Department of Earth Science

Earth science is one of the fundamental sciences concerning the understanding of the Earth. Taking the earth system and its components as research objects, earth science explores the phenomena, processes and thereafter the mechanism, evolution and causality of these processes and their interactions, therefore, to promote the understanding of the Earth, and to help solve the major problems of resource supply, environmental protection and hazard mitigation for human habitation and sustainable development by providing scientific basis and technical support. The spirit to explore the mystery of the Earth, the increasing immense needs rooted from the utilization of resources for social economic development and the improvement of life qualities for environmental protection and natural hazard prevention have always been the driving force for the development of earth science.

At present, the development of earth science shows the following features:

1) Understanding the Earth in a systematic rationale: to study the earth science issues by multidisciplinary approaches with a broader vision and at a higher level, to enhance the contemporary characteristics of the intercrossing and pervasion of different disciplines and the improvement of social functions;

2) Taking basic earth processes at various temporal- and spatial-scales as key topics to establish a research pattern featured by extensively applying and developing high-technology and closely combining quantified observation and detection with experimental simulation and process study;

3) Better understanding the fundamental processes of various spheres of the earth system, their changes and interactions, as well as the effect of human activities to harmonize the relationship between human beings and the nature, and to develop earth system science;

4) Applying the knowledge about the primary earth-processes and their interactions to solve basic problems associated with resources, environment, ecology, disasters and earth information systems for a sustainable development of human society;

5) Computer modeling, trans-sphere tracers and information network covering the entire globe become the crucial tools for modern research.

In 2006, the Department received 4,376 proposals for General Program projects. Among them, 3,163 were for Free Application projects and 766 got funded, with a success rate of 24.22%; 1,047 proposals for Young Scientists Fund and 273 were funded, with a success rate of 26.07%; and 166 proposals for the Fund for Less Developed Regions and 25 were funded, with a success rate of 15.06%. For Key Program, 236 proposals were received and 42 were funded. Out of the 188 proposals for the National Science Fund for Distinguished Young Scholars (including applicants with foreign citizenships), 18 were funded. For the Joint Research Fund for Overseas Chinese Young Scholars and Joint Research Fund for Hong Kong and Macao Young Scholars, 32 proposals were received

and 7 were funded. There were also 9 applications for the Creative Research Groups and 3 were funded.

Among the General Program projects in 2006, universities and research institutes undertook 528 and 515, accounting for 49.62% and 48.40%, respectively. The principal investigators of 839 projects were under 45 years old, accounting for 78.85% of the total. Continuous funding was given to 346 projects, accounting for 32.52% of the total. There were 104 interdepartmental and interdisciplinary projects. The number of interdisciplinary projects supported by different divisions of the Department was even higher. As a continuing effort to encourage the exploration of highly innovative basic research studies, particularly non-consensus projects with innovative ideas, feasible, operative and protective measures have been taken, which might reinforce the intensity of support of approved projects and trigger to improve the general research quality of earth sciences in China. In 2006, 15 non-consensus projects funded were recommended by individual panel members. In the meantime, the Small Fund for Exploratory Studies with a term of 1 year was set up for highly exploratory, innovative and highly risky projects or projects with uncertainty. Altogether, 48 proposals were approved as the Small Fund projects in 2006.

The criteria for the selection of General Program projects in 2007 are as follows: 1) innovation and academic value of the overall research approach, 2) ability and potentiality of the applicants; 3) rationality, thoroughness and feasibility, and 4) the availability of necessary research basis and conditions. While encouraging the exploration of new scientific issues, attention will also be given to the weaker disciplines. Under the same condition, preferential support will be given to those applicants who have good accumulation of previous studies and accomplishments of high-quality obtained in their recently completed projects and who apply to continue their studies. Applicants are required to address the relation between the proposed research work and their accomplished projects. Because cutting edge science and interdisciplinary projects have become the fertile soil for innovative ideas and indigenous innovation, special care should be provided to those applications of interdisciplinary studies during the selection of projects. The trend of globalization of basic research is becoming more and more apparent. By acquiring and sharing research results and experience of international scientific community and using the research means, apparatus and information of developed countries, it would be most likely for our research to reach the international advanced level at the earliest possible time. Therefore, applications with international collaborative background, particularly those participating in the international science research plans, will be given a high focus. The Division will gradually introduce and create the honest style of study, and encourage excelsior research style in the project application through proposal evaluation.

