealand)

Invited by Prof. Peter Malin, Director of the Institute of Earth Science and Engineering (IESE) of the University of Auckland, New Zealand, XU Jiren, FU Derong, and PI Jinyun visited the IESE on April 11-19, 2011 to discuss the installation of borehole geophysical observation instruments to the bottom of the 5158m borehole located in Donghai County of Jiangsu Province, China, about 30 kilometers east of the Dabie-Sulu UHPM belt and the Tan-Lu Fault Zone.



Fig. 4.2.3 Technical meeting of both sides.



Fig. 4.2.4 Group photo at IESE.



LIU Dunyi and coworkers visited the Australian National University (ANU) (Canberra, Australia)

Invited by the Research School of Earth Sciences, Australian National University (ANU), LIU Dunyi and coworkers conducted SHRIMP oxygen and sulphur isotopic measurements on May 1-20, 2011. Furthermore, LIU Dunyi met Dr. Trevor Ireland, Director of the SHRIMP Center in the Research School of Earth Sciences, for discussions on future cooperation on the research and development of high-definition TOF-SIMS to be applied in the field of Earth and Space Sciences.



Fig. 4.2.5 LIU Dunyi exchanging ideas with experts from ANU and AGSO.



Fig. 4.2.6 JI Zhansheng and Ian Williams discuss SHRIMP testing.

LIU Dunyi attended the “Excursion to early Archaean terrains of the southeastern Kaapvaal craton, southern Africa and Swaziland” (South Africa and Swaziland)

Invited by Prof. Axel Hofmann of the University of Johannesburg, South Africa, LIU Dunyi attended the “Excursion to early Archaean terrains of the southeastern Kaapvaal craton, southern Africa and Swaziland” held on June 30 – July 11, 2011, in South Africa and Swaziland. It was an important international academic activity which was launched jointly by Johannes Gutenberg University Mainz (JGU) and University of Johannesburg.



Fig. 4.2.7 LIU Dunyi, Alfred Kröner, Academician ZHANG Guowei, and Carl Anhaeusser of Witwatersrand University during the excursion.



WANG Yong and CHI Zhenqing conducted tests on paleomagnetic samples in Academia Sinica (Taipei, Taiwan)

To test paleomagnetic samples in Taipei is the main part of research projects of WANG Yong and CHI Zhenqing funded by the National Natural Science Foundation of China. LI Degui of the Institute of Earth Sciences, Academia Sinica, Taipei, is one of the team members of the projects. Based on cooperation of both sides for years, WANG Yong and CHI Zhenqing, invited by LI Degui, conducted intensive tests on more than 3000 samples in Academia Sinica, Taipei, during February 8 – April 7, 2011.



Fig. 4.2.8 CHI Zhenqing undertaking tests on paleomagnetic samples.



Fig. 4.2.9 WANG Yong undertaking tests on paleomagnetic samples.

MENG Fancong and LI Tianfu participated in the “Geological Trip for Ophiolite from the Polar Urals, Russia” (Polar Urals, Russia)

To obtain samples during a geological trip to the Polar Urals (Russia) is an important part of the project “Genesis of jadeitite from the Polar Urals, Russia 41072026 ” funded by the National Natural Science Foundation of China. MENG Fancong and LI Tianfu participated in the “Geological Trip for Ophiolite from the Polar Urals, Russia” organized by the Institute of Geology, Komi Science Center of Uralian Division, Russian Academy of Sciences (RAS) on July 2-26, 2011.



Fig. 4.2.10 Members at the geological trip.



Fig. 4.2.11 Visit to the drill core library (Middle: I I Popov, right: Dr. B P Shmelev, left: MENG Fancong).



TONG Ying paid two visits to the Univeristy of Hong Kong (Hong Kong, China)

TONG Ying has been responsible for the projects “Spatial and temporal distribution of the Permain-Triassic alkalines in the Eastern Tianshan-Langshan, and its significance” and “Evolution of granitoids in the Dahinggan Mts.-Mongolia orogenic belt and coupling relation with ore-formation”. According to the project plans, TONG Ying, invited by Prof. SUN Min of the Univeristy of Hong Kong, paid two visits to the Univeristy (June 1- August 1, 2010, and May 11- August 11, 2011) for academic exchange and cooperative research. He also undertook a two-week field trip to Xinjiang Province together with Prof. SUN’s team.



Fig. 4.2.13 TONG Ying and SUN Min on the field trip in Xinjiang.

LI Qiusheng and GUAN Ye visited the University of California at Davis and the University of Southern California, Los Angeles (California, USA)

Invited by Prof. Sinha of Virginia Tech, USA, and Prof. WU Daming of the State University of New York, LI Qiusheng and GUAN Ye visited Kake CAVES (the 3-D visual system for geoscience) at the University of California at Davis, Geometrics (an American company for geophysical instruments), and the Department of Geological Sciences, University of Southern California, Los Angeles, during August 17 –September 8, 2011.



Fig. 4.2.15 GUAN Ye is exchanging ideas with an expert at Kake CAVES.



A CAVE Demonstration System Showing Test Pattern Images.

Fig. 4.2.14 A CAVE demonstration system showing test pattern images.



LI Jinyang, XIONG Fahui and LIU Fei participated in the “Excursion/Workshop across the central part of the Scandinavian Caledonides Jamtland (Sweden) and Trondelag (Norway)” (Sweden and Norway)

Three graduate students of the Institute of Geology, namely LI Jinyang, XIONG Fahui and LIU Fei participated in the “Excursion/Workshop across the central part of the Scandinavian Caledonides Jamtland (Sweden) and Trondelag (Norway)” which was jointly organized by Uppsala University, Sweden, and Norway University of Science and Technology, Norway, on June 29 - July 10, 2011. More than 20 graduate students from Sweden, Norway, Poland, Russia, America and China participated in this field trip.



