Graduate Handbook

(International Students)

School of Earth Sciences

July, 2017

Contents

Chapter Ⅰ: Introduction ▶▶▶▶▶

The School of Earth Sciences is one of the oldest department (school) in the field of geology across all China universities. Its root can be traced back from the Department of Geography and History that was founded in 1936 by Zhu Kezhen, a famous Chinese meteorologist and former president of Zhejiang University. Many renowned scientists have graduated and worked in the School of Earth Sciences, including more than ten academicians of Chinese Academy of Science such as Duzheng YE, Yafeng SHI, Shupeng CHEN, Jiyu CHEN, Zhiyan ZHOU, Zhongli DING, and Ping'an PENG.

The School of Earth Sciences has four departments: Geology, Earth Information Science and Technology, Geographical Science and Atmospheric Sciences. Seven research institutions are affiliated with the School of Earth Sciences: Geology and Geophysics, Space Information and Technique, Environment & Biogeochemistry, District&Urban Development, Climate&Weather Information and Forecast, and Geographic Information Science and Oceanography. The school also has one Research Centre for Structures in Oil and Gas Bearing Basins(Ministry of Education), and a Key Laboratory of Resource and Environment of Zhejiang Province. Currently, the School has 102 faculty members including 2 academicians, 36 professors(or research fellows) and 34 associate professors(or associate research fellows).

The School of Earth Sciences has the following research fields:

Atmospheric Sciences

Atmospheric sciences focus on the research of atmospheric physics, dynamics, and chemistry. The history of atmospheric sciences in Zhejiang University can be traced back to the year of 1936 when the famous Chinese meteorologist Kezhen ZHU initiated the major of meteorology.

Department of Atmospheric Sciences (DAS) currently has thirteen faculty members, including six professors, five associate professors, one assistant professor, and one technician. Main research areas include synoptic meteorology, regional and global climate change, cloud physics, Earth system modeling, climate engineering, atmospheric radiation, and atmospheric chemistry and pollution. Faculty members in DAS participated in the writing of Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report, was awarded the international radiation award for your scientist, and world meteorological organization (WMO) MUMM award.

Geology

- **Structural Geology**

Structural Geology is an important branch of the Geology, which focuses on the formation mechanism, temporal & spatial distribution and evolution of the geological bodies in Earth's lithosphere. Tectonic events and its

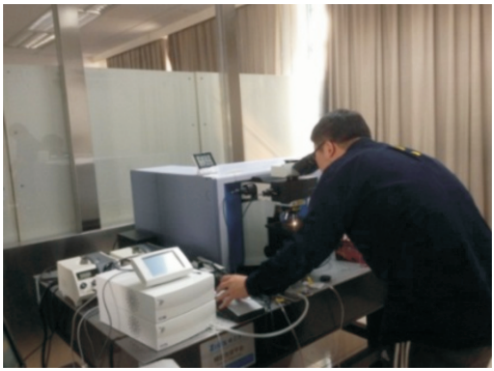
movements are the main factors that usually initiate or trigger other geological process. Therefore, theories of Structural Geology constitute the foundation of the knowledge of Geology. The geological structure firstly refers to the understanding of structural elements, namely the shape and deformation of the folds and faults, then, the researching on the zones of the structural homogeneous domain. Combined with the characteristics of the rock association, the evolution history and the deformation period & stage are explained accordingly.

- **Mineralogy, Petrology, Mineral Deposit Geology**

Petrology and mineralogy is one of the most important pillars of modern earth science, focusing on the study of rock and mineral composition and genesis, evolutionary mechanism and regional dynamics. In the subject's view, the Earth's material system is treated as a whole, combination of macro and micro, basic theory and application. Based on the continental lithosphere theory, the tectono-fluid-diagenesis-mineralization as the main line, systematically studies the regional metallogenic regularity and provides a good research basis for other related fields of earth science.

- **Geochemistry**

Geochemistry is the discipline that uses the tools and principles of chemistry to explain the mechanisms behind major geological systems, which is related to the combination of geology and chemistry, and physics, focusing on the chemical composition of the earth and chemical evolution. The main research is to explore the composition of elements and their isotopes in the Earth or geological bodies. In addition, including quantitatively determine the elements and their isotopes in the various parts of the earth, and the distribution in



geological bodies. Studying the chemical action of the surface of the earth and the interior, or some celestial bodies. The purpose is to reveal the migration, enrichment and dispersion of elements and their isotopes, and the evolution of the chemical elements in the various parts of the earth, and the change on the law of time and spatial.