One of the important targets of NSFC is to train and cultivate continuously and steadily a big contingent of distinguished young scientists. Support to the applications of young scientists, especially distinguished young scientists, will be highly addressed. The main

function of the Young Scientists Fund is "seedling raising", that is, to provide more opportunities to those young scholars who just start their research career so that they can grow up more quickly. As young scientists under 45 years old have become the main body for the implementation of General Program projects, the funding for Young Scientists Fund will focus on younger scientists.

Listed in the following table are numbers of projects granted and successful rates in the Department of Earth Sciences and individual scientific divisions in 2005 and 2006. In 2007, the funding for each project will be raised reasonably, while the successful rate will be remained.

Funding for Free Application Projects in Recent Years

Unit: 10,000 yuan

Scientific division		FY 2005			FY 2006		
		Projects granted	Funds	Rate (%)	Projects granted	Funds	Rate (%)
Division I	Geography (including soil science and remote sensing)	247+18*	8,340	19.53	317+6*	10,377	18.67
Division II	Geology	201+9*	7,339	28.11	235+18*	8,639	30.45
	Geochemistry	80+4*	2,828	27.10	99+6*	3,484	28.85
Division III	Geophysics and space physics	100+6*	3,602	28.80	116+6*	4,174	30.05
Division IV	Marine science	109+8*	3,796	26.77	135+6*	4,605	26.65
Division V	Atmospheric science	93+6*	3,196	22.76	114+6*	3,879	23.26
Total		830+51*	29,101	24.11	1016+48*	35,158	24.31
Average amount per project		33.03(34.13**)			33.04 (34.45**)		

Notes: * The number of projects of Small Fund for Exploratory Studies for 1 year.

** Average amount for individual projects with a term of 3 years (not including Small Fund for Exploratory Studies projects).

Division I of Earth Sciences

The funding areas of the Division include physical geography, human geography, pedology, remote sensing and GIS, and environmental geography.

Geography (including pedology, remote sensing and GIS) is a comprehensive discipline, aiming at the understanding of the developing processes, the spatial/temporal heterogeneity and especially the interaction of human and natural environment on the

earth's surface. In recent years, with the rapid development of the branches in geography, the research areas of traditional geography have become deeper and wider. In the recent two years, some progress in physical geography was made in the field of Land Use/Cover Change (LUCC) in typical regions, physical based distributed ecohydrological models on small watershed scale supported by GIS, the mathematical-mechanical modeling of the aeriform-liquid-solid triphase transfer in tunnels in cold regions, the proxies of environmental changes in Tibet Plateau and the evaluation model of debris flow hazards, and so on. In human geography, some progress has been made in the town system, the interior structure of city and spatial structure of regional economy, and so on. In soil science, some progress has been made in the mechanism and dynamic modeling of soil biological process, nutrient cycling and pollutant degradation, the forming process and environmental effect of soil minerals, such as Fe_2O_3, MnO_2, soil erosion by rainfall, transfer of nutrients such as N and P from soil to water, and the spatial-temporal distribution of soil quality and soil nutrients. In remote sensing and GIS, some progress has been made in precise identification with hyperspectral remote sensing data, improving search speed under remote sensing data with high spatial resolution, physical based remote sensing inverse model based on vegetation actual structure knowledge base, new method for error distribution of spatial data, and block adjustment with new geometric model, correlation of traditional azimuth parameter in high spatial resolution remote sensing data. In environmental geography, some progress has been obtained in the study of environmental-chemical behaviors and remediation of heavy-metal-contaminated soil, the speciation of metals in plant-soil-water system and the bioavailability within the rhizosphere, the effects of methane oxidation on soil carbon sequestration of forest soil and its microbiological mechanism, and the proxies and significant events of environmental evolution.