Fig. 4.2.16 Group photo of participants.



Fig. 4.2.17 Graduate students of the Institute of Geology during the excursion.

YANG Jingsui and RONG He visited the German Research Centre for Geosciences (Potsdam, Germany)

Invited by GFZ-Potsdam (Helmholtz-Centre Potsdam - German Research Centre for Geosciences), YANG Jingsui and RONG He visited the GFZ and undertook collaborative research with Richard Wirth of the FIB-TEM laboratory, GFZ, on May 15- June 4, 2011.



Fig. 4.2.18 YANG Jingsui giving a presentation at GFZ.



Fig. 4.2.19 RONG He exchanging opinions with an expert of GFZ.



WANG Tao participated in a study tour on 3D geological mapping to Australia (Australia)

On November 29 - December 6, 2011, WANG Tao participated in a study tour on 3D geological mapping to Australia. Headed by Deputy Director ZHAI Gangyi of the Department of Basic Geological Survey, four members of the delegation visited such geological institutions as the Australian Geological Survey Organization (AGSO), the Geological Survey of Western Australia, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the University of Queensland, and the University of Sydney.

During the study tour, the participants learned about the development of 3D geological mapping in Australia, and exchanged opinions on 3D geological mapping techniques, 3D geological framework modeling, geophysical digital simulation, and other related areas, with experts of the above Australian institutions. More importantly, both sides discussed possible cooperation on 3D geological mapping in the future. Through this study tour, the delegation learned the latest achievements of 3D geological mapping in Australia and gained experience on how to organize and undertake 3D geological mapping projects from their Australian counterparts, which could be used in China's "3D Geological Mapping Pilot" development.



Fig. 4.2.20 The 3D mapping study team, as members of the delegation from China Geological Survey (CGS), visited Australia for a study of 3D geological mapping.

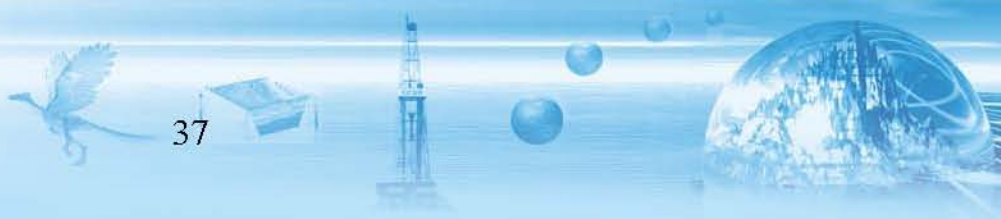


Fig. 4.2.21 Director ZHAI Gangyi from the Department of Basic Geology Survey, CGS and WANG Tao exchanged ideas on 3D mapping with a geologist from Australia

4.3 International conferences organized and held by the Institute

The Fifth Workshop on 1:5 Million International Geological Map of Asia (IGMA5000)

On April 25-29, 2011, the Fifth Workshop on 1:5 Million International Geological Map of Asia (IGMA5000), sponsored by China Geological Survey, Chinese Academy of Geological Sciences and the Commission for the Geological Map of the World and organized by Institute of Geology, was held in Beijing.





The main purpose of the Workshop was to review the draft IGMA5000, to exchange opinions on the geological evolution of Asia, and to discuss future work and cooperation. More than 90 experts and scholars from 13 countries such as France, Germany, Iran, Iraq, Russia, Thailand, and Japan participated, and more than 30 delivered academic reports. After the workshop, the attendees also participated in a field excursion to the West Hills of Beijing.



Fig. 4.3.1 Opening ceremony.



Fig. 4.3.2 Attendees at the workshop.



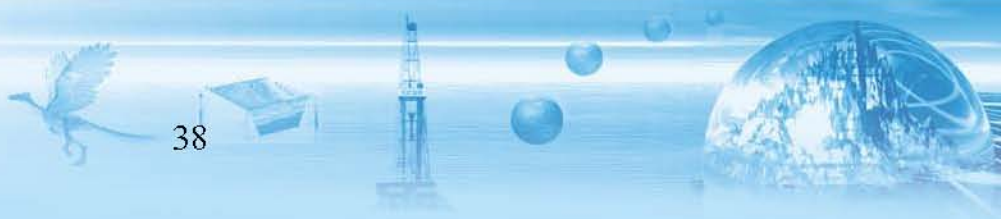
Fig. 4.3.3 Unveiling ceremony for the CGMW Subcommission for South and East Asia Office.



Fig. 4.3.4 Viewing the 1:5 Million International Geological Map of Asia (IGMA5000)

First Workshop of the IGCP/SIDA 600 project “Metallogensis of Collisional Orogens in the East Tethyside Domain”

The First Workshop of the IGCP/SIDA 600 project “Metallogensis of Collisional Orogens in the East Tethyside Domain”, jointly funded by UNESCO and the Swedish International Development Cooperation Agency (SIDA), was held in Beijing on October 29-30, 2011. Dr. WANG Min, Director-General of China Geological Survey, and Vice Minister of the Ministry of Land and Resources of the People’s Republic of China, attended and addressed the Opening Ceremony.





The IGCP/SIDA 600 project is the second IGCP project in the field of ore deposits with a Chinese scientist (HOU Zengqian) as the first leader. At the workshop, HOU Zengqian gave a presentation in introducing the project background, aims and the entire research plan. More than 120 scientists from eight countries such as Dr. David Leach from the USGS, former President of the Society for Geology Applied to Mineral Deposits, Dr. Richard Goldfarb of the USGA, former President of the Society of Economic Geologists, Dr. Imran Ahmed Khan, Director-General of the Geological Survey of Pakistan, Dr. Mehraj Aghazadeh of Payam Noor University, Academicians from the Chinese Academy of Sciences and Chinese Academy of Engineering LI Tingdong, XIAO Xuchang, TENG Jiwen, ZHONG Dalai, MO Xuanxue, and Duo Ji, and Professor DENG Jun, President of China University of Geosciences, attended the workshop.