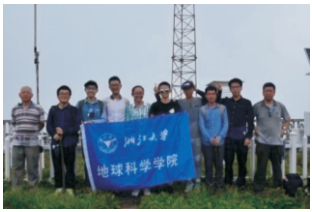
- **Quaternary Geology**

A science that studies the various geological events and their causes of the Earth's surface during the Quaternary period. It studies the evolution of the environment during the Quaternary period including crustal movement, climate change, sedimentary environment, stratigraphic division and contrast, biological succession and so on. And geology, geomorphology, climatology, paleogeography, paleontology, ancient anthropology, archeology and other disciplines are closely linked with it. It aims to rebuild the geological evolution history during the Quaternary period, studying the evolution laws, to predict the change in the future time.

- **Resources, Environment and Regional Planning**

Resources, environment and regional planning is a discipline that studies the spatial differences of human activities and the relationship between human beings and the geographical environment. Taking the traditional theory of geography as the backing, this discipline uses the emerging geographic information technology to set the rules of spatial geographic behaviors of the human society as the object of study.

This discipline is one of the key developing subjects. Based on the advantages of urban scientific research, it conducts the professional education which related to the comprehensive utilization and planning of urban environmental resources, the planning management of urban construction, monitoring and control of urban environment, etc. Through overall training of students' comprehensive ability, the students will not only be strongly professional, technical and with great skill, but also have the characteristics of high quality, high ability and inter-disciplinary. There is no doubt that they will meet the needs of social development and be greatly welcomed by the community.



➢ **Resource Exploration and Geophysics**

Geophysics is a subject of natural science concerned with the physical processes and physical properties of the Earth and its surrounding space environment, and the use of quantitative methods for their analysis. The term geophysics sometimes refers only to the geological applications: Earth's shape, its gravitational and magnetic fields, its internal structure and composition, its dynamics and their surface expression in plate tectonics, the generation of magmas and rock formation.

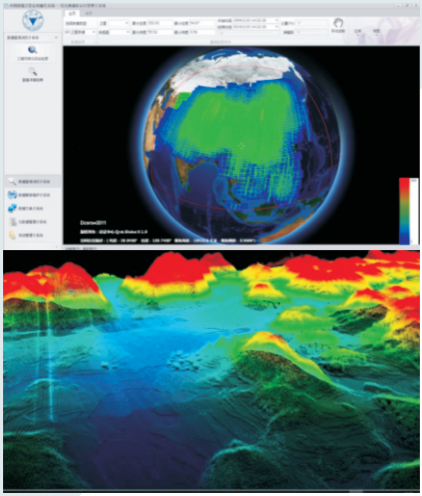
Geophysics is applied to societal needs, such as mineral resources, mitigation of natural hazards and environmental protection. Geophysical survey data are used to analyze potential petroleum reservoirs and mineral deposits, locate groundwater, find

archaeological relics, determine the thickness of glaciers and soils, and assess sites for environmental remediation. The department is looking for the students with sound background of mathematics and physics. The ability of using common software and programming is also required. Applications in great interest of complex natural phenomenon as well as consciousness of innovation are better.

The research of the department focuses on the following areas: solid geophysics, applied geophysics, resources exploration and exploitation, geologic and environmental exploration. Many professors in the department are the member of committees on geophysics or the head of the Journal with high impact factors (details in their homepages). Geophysics research projects offer fieldwork or internship opportunities for collecting geophysical data supported by the country (including NFSC, 863 Program, 973 Program, etc.), industry and local government.

- **Remote Sensing and Geographic Information System**

Remote sensing and geographic information system is one of the most important high-tech field in our country. The 3S technology is highly valued over the world, as the core of "Digital Earth" strategy.



There are two institutions in the department. Institution of Spatial Information Technology and Institution of Geographic information science manage a key laboratory on resources and environment information system of Zhejiang Province, collaborating with 5 famous academicians in this field as

part-time professor. Compared with other similar majors, this specialty pays special attention to the skill of programming and GIS technologies. The department is devoted to enhance the students' capability and creativity. At the same time, the department provides a number of academic scholarships for students with better performance as an encouragement.

The average annual rate of graduates employment reaches 100%. Most of them are offered by famous IT-companies with high salaries such as Alibaba, NetEase etc., or well-known universities, advanced research institutions or go abroad for further study.

Marine Geology

It is the study of the history and structure of the ocean floor. It involves geophysical, geochemical, sedimentological and paleontological investigations of the ocean floor and coastal zone which has strong ties to geophysics and to physical oceanography.

Marine geological studies were of extreme importance in providing the critical evidence for sea floor spreading and plate tectonics in the years following World War II. The deep ocean floor is the last essentially unexplored frontier and detailed mapping in support of both military (submarine) objectives and economic (petroleum and metal mining) objectives drives the research.