In 2006, the Division received 1,730 applications for General Program projects, among which 1,150 were for Free Application, 468 for Young Scientists Fund and 112 for the Fund for Less Developed Regions. A total funding of 103.5 million yuan was finally provided to 322 General Program projects. Among them, 197 were Free Application projects with a total funding of 70.40 million yuan, 109 Young Scientists Fund projects with 29.42 million yuan, and 16 for Fund for Less Developed Regions with 3.68 million yuan. As for the fields, 78 projects were supported in physical geography with a total funding of 27.48 million yuan, 29 in human geography with 8.32 million yuan, 63 in soil science with 21.34 million yuan, 76 in remote sensing and GIS with 21.58 million yuan, and 76 in environment geography and regional sustainable development with 24.78 million yuan. Besides the above-mentioned projects of General Program, the Division, according to the principle of encouraging innovation and the nomination of panel members, also funded 8 non-consensus projects with a total funding of 3.06 million yuan, and 6 projects for Small Fund for Exploratory Studies with 600 thousand yuan. In addition, 3 projects with 1.14 million yuan were funded in the field of health science.

For a certain period of time in the future, the Division will continue to support projects both in basic and applied researches in geography (including pedology, remote sensing

and GIS), aiming at the national requirements and regional specificity of China. Emphasis will be given to regional-scaled comprehensive projects with great innovation or new technologies/methods, and to researches on the mechanism of structural/functional change of the earth's surface system under the effects of human activities and on the ways for regional sustainable development. The funding for General Program projects may be increased according to their importance and application prospects.

Division II of Earth Science

The funding areas of the Division include geology, geochemistry and environmental geology.

Geology (including environmental geology)

Geology (including environmental geology) is the knowledge about the composition, structure and evolution of the solid Earth. The task of modern geology is not only to elucidate the materials that construct the Earth, the mechanism controlling the transition of matters and the history of geo-evolution recorded by these matters, but also to reveal the agents and processes which modify the surface of the Earth. Our knowledge of geology can also be useful for the human society to explore and utilize energy, water and mineral resources and to understand the relationship between geological processes and human community.

The introduction of plate tectonic theory has brought about revolutionary changes to our understanding of the Earth. Reasonable and comprehensive explanation to the seemingly isolated and puzzling geological processes and phenomena is successfully applied. The complexity of the continental dynamics is further raising new themes for the advancement of plate tectonic theory. The development of mantle plume theory in recent years has closely linked the deep activities and surface phenomena of the solid Earth.

The development of modern science and technology has improved our ability for data acquisition. The advancement of analytical precision for terrestrial materials has enhanced our ability to determine the composition and time for the Earth’s specimen. The utilization of seismological technology in chromatography imaging and the remote sensing technology and satellite observation of the Earth and neighboring space objects have deepened our understanding of the structure of the Earth. GIS and GPS technologies have improved the quality of geological mapping and monitoring of plate motion, earthquake and volcanic activities. Computer simulation has made possible the analysis and predication of important geological processes. Crust drilling techniques and high-temperature and high-pressure experimental technologies have also greatly promoted the development of geology.

Population expansion is exerting a great impact on the Earth. Mineral resources consumed by human beings every year is 3 times of the land sediments transported to the sea by rivers. The rate of ground water extraction exceeds that of supply. Human activity may cause species extinction. As a kind of new geological agent, human activities closely link the terrestrial environment and human habitat together.

In the past decade, profound changes have taken place in the research subjects, models and methods of geological science owing to the emerging new framework of earth system science, the strong demand to serve social and economical sustainable development and the rapid development of space science, information technology and analysis technology of substances. The role of geology has evolved from its traditional function of disclosing the records of the Earth's history to the prediction of the Earth's future environment. New interdisciplinary fields are emerging due to the close correlations between geological science and life science.

In 2006, 831 proposals for General Program projects were received and 253 were funded (including 18 projects of Small Fund for Exploratory Studies), and among them, projects for Free Application, Young Scientists Fund and Fund for Less developed Regions are 212 (with a success rate of 29%), 39 (29%) and 2, respectively. The average funding for each project is 377.2 thousand yuan. The distribution pattern of the funded projects among main research fields is that projects in mineralogy, petrology and ore deposit account for 20% of the total funds, projects in paleontology, stratigraphy and sedimentology for 19%, projects in structural geology and regional geology for 14%, projects in Quaternary geology and environmental geology for 16%, projects in hydrogeology and geo-engineering for about 19% and projects in petroleum geology and coal geology for 10%.