Fig. 4.3.6 Participants at the workshop.



Fig. 4.3.5 Group photo of the workshop.



Fig. 4.3.7 Group photo of the presenters.



Fig. 4.3.8 HOU Zengqian chairing a session at the workshop.



International Workshop on 3D Geological Mapping Techniques

An International Workshop on 3D Geological Mapping Techniques, sponsored by China Geological Survey and organized by the Institute of Geology, CAGS, was held in Hangzhou, Zhejiang Province, on November 25-26, 2011. Nearly one hundred experts from 3D Geological Mapping related organizations attended the workshop.

Dr. Stephen John Mathers of the British Geological Survey (BGS), Dr. Yves Michaud of the Geological Survey of Canada (GSC), and Dr. YANG Kai of the Geological Survey of Western Australia, were invited for presentations on 3D geological mapping research and achievements in their respective countries. Dr. WEI Zixin of the Shanghai Geological Survey, Dr. LV Qingtian of the Institute of Mineral Resources, CAGS, Dr. LI Qiusheng of the Institute of Geology, CAGS, and Dr. LIU Xiuguo of China University of Geosciences (CUG-Wuhan) delivered reports on 3D geological mapping research and development in China.

The Workshop constituted an important step to boost the development of 3D geological mapping in China.



Fig. 4.3.9 Opening ceremony.



Fig. 4.3.10 Dr. Stephen John Mathers giving his presentation.



Fig. 4.3.11 Dr. Yves Michaud giving his presentation.



Fig. 4.3.12 Dr. YANG Kai giving his presentation.





Training Course on “Lithospheric Evolution through Geologic Time”

The International Precambrian Research Center of China (IPRCC), in cooperation with the Administrative Office of SinoProbe, held a training course on “Lithospheric Evolution through Geologic Time” in Beijing, on April 8-12, 2011. More than 180 researchers and students from the Chinese Academy of Geological Sciences, the Chinese Academy of Sciences, the China Earthquake Administration, Peking University, Nanjing University, China University of Geosciences, etc. attended the lectures.

Prof. Alfred Kröner from the University of Mainz, Germany, and member of the Beijing SHRIMP Center, CAGS, Dr. Walter Mooney, well-known expert in geophysics and seismology from USGS in Menlo Park, California, USA, and Prof. Ron Clowes from the University of British Columbia, Canada, Chief Scientist of the Canadian LITHOPROBE Project, delivered nearly thirty lectures in five days. Dong Shuwen, Vice-President of Chinese Academy of Geological Sciences and Director of SinoProbe, and Liu Dunyi, Director of the Beijing SHRIMP Center, chaired the lectures in succession and guided the discussions.



Fig. 4.3.13 Liu Dunyi chairing the workshop.



Fig. 4.3.14 The three instructors from left to right: Walter Mooney, Alfred Kröner, and Ron Clowes



Fig. 4.3.15 Prof. Ron Clowes giving his presentation.



Fig. 4.3.16 Dong Shuwen chairing the workshop.



4.4 Academic visitors

Visit of LI Degui, SONG Shengrong, WANG Weilong, and CHEN Huifen from Taiwan

Based on friendly cooperation for several years and project requests, WANG Yong invited LI Degui of the Institute of Earth Sciences, Academia Sinica, Taipei, Prof. SONG Shengrong from National Taiwan University (NTU), Prof. WANG Weilong from National Changhua University of Education (NCUE), and Dr. CHEN Huifen from National Taiwan Ocean University (NTOU) to the northeastern area of the Chinese mainland for joint field work on July 13-23, 2011.



Fig. 4.4.1 Sample collection at Songyuan, China.



Fig. 4.4.2 Sample collection at Songyuan, China.

Visit of CHEN Roufei, ZHANG Guozhen, and YANG Tiannan from Taiwan

To run the project “Detailed study of Cenozoic strata from the western Kunlun foreland basin and its constraints to the timing of uplift of northwest Qinghai-Tibet plateau”, funded by the National Natural Science Foundation of China, WANG Yong invited Dr. CHEN Roufei, Dr. ZHANG Guozhen, and Dr. YANG Tiannan of the Institute of Earth Sciences, Academia Sinica, Taipei, to the West Kunlun of Xinjiang for joint field work, on September 2-11, 2011.



Fig. 4.4.3 Sample collection at the Hotan River terraces.



Fig. 4.4.4 Sample collection at the Keriya River terraces.



Visit of seismologists and instrument specialists from the USA

In March, 2009, Prof. G. Randy Keller of the University of Oklahoma, the Director-General of Oklahoma Geological Survey and co-workers visited the Institute of Geology, CAGS, and signed a contract on “Sino-US Partnership in Research and Education of Continental Tectonics” with the SinoProbe 02 team. The first cooperative research on deep seismic reflection and refraction profiling exploration experiment was done in North China in December 2009 with good results. The second Sino-US cooperation was undertaken in Da Xingganling of northeast China, with joint field work including important observations and data collection, in July and August, 2011. The third cooperation in Longmenshan and adjacent areas, including field observations and data collection, was conducted during the experiment in which three seismologists and three instrument specialists from the American side participated.