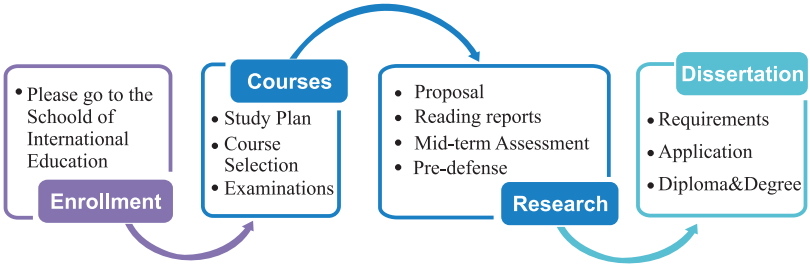
Chapter Ⅱ: Admission ►►►►►

Research Programmes

Programmes	NO.	Master	Ph.D.
Historical Geography (Archaeology)		√	
Atmospheric Science	070600	√	
Mineralogy、Petrology、Mineral Deposit Geology	070901	√	√
Geochemistry	070902	√	√
Structural Geology	070904	√	√
Quaternary Geology	070905	√	√
Resources, Environment and Regional Planning	0709Z4	√	√
Resource Exploration and Geophysics	0709Z5	√	√
Remote Sensing and Geographic Information System	0709Z6	√	√
Marine Geology	070704	√	

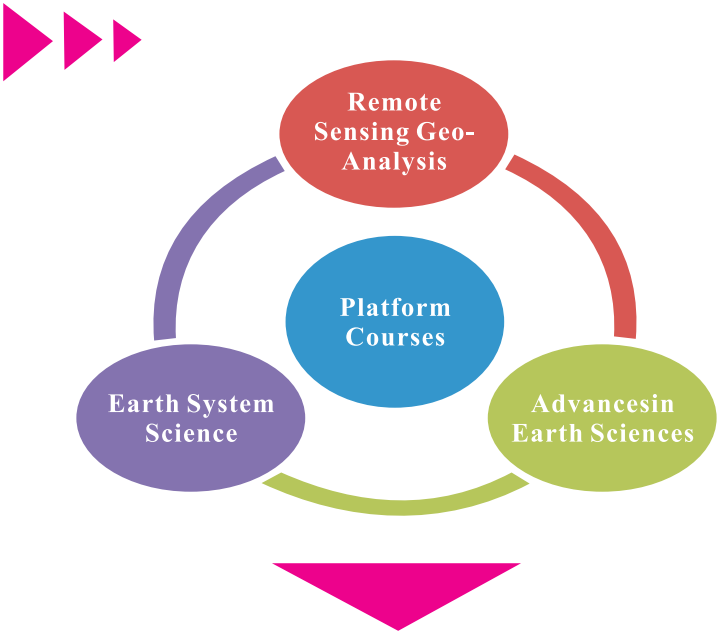
More information about supervisors, please see:
http://gs.zju.edu.cn/english/redir.php?catalog_id=11932
More details about application requirements、procedure、deadline、tuition and scholarship etc., please see:
http://iczu.zju.edu.cn/english/

Chapter Ⅲ : Degree ▶▶▶▶▶



Courses

Three feature courses are shown below and are compulsory. Core courses for different specializations are listed in following tables. IF you are NOT sure which courses to choose, please contact your mentor, if you have technical problems, please contact the secretary of graduate office in our school.



➢ **Atmospheric Science**

Number	Courses	Credits	Semester
3821062	Advanced Atmospheric Dynamics (I)	2	Spring
3821060	Advanced Synoptic Meteorology (I)	2	Autumn
3822761	Climate Physics	2	Autumn
3821766	Atmospheric Radiation and Remote Sensing	2	Summer
3801762	Cloud Precipitation System Simulation	2	Spring
3821061	Advanced Synoptic Meteorology (II)	2	Winter
3821063	Advanced Atmospheric Dynamics (II)	2	Summer

➢ Geology

Number	Courses	Credits	Semester
Mineralogy, Petrology, Mineral Deposit Geology			
3821016	Genetic Mineralogy	3	Autumn
3801767	Rock Geochemistry	2	Spring
3811020	Advances in Mineralogy and Petrology(Ph.D.)	3	Summer
Geochemistry			
3821008	Advanced Geochemistry	2	Autumn
3811007	Organic Geochemical Experiment Technology(Ph.D.)	2	Spring
Tectonics			
3823066	Tectonic Geomorphology	2	Summer
3821085	Geotectonics	2	Summer
3821086	Basin Analysis	2	Winter
3811032	Geodynamics(Ph.D.)	2	Spring
Quaternary Geology			
3821005	Quaternary Chronology	2	Spring
3821010	Quaternary Geology and Environment	2	Spring
3811011	Progress in Quaternary Geological Frontier	2	Spring
Resource Environment and Regional Planning			
3821070	Tourism Planning and Innovative Design	2	Spring
3821029	Real Estate Market Analysis and Valuation	2	Autumn
3821072	Urban Construction Economy	2	Autumn