The predominant problems in the proposals in 2006 are that many failed to state the academic issues clearly, thus inducing the poor design of main objects and approaches of research. In some proposals, the description of research methods and technological outlines are very general and there is a lack of essential feasibility on key approaches. In certain proposals, the budget is stated not reasonable enough. A few proposals were attributed to unsuitable application code. The opinions of all the reviewers for each proposal have been forwarded to the applicants for their reference to prepare proposals for the next season.

Geochemistry

As the principal part of the theoretical framework and methodological system of geochemistry, the elemental and molecular tracing and isotopic tracing and dating are gradually developed to the level of maturation. Furthermore, the research fields of geochemistry have been shifted to the interaction among various spheres of the Earth from the single lithosphere in depth. With the gradually intensified disciplinary interaction between geochemistry and other disciplines, geochemistry is playing an increasingly important role in the earth system science.

To intensify the basic theoretical system of geochemistry and to establish the analytical and experimental techniques are key points for the development of geochemistry and the basis for the applicable researches. Researches on these geochemical subjects will be given further sustainable and consistent support by the Division. Aiming at the international scientific frontiers, researches of applicable geochemistry should be carried out deeply on the basis of natural conditions and characteristics of China.

Environmental and biological (organic) geochemistry has become one of the most active research fields in the world. Researches on the global change should give consideration to both "the record" and "the mechanism" of global change. Bio-geochemistry should focus on studying the dynamics of geochemical cycling and the bio-geochemical reaction mechanism of nutrient elements, trace gases and particulates, and special attention should be paid to the study of microorganism effect in the geological environment. In environmental geochemistry, stress should be given to the study of dynamic process and mechanism, the exposure level and health risk of poisonous pollutants, as well as the assessment system and the remediation mechanism of the highly contaminated environment. Chemical geodynamics has become one of the most competitive areas in earth system science. Petro-geochemistry should study key geological problems which attract close attention from international petrological researchers. Studies of modern earth sciences have raised more and more new demands to the short-life radioactive isotopic geochronological methods and other young geochronological methods. Nevertheless, many methodological problems are still worth to be further studied in the long-life radioactive isotopic geochronological method. Researches on ore deposit geochemistry should pay more attention to the comprehensive understanding of geodynamic background of metallogeny. Especially, basic researches on the theories and methods of geochemical exploration for prospecting the concealed mineralization, the hardly identified mineralization and the theories and methods of geochemical exploration in special sightseeing areas are extremely encouraged. Experimental and computing geochemistry is one of the main supported research fields due to the innovative research ideas and scientific frontiers. Researches on various new analytical technologies and new experimental methodologies, which could be directly applied to geochemical studies, are strongly supported. However, researches on the transplantation and introduction of methodologies and technologies of non geochemical interest will not be supported in this discipline.

In the next few years, the Division will provide key support to the following studies: 1) chemical structure and compositional unevenness of continental lithosphere, interaction of crust and mantle and associated material cycling, mechanism of continental formation and lithosphere evolution, continental collision and reworking process and their associated metallogenic effects and environmental impacts, 2) geochemical interaction and matter exchange between the solid earth system and earth surface systems, 3) formation and evolution of Monsoon in East Asia, the effect of geological processes on the cycling of carbon, nitrogen, phosphorous and sulfur, and the interaction between

human activities and environmental changes, 4) bio-geochemical processes and their effects on the surface environment of the Earth, earth environments that controlled the origin, evolution and biodiversity of important creature biota, and 5) fundamental studies on the metallogenesis and accumulation with potential application for the exploration of basic theoretical significance, and the studies on techniques for resource exploration.

In 2006, 105 out of 364 proposals in this field were funded, with a success rate of 28.8%. They include 6 projects of Small Fund for Exploratory Study, 73 projects under the General Program with a funding rate of 27.3%, 24 projects under the Young Scientists Fund with a supporting ratio of 28.2%, and 2 projects under the Fund for Less Developed Regions with a funding rate of 16.7%. The number of proposals has been relatively high and the funding rate relatively stable in recent years for a number of subdisciplines, including environmental geochemistry and biogeochemistry (158 proposals and 20% were supported), geochemistry of mineral deposits and petroleum and natural gas (50 proposals and 20% supported), isotope geochemistry (42 proposals and 48% supported), and petro-geochemistry (37 proposals and 54% supported). The number of proposals in isotope geochronology is not big, but their quality is pretty high. Proposals in isotopic geochronology are low in number but high in quality. Many proposals in geochemical new technologies and methodologies are out of the funding scope of geochemistry.