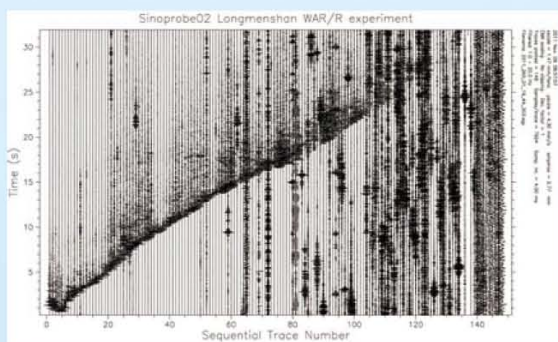


Fig. 4.4.5 Seismic single shot records.



Fig. 4.4.6 The DZS-1 seismograph.

Visit of Dr. Udoratina Oxana and Dr. Kulikova Ksenia from Russia

Funded by the National Natural Science Foundation of China (Project “Genesis of jadeitite from the Polar Urals, Russia”), MENG Fancong invited Dr. Udoratina Oxana and Dr. Kulikova Ksenia from the Institute of Geology, Komi Science Center of Uralian Division, Russian Academy of Sciences (RAS) to visit the Institute of Geology, CAGS and the State Key Laboratory of Continental Tectonics and Dynamics for academic exchange during April 30- May 11, 2011.



Fig. 4.4.7 Dr. Udoratina Oxana and Dr. Kulikova Ksenia visiting the EPMA Laboratory.



Fig. 4.4.8 Kulikova Ksenia doing an EPMA test.



Visit of Dr. W. D. Cunningham from the UK

To realize the research goal (how the Altyn Tagh Fault extends northeastwards) set in the National 973 Project “Major Fault System and Reconstruction of the Ancient Tectonic and Metallogenic Framework”, LI Jinyi and ZHANG Jin and co-workers have undertaken cooperative research with Dr. W. D. Cunningham of the Department of Geology, Leicester University, UK. On May 5-20, 2011, LI Jinyi and ZHANG Jin undertook geological field work and cooperative studies in the south Beishan area, to the north of Dunhuang, China, with Dr. W.D. Cunningham.

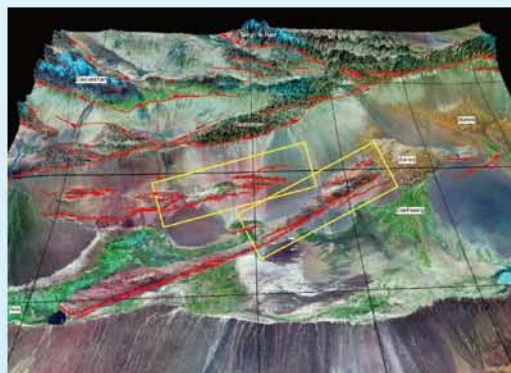


Fig. 4.4.9 Area of the field work (marked by yellow rectangles on the map)



Fig. 4.4.10 Dr. W.D. Cunningham during the field trip.

Visit of Dr. Nicholas Stanley Belshaw from the UK

Invited by ZHU Xiangkun, Dr. Nicholas Stanley Belshaw of the Department of Earth Sciences, University of Oxford, UK, visited the Institute of Geology, CAGS for academic exchange and a geological excursion conducted in Wenchang and Sanya of Hainan Province, China, on May 24- June 18, 2011.

Visit of Prof. Peter Malin and co-workers from New Zealand

Invited by XU Jiren, Prof. Peter Malin, Director of the Institute of Earth Science and Engineering (IESE) of the University of Auckland, New Zealand, and eight other members came to Donghai County of Jiangsu Province, China, on July 11- August 5, 2011 to undertake installation of borehole geophysical observation instruments to the bottom of the 5158m borehole located there, about 30 kilometers east of the Dabie-Sulu UHPM belt and the Tan-Lu Fault Zone.



Fig. 4.4.12 Group photo of experts involved in the installation project.



Fig. 4.4.11 Installation of the L4 instrument.



Visit of Drs. Axel Gerdes and Ulrike Bettina Stürner from Frankfurt, Germany

As required by the project goals, Researcher LIU Fulai invited Prof. Axel Gerdes and Dr. Ulrike Bettina Stürner from the Laboratory of Isotopic Geochemistry, Institute of Geoscience, J. W. Goethe University, Frankfurt am Main, to undertake joint geological field excursion in east Tibet and Sanjiang area of Yunnan Province, China, on October 5-25, 2011.



Fig. 4.4.13 Prof. Axel Gerdes and Dr. Ulrike Bettina Stürner at the field trip.



Fig. 4.4.14 Researcher LIU Fulai at the field trip.

Research visit of Prof. Alfred Kröner and Dr. Yamirka Rojas-Agramonte of Mainz University, Germany

Base on an employment contract signed by both sides, Prof. Alfred Kröner from University of Mainz, Germany, together with post-doc researcher Dr. Yamirka Rojas-Agramonte, visited the Beijing SHRIMP Center of the Institute of Geology, CAGS for four-month (April, September, October, and November of 2011) and undertook joint research and prepared publications with members of the SHRIMP Center.

Visit of Dr. Stephen William and Dr. James Clement from Canada

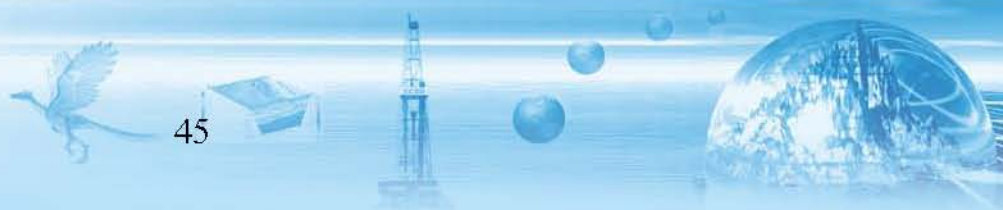
On November 10-30, 2011, Dr. Stephen William and Dr. James Clement, well-known Canadian specialists in mass spectrometry, visited the Beijing SHRIMP Center and discussed future cooperation in research and development of instruments with the technicians.