There are some major shortcomings existed in those failed proposals. 1) Some proposals have only emphasized the importance of the research subjects, but have not elucidated the innovation of research ideas and the research values of proposals according to the research subjects; 2) Some proposals have set long-term targets instead of short-term targets which are achievable for the proposals; 3) Some proposals have selected good research objects or subjects, but have not extracted innovative scientific questions to be solved; 4) Some proposals fail to provide detailed research plans, or the research plans are not in accordance with the proposed targets; 5) Some proposals are interested only in the application of new techniques and methods, but do not have clear expression of scientific questions to be solved; 6) Some proposals try to pursue the full span of research methods and experimental techniques, but forget to provide specific effective methods for solving these problems; 7) There is a lack of demonstration for the feasibility of core and crucial techniques in some proposals.

Division III of Earth Science

The Division supports research in the following major fields: solid geophysics, space physics and geodesy.

Owing to the wide application of GPS, INSAR and satellite gravity in the field of earth sciences, significant breakthroughs have been made in the research of geodesy. The precision of observation in geodesic survey and the space observation resolution have been increased by 2 to 3 orders of magnitude in comparison with that in traditional

geodesic survey. Thanks to the application of deep seismic reflection technology, information and new discoveries of earth sciences in the fine structure of crust and the top of up-mantle have been acquired from the reflection profile, which has enriched the theory of this technology and the experience in its application. With the establishment of nonlinear seismic inversion theory and its application, the observation resolution has been highly improved and the features of very complicated tectonics have been brought to light accordingly. Long time accumulation of earthquake data and the improvement of research methods together with non-seismic methods have made it possible to study the deep structure and status of the Earth. Applied geophysics has made great contributions to the development of the national economy. Space physics has been developing rapidly over the years and a great deal of research achievements have been obtained in the transmission and coupling of energy in all layers and spheres of the space. The general theoretical framework in the disturbance of solar terrestrial system has been basically taken shape, which has laid a solid foundation for the rapid development of space weather research and the provision of space weather service.

In 2006, 406 proposals for General Program were received by the Division, with a total budget of 505.0435 million yuan demanded, including 323 for Free Application (an increase of 12.94% compared with that in the previous year), 79 for Young Scientists Fund (an increase of 3%), 4 for the Fund for Less Developed Regions. More applications are submitted in the fields of exploration geophysics (D0409), geodesy (D0401), seismology (D0402), space physics (D0410), geodynamics (D0408) and deep earth geophysics (D0407), and few proposals in geophysical instrumentation, gravity, space environment, geomagnetism, electromagnetism and geothermal; 24.6% of the total proposals in 2006 belong to interdisciplinary, which contained research contents supported by other disciplines like geology, oceanography, information sciences, etc. Among the applicants in 2006, 74.88% have Ph.D. degrees.

In the past few years, the Division has given emphasis and preferential funding to proposals having creativity, and good results have been obtained. For a certain period of time in the future, creativity will be given the highest priority and fostering outstanding young scientists will have an important position. While strengthening basic theoretical research, priority will be given to in-depth studies, new research areas and creative and exploratory research projects, especially the potential breakthroughs of these areas, which have been long-term focus and difficult issues. Research will also be encouraged in space weather, satellite gravity, environmental geophysics, physics and dynamics of the Earth's interior, interdisciplinary studies between geophysics and planetary physics, experimental geophysics and seismological wave propagation theory. Attention will also be given to research on scientific issues in geophysics and space physics by applying new technologies and methodologies, and proposals for the utilization of observation data to understand the Earth will be encouraged.

It is impossible to predict scientific discovery, and therefore every proposal with new idea is sincerely welcome.

Division IV of Earth Science

The main funding areas of the Division cover marine science and polar science.

Marine Science

Marine science is a discipline concerning all kinds of natural phenomena, processes of the ocean and their changing rules. The research objects include not only the colossal sea water but also the estuarine coastal areas, the interface between ocean and the atmosphere, the interface between sea water and sediments, and the lithosphere of the seafloor. As the foundation for marine science development, mathematics, mechanics, physics, chemistry and biology have interpenetrated and intercrossed with marine science. New and high technologies, such as space technology, information technology, biotechnology and deep-diving technology, have been continuously applied to marine science. New frontier disciplinary areas formed in this way have also been funding areas of marine science. Research in these areas will be the promoting force of marine science development.

The marine environment is an integral system in which various affecting factors exist simultaneously and interact with each other; therefore, it is necessary to carry out integrated research to solve marine science problems. The interconnection between various disciplines and integrated research are currently the development trends of marine science. While strengthening regionalization research, marine science has also simultaneously developed globalization and internationalization research. A series of influential international research plans on marine science have been formed in combination with hot and pressing issues such as climate change, resources, environment, etc. Therefore, extensive international cooperation is coming forth, impelling the fast and in-depth development of marine science. In addition, the ability to acquire data and information through field observation has greatly promoted the continuous progress of marine exploration technology, indoor analysis technology and marine information process technology. This has become a key impetus for the development of marine science today.

It has been suggested that for the development of marine science in China, importance should be attached to the interconnection of various disciplines and that special attention be given to the interpenetration and integration among them. Research fields and directions which should be emphatically supported recently are as follows: ocean circumfluence and climate change, offshore circumfluence and its dynamic mechanism, the paleo-global change of the ocean and the comparison between land and sea, marine energy sources and fundamental geological research of mineral wealth, marine biogeochemical cycle, the coupling of marine ecosystem and biogeochemical processes, material flux and cycle between upper ocean and low atmosphere, land-sea interaction and estuary coastal zones, the oceanography and ecology of harmful red tide, the

biosphere of deep ocean and the life processes in the extreme deep-ocean environment, fundamental research of marine acoustics and optics, etc.

In 2006, 529 proposals for General Program projects on marine science were received by the Division. Among them, 368 were in the fields of physical oceanography, marine geology and geophysics, marine environmental science and marine biology, which account for 70% of the total, and 141 were supported, with a funding rate of 25.5% (excluding 6 for Small Fund for Exploratory Studies). The funding rate for Free Application projects is 24.5% (excluding 6 for Small Fund for Exploratory Studies) and the average funding is 369,000 yuan per project, and that for Young Scientists Fund is 28%, and the average funding is 270,000 yuan per project. There are still more proposals funded in the above-mentioned four sub-disciplines than in other fields, consistent with that in the past few years. The number of proposals approved has changed little in the fields of marine chemistry, estuarine and coastal research, marine monitoring and investigation, and marine remote sensing. However, applications in marine physics (including acoustics, optics and electromagnetics) and marine engineering are not enough and with low level of funding. But actually, they are two important funding directions in marine science.

The overall quality of applications in 2006 has improved evidently compared with that in the past, particularly in the selection of research orientation, project design and the completion of application forms. Although some proposals, especially those for Young Scientists Fund, do give a clear statement of the importance of the subject and national demand, they still fail to point out whether what they proposed has been solved or not, what is still waiting to be studied, what the key points are, what the applicants are going to deal with, and how they are going to resolve these concrete issues. That is to say, there is a lack of explicit scientific issues.

Polar Science

Polar science is a discipline studying various special natural phenomena, including processes and changing rules in the polar regions as well as the interactions between polar regions and other regions of the Earth. It is a comprehensive discipline composed of several sub-disciplines including polar biology and ecology, polar oceanography, polar space physics, polar atmosphere science and climatology, polar geology, geophysics and geochemistry, Antarctic astrolithology, polar glaciology, polar mapping and remote sensing science, polar management and information science, polar observation and engineering technology, etc.

In the past few years, great progress has been made in international polar research. However, it is still the weakest sub-field in earth sciences. Aiming at the current key scientific issues on global change and sustainable development, the breaking boundaries of traditional disciplines, integrated research on the features and interaction of the five spheres in polar region as well as their connection with every sphere in the middle or low

latitude in a larger time-space scale have become the development trends in polar science nowadays.