Overseas visitors for SHRIMP dating in the Beijing SHRIMP Center

In 2011, the Beijing SHRIMP Center hosted 12 overseas visitors who came for SHRIMP zircon dating, assisted in the laboratory by staff members of the Center.

In February, 2011, Prof. Ryszard Kryza from the College of Earth Sciences, University of Wroclaw, Poland, together with three other members, completed 6.5 days SHRIMP zircon dating.

On March 9, 2011, Dr. Şenel Özdamar from Istanbul Technical University, Turkey, completed one day of SHRIMP zircon dating.





During research visits in April, and September-November Prof. Alfred Kröner from University of Mainz, Germany, and Dr. Yamirka Rojas-Agramonte completed 6 days of SHRIMP zircon dating.

During the period from September to November, 2011, Prof. Annalisa Tunesi and Prof. Andrea Zanchi from the Università degli Studi di Milano-Bicocca, and Dr. Lucca Ferrari from Universidad Nacional Autónoma de México, completed 3 days of SHRIMP dating.

Overseas delegations visiting the Beijing SHRIMP Center

In 2011, the Beijing SHRIMP Center received four overseas delegations (18 people in total).

On July 25, 2011, accompanied by Dr. DONG Shuwen, Vice-President of CAGS, Ms. Gretchen Kalonji, Assistant Director-General for Natural Sciences of UNESCO and her team visited the Center.

On September 21, 2011, Prof. Krutkina Olga Nikolaevna, Chief Geologist of A. P. Karpinsky Russian Geological Research Institute (VSEGEI) and five other members visited the Center.

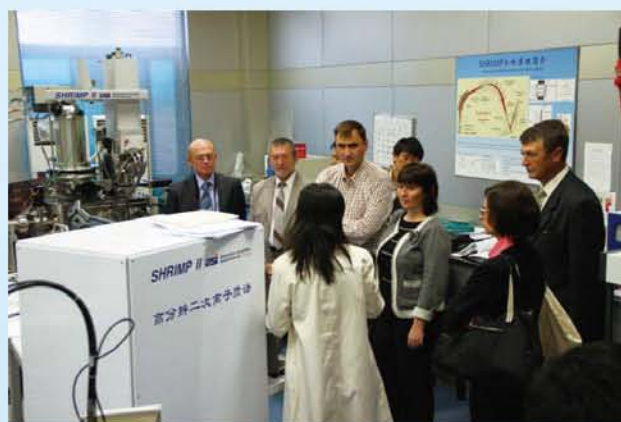


Fig. 4.4.15 VSEGEI delegation visiting the Beijing SHRIMP Center.

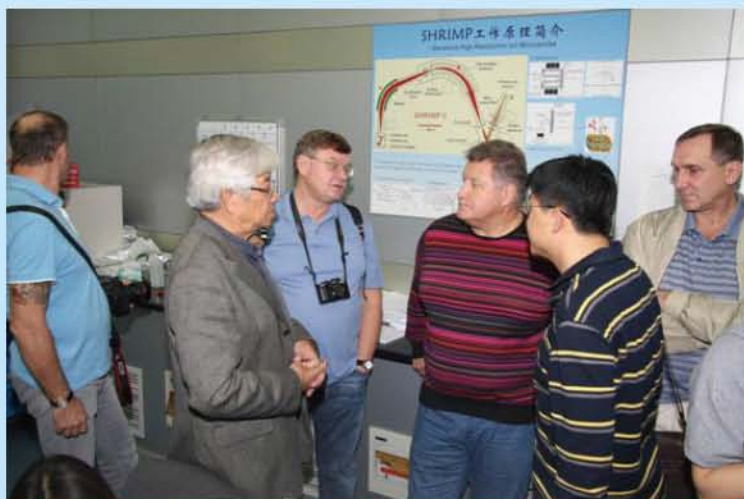


Fig. 4.4.16 The Rosnedra delegation is visiting the Center.

On October 10, 2011, headed by Mr. Anatoly Ledovskikh, Head of Rosnedra, seven leading members of Rosnedra visited the Center.

On November 3, 2011, four experts of the Geological Survey of Iran and Tarbiat Modares University who came to China to attend the First Workshop of IGCP/SIDA 600 “Metallogensis of Collisional Orogens in the East Tethyside Domain”, visited the Center.





Visit and cooperation field work of Prof. G. A. Davis from the USA

Funded by the key project of National Natural Science Foundation of China, Prof. WANG Tao invited Prof. G. A. Davis from the Department of Earth Sciences, University of Southern California to visit the Institute of Geology, CAGS for field cooperation work and academic exchange during June 27 - August 6. On June 28, 2011, as the chairman of the academic defense committee, Prof. G. A. Davis attended the middle term examination of postdoctoral researcher Dr. GUO Lei. On August 3-6, 2011, WANG Tao, G. A. Davis, GUO Lei and co-workers undertook field trip in the Daqingshan area for the discussion on the time and process of the Hohhot metamorphic core complex.



Fig. 4.4.18 Group photo in the field excursion in the Hohhot metamorphic core complex, north China.



Fig. 4.4.19 Prof. Davis, WANG Tao, GUO Lei and YANG Qidi are doing field observation and discussion.





5. Important Academic Activities in 2011

The State Key Laboratory of Continental Tectonics and Dynamics received visitors on the 42nd Earth Day

On April 22, 2011, the 42nd Earth Day of UNESCO, over 60 pupils from Qianjin Primary School of Haidian District, Beijing, visited the State Key Laboratory of Continental Tectonics and Dynamics of the Institute of Geology. Academician XU Zhiqin introduced and explained the major scientific research achievements of the laboratory, especially those in Chinese continental scientific drilling, and led them to recognize geological maps, cores, rock specimens, etc., encouraging them to consider become geologists in the future.

The State Key Laboratory of Continental Tectonics and Dynamics is one of the first geological organizations in China that have taken an active part in the Earth Day activities. It has created a favorable impression on society for years with its opening to the public on Earth Day.



Fig. 5.1 Group photo of Academician XU Zhiqin and pupils.

Progress in the Establishment of Donghai Station for Long-term Geophysical Observation

The Deepest Borehole in Asia (5158m), located in Donghai County of Jiangsu Province, China, where belongs to the Tan-Lu Fault Zone, was drilled from 2001 to 2005 as one of the ninth “Five-year Plan” key national scientific engineering projects— Chinese Continental Scientific Drilling (CCSD). The Institute of Geology has been constructing the CCSD site to be a station for long-term geophysical observation.



Fig. a. Preparation before the installation



In July, 2011, Institute of Geology, together with Institute of Earth Science and Engineering (IESE) of the University of Auckland, University of Southern California, Jiangsu Earthquake Bureau, and SinoPec Zhongyuan Petroleum Exploration Bureau, conducted an installation of seismometers (four sets of instruments, to be set at the depth of 5158m, 3500m, 2500m, and 1500m respectively) in “the Deepest Borehole in Asia”. Though not finished yet, this installation turned out to be a good try to be the first one in the world with the depth exceeding 5000m. When finished, this observation system will be able to effectively avoid the noise on the ground surface and get accurate and objective information about the movements of the interior of the earth, ensuring a 1-2 magnitude better sensibility than ground observation.



Fig. b. The installation process.



Fig. c. Two IESE experts from New Zealand are at the installation site.

Workshop on the Evolution of the Early Crust and Academician SHEN Qihan's 90th Birthday Celebration

A workshop on the evolution of the early crust and Academician SHEN Qihan's 90th Birthday Celebration was held at Beijing Century Guojian Hotel on April 27, 2011. Dr. ZHANG Hongtao, Counselor of the State Council and Chief Engineer of the Ministry of Land and Resources of China, Dr. LI Jinfa, and leaders from China Geological Survey and Chinese Academy of Geological Sciences attended the workshop and celebration, expressing their best wishes and high respects to Academician SHEN Qihan.



Fig. 5.2 GAO Jinxi, Deputy Director of the Institute, chairing the workshop.



Fig. 5.3 HOU Zengqian, Director of the Institute, presents congratulatory couplets to Academician SHEN Qihan.



Dr. HOU Zengqian, Director of the Institute of Geology, summarized Academician SHEN Qihan's achievements in his academic field and his extensive contributions to the advancement of Precambrian geology and metamorphic geology, and to the development of the Institute. On behalf of the Institute of Geology, Dr. HOU gave presents and congratulatory couplets to Academician SHEN Qihan. More than one hundred distinguished guests, including more than 10 Academicians, attended the workshop and celebrations.



Fig. 5.4 Academician SHEN Qihan.



Fig. 5.5 Group photo of the workshop participants.

The EPMA (Electron Probe Micro Analysis) Laboratory achieved the “Micro Analysis Capacity Accreditation”

In September, 2011, the EPMA (Electron Probe Micro Analysis) Laboratory of the Institute of Geology achieved the “Micro Analysis Capacity Accreditation” organized by Shanghai BaoSteel Co., Ltd., a certified corporation entrusted by China National Accreditation Service for Conformity Assessment CNAS. Twenty-six laboratories nationwide entered for this accreditation, and the EPMA Laboratory won with a satisfactory result and obtained the certificate.



Fig. 5.6 The Certificate.

Penrose Conference 2011 “Comparative evolution of past and present accretionary orogens: Central Asia and the Circum-Pacific”

A Penrose Conference of the Geological Society of America on “Comparative evolution of past and present accretionary orogens: Central Asia and the Circum-Pacific” was held in Urumqi, China, on September 4-10, 2011 and was co-sponsored by the Institute of Geology. Penrose Conferences are one of the highest-level international conferences in the field of geosciences and the topic is generally based on key issues at the cutting edge of geosciences.



The Central Asian Orogenic Belt (CAOB) is one of the largest accretionary orogens on Earth and evolved over some 800 million years from the latest Mesoproterozoic to the early Triassic. In view of the discovery of world-class mineral deposits, a wealth of new age and isotopic data, and much improved possibilities for international cooperation it was considered timely to discuss and compare the formation of the CAOB with that of modern accretionary orogens such as the multiple arc terranes of the circum-Pacific in Indonesia, Melanesia, Taiwan, Japan, Alaska, and California. The Penrose Conference 2011 provided a clear path for future research in Central Asia and generated contacts that should lead to increased international collaboration.

This Conference was funded by the National Natural Science Foundation of China, the State Key Laboratory of Lithospheric Evolution of the Chinese Academy of Sciences (IGGCAS), the Institute of Geology, Chinese Academy of Geological Sciences, the National 305 Project Office Xinjiang, Uygur Autonomous Region of China, the State Key Laboratory for Mineral Deposits Research, Nanjing University, the Topo-Central-Asia (CC-1/4) Project of the International Lithosphere Program (ILP), the Center for Russian and Central EurAsian Mineral Studies (CERCAMS) at the Natural History Museum, London, UK, and Gold Fields Corporation Inc., USA. Fifty-nine participants (including 6 students) from Australia, China, Cuba, France, Germany, Italy, Japan, Russia, UK, and USA, attended the Conference that was preceded by the 3-day field trip across the Chinese Tianshan from Urumqi to Korla. A special volume of the journal "Lithosphere" with papers presented at this conference is now in preparation.



Fig. 5.7 Group photo at the end of the field trip in the Baiyanggou section, southern Bogda Mountains, Chinese northern Tianshan.

Scientific Assessment of the Project on Eco-Environment Restoration for the dry Qagan Lake Basin

On September 8-9, 2011, the Scientific Assessment of the Project of Eco-Environment Restoration for the dry Qagan Lake Basin, organized by the Institute of Geology and EcoPeace Asia, was held in Xilinhaote, Inner Mongolia. More than seventy representatives from the the Chinese Ministries of Science and Technology and Agriculture, the Chinese Academy of Geological Sciences, the Chinese Academy of Sciences, EcoPeace Asia, and other related organizations attended the meeting and the following field trip to the Qagan Lake Basin. After three years of planting Suaeda (about 4000 hectares), the dry saline-alkaline Qagan Lake Basin has gradually turned into green land.





The Project of Eco-Environment Restoration for the dry Qagan Lake Basin is an innovative environmental improvement project with a new method of improving dry lake basins, which is of great significance in desertification control.



Fig. 5.8 Group photo of the assessment experts.

National Major Special Project on “New Models of TOF-SIMS for Isotope Geology”

With LIU Dunyi of the Institute of Geology as project leader, the National Major Special Project on “New Models of TOF-SIMS for Isotope Geology” was launched on October 26, 2011, after being reviewed by specialists designated by the Ministry of Science and Technology of China which funded the project with 74 million yuan.

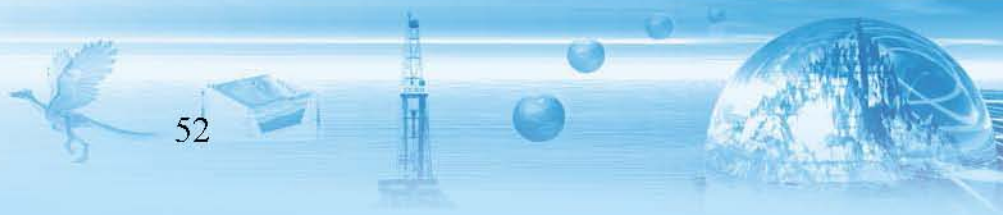
The main aim of this project is to develop new TOF-SIMS techniques within five years, with the manufacture of two instruments “TOF-SIMS-SI” for stable isotope analysis and “TOF-SIMS-REE” for lanthanide analysis, which will provide the most advanced technical support to such cutting-edge fields as petrology, metallogenesis, global environment, climate change, evolution of the moon and planets, etc..

The new TOF-SIMS technique, which is without precedent if achieved, will be a milestone in the history of mass spectrometry development.

Forum on the annual achievements of the Special Scientific Research Project for Public Industry “Applications of isotopic tools in geosciences and preparation of reference materials for isotopic measurements”

On December 6-8, 2011, the forum on the annual developments of the Special Scientific Research Project for Public Industry “Applications of isotopic tools in geosciences and preparation of reference materials for isotopic measurements”, organized by the Division of Science and Technology, Institute of Geology, was held in Kunming, Yunnan Province, China. Experts from the National Natural Science Foundation of China (NSFC), Peking University, Nanjing University, and the Chinese Academy of Geological Sciences, attended the forum.

The forum was chaired by Prof. JIANG Shaoyong of Nanjing University. ZHU Xiangkun, leader of the project, gave a brief introduction of the project. The project, undertaken by the Institute of Geology, in collaboration with the Institute of Mineral Resources, Tianjin Institute of Geology and Mineral Resources, and Wuhan Institute of Geology and Mineral Resources, was implemented within eleven sub-projects. The leaders of the sub-projects made presentations on the implementation of their research, the annual developments, and the work plan for the next step one by one.





After hearing the presentations, the experts reviewed the work done by each team of the project and agreed that with concerted efforts of all team members, the project has gone smoothly with great innovative achievements.



Fig. 5.9 ZHU Xiangkun introducing the project.

Workshop on the 10th Anniversary of the establishment of the Beijing SHRIMP Center

On December 18-20, 2011, a workshop on the 10th Anniversary of the establishment of the Beijing SHRIMP Center was held in Beijing. HOU Zengqian, Director of the Institute of Geology, chaired the opening ceremony and WANG Xiaolei, Vice- President of the Chinese Academy of Geological Sciences, addressed the audience. More than 200 geoscientists, including Academicians SHEN Qihan, XU Zhiqin, MO Xuanxue, Zhou Rixiang, and others, as well as leading representatives of the Chinese Ministries of Land and Resources, Science and Technology, Finance, and the National Natural Science Foundation of China, and other related organizations attended the workshop.

Forty presentations by Chinese and foreign scientists were delivered, with in-depth discussion of the results presented which were largely based on zircon dating in the SHRIMP Center and elsewhere. The Beijing SHRIMP Center's advancement and its publications in the past decade have exerted a profound influence on the development of China's geosciences.



Fig. 5.10 Distinguished guests signing at the workshop.



Fig. 5.11 Prof. LIU Dunyi, Director of the center, giving an opening address



Annual Academic Conference (2011)

The Annual Academic Conference (2011) was held on February 16-17, 2012, in the Institute of Geology. More than 60 geologists, including post-docs and Ph.D. candidates of the Institute, delivered research reports. In the morning of February 16, eight keynote addresses were delivered during a plenary session chaired by Deputy Director GAO Jinxi. During the following three sessions, excellent presentations and heated discussion revolved around six topics: geological evolution and mineralization of the Qinghai-Tibet Plateau and adjacent areas, metamorphism and Precambrian geology, geological evolution and mineralizations of northern and eastern China, economic geology and isotope geochronology, geophysics, and paleontology and stratigraphy.

The Annual Academic Conference served as an academic platform for communication and cooperation among different branches of the geosciences within CAGS. It helped to broaden the geologists' horizon and fostered new breakthroughs in their research.



Fig. 5.12 The main session of the Annual Academic Conference 2011.



Fig. 5.13 Session 2 of the Annual Academic Conference 2011.



Fig. 5.14 Session 3 of the Annual Academic Conference 2011.





6. Invitation to Foreign Researchers and Education

6.1 Invitation of high-profile foreign scientists for collaborative research

The Institute of Geology has established a program to invite high-profile foreign researchers or local researchers with overseas educational background to Beijing for scientific collaboration. There are senior and junior researchers, which are named “HUANG Jiqing scholar” and “HUANG Jiqing young scholar”, respectively. Academician HUANG Jiqing was a famous Chinese geologist and contributed greatly to the development of geology, in particular to the Geological Survey of China. Distinguished researchers are encouraged to apply for a one to three years’ scholarship.

In 2012, Dr. LIU Chaohui was invited to work in the Institute as “HUANG Jiqing young scholar”. He will stay in Beijing for three years as a member of the Laboratory of Metamorphic and Precambrian Geology and will collaborate with Prof. LIU Fulai and join the research team on the Khondalite Belt Project. Dr. LIU Chaohui, who obtained his degree of PhD with Prof. ZHAO Guochun in precambrian geology from the University of Hong Kong in 2011, has published 5 papers in SCI journals, including Sedimentary Geology, Gondwana Research, Precambrian Research and Lithos.



Fig. 6.1.1 Dr. LIU Chaohui is working in the Lab. of the Institute of Geology

6.2 Post-graduate Education

6.2.1 Post-graduate advisors

In 2011, there were 28 doctoral and 25 master’s degree candidates and 44 post-graduate students in the Institute. On the average, the Institute has about 10 new candidates for the doctoral degree and 8 for the master’s degree every year. The detailed information of the 25 advisor of doctoral students and 23 advisor of master students is listed below:

Advisors of doctoral students				
No.	Name	Title	Specialty	E-mail address
1	SHEN Qihan	Professor	Early Precambrian geology and metamorphic geology	huixiasong@cags.ac.cn
2	XIAO Xuchang	Professor	Tectonic geology ophiolites and HP metamorphic belts	xxchng@public.bta.net.cn



3	XU Zhiqin	Professor	Micro- and macrotectonics, geodynamics	xzq@ccsd.cn
4	REN Jishun	Professor	Geotectonics and global tectonics	renjishun@cags.ac.cn
5	YANG Wencai	Professor	Geophysics	yangwencai@ccsd.org.cn
6	HOU Zengqian	Professor	Regional metallogeny	houzengqian@126.com
7	LIU Dunyi	Professor	Isotope geochronology and isotope geochemistry	liudunyi@bjshrimp.cn
8	YANG Jingsui	Professor	Petrology	yangjingsui@yahoo.com.cn
9	GAO Rui	Professor	Deep geophysical probing, lithospheric structure, and geodynamics	gaorui@cags.ac.cn
10	YAO Jianxin	Professor	Conodont fauna and stratigraphy	yaojianxin@gmail.com
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6.2.2 Educational Activities and News

Eighteen graduate students were awarded diplomas at the 2011 graduation ceremony

Eighteen graduate students (half pursuing their Master's Degree and half Doctor's Degree) graduated from the Institute of Geology in July 2011. They were awarded diplomas at the graduation ceremony held by Chinese Academy of Geological Sciences.

It was decided by the CHENG Yuqi Award Committee that Dr. DONG Xin (her advisor: Researcher ZHANG Zeming) and Dr. WANG Yue (her advisor: Researcher ZHU Xiangkun) should be granted the CHENG Yuqi Award for their excellent dissertations; and Dr. PAN Jiawei (his advisor: Researcher XU Zhiqin) should be granted the CHENG Yuqi Award for his dedication in public service during his graduate study. Dr. LIU Yong, Dr. DING Weicui, Dr. WANG Fang, Dr. LI Shan, and HU Guyue were honored as "Triple-A Students"; and Dr. DONG Xin, Dr. LIU Yong, and ZHAO Zhili "Excellent Graduates".



Fig. 6.2.1 Group photo at the graduation ceremony.



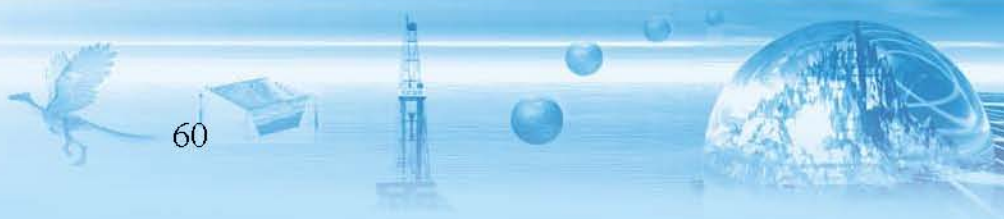
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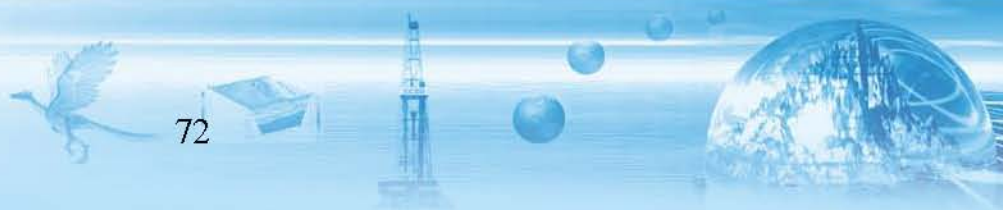
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