For polar science in China, research integrated with the existing work and in close association with key scientific issues such as global change and sustainable development has been suggested. Research fields and directions to be emphatically supported are as follows: the processes and variation of the Southern Ocean, mechanisms of the Arctic Ocean and sea ice rapid-change as well as their climatic effect, geochemical processes in polar regions and biogeochemical cycle of carbon, climate and environmental changes of the Antarctic ice sheet, the response of environmental evolution on global change in the ice-free polar regions, the process of polar atmosphere and its relation with global change, polar environment and biodiversity, polar microbe germ palms and gene resources, polar marine biological resources changes, dayside magnetosphere boundary layer and its dynamic processes, Antarctic aeroliths and astro-dusk research, modern plate movements in Antarctic and sea level model of Antarctic Ocean, land measurement in polar, mountain-building during the Pan-African period, and the formation process of Gondwanaland in the East Antarctica.

In 2006, 30 proposals for General Program projects on polar science were received by the Division, involving those for polar biology and ecology, polar oceanography, etc. Ten were funded, including 6 for Free Application projects and 4 for Young Scientists Fund. The average funding rate is 33.3%.

The application code for polar science is D06. In the proposal sheet, applicants need to fill in the relevant area in “Annotations”. Research areas are polar biology and ecology, polar oceanography, polar space physics, polar atmosphere science and climatology, polar geology, geophysics and geochemistry, Antarctic astrolithology, polar glaciology, polar mapping and remote sensing science, polar management and information science, polar observation and engineering technology, etc.

Division V of Earth Science

Research areas supported by the Division include meteorology, atmospheric physics, atmospheric environment and atmospheric chemistry.

Atmospheric science studies various phenomena and their changing regulations occurring in the atmosphere so as to serve the mankind.

In recent years, with the introduction of earth system science and sphere interaction concepts, atmospheric science enters into a new historical phase of development. The atmosphere is one of the most active spheres in the earth system. Its changes are affected and controlled by other spheres in the system and celestial bodies such as the sun, while the response of the atmosphere to the changes will result in simultaneously important and

direct impact on the ocean, terrestrial surface, ice and snow and the ecosystem on the Earth. The atmosphere plays an important role in the interaction among different spheres of the earth system, and the interaction of the atmosphere with other spheres regulates the whole behavior of the earth system. Therefore, recently atmospheric science focuses on the study of dynamical-physical-chemical process within the atmosphere, at the same time pays more attention on research to find out the essence of the atmosphere change with the comprehensive studies on the interaction of hydrosphere, lithosphere, cryosphere, biosphere and human activity to global climate; the regulation of climate system and theories and methods of climate change prediction; regulating techniques and measures against local weather; the impact of human activities to weather, climate and environment system; and the influence of weather, climate and environment system change on human society. Atmospheric science deepens the study on its various sub-directions, as well as on the interaction of each different spheres, the comprehensive, integrated and systematical study of various processes, the model development, the combination of different methods such as observation, analysis, theory, simulation and prediction, the issues of global climate and environment change and its impacts, prediction and adaptation, and the optimization of human life-supporting environment and human orderly activities, so as to provide a scientific basis for the crosscutting research of multi-subjects on the sustainable development of human impact and social development.

In 2006, there were 516 applications for General Program, which is an increase of 18.62% than that in 2005. including 376 for Free Application projects (an increase of 18.61%), 121 for Young Scientists Fund (an increase of 22.22%) and 19 for Fund for Less Developed Regions (same as that in 2005).

In 2006, 119 projects were funded by the Division (the success rate is 23.06%), including 76 for Free Application, with the success rate of 20.21% and an average intensity of 367.1 thousand yuan per project. In addition, there were six projects for Small Fund for Exploratory Studies and the average funding is 100 thousand yuan per project, 34 projects for Young Scientists Fund (the success rate is 28.10% and the average intensity is 270 thousand yuan per project) and 3 for Fund for Less Developed Regions (the success rate is 15.79% and the average intensity is 280 thousand yuan per project).

In the Eleventh Five-Year Plan period, the Division will continually encourage the study of various investigative and creative issues, and the study of various unknown phenomena and issues occurred in the atmosphere by using latest research results and methods from the basic disciplines such as mathematics, physics, chemistry and biology as well as advanced equipment and technologies. The Division encourages 1) applications related to atmospheric chemistry, atmospheric environment, atmospheric remote sensing and stratospheric processes research, 2) applications related to large-scaled scientific experiments currently conducted in China and key projects already funded in the priority research areas, and 3) applications of atmospheric processes (including land surface) study using satellite remote sensing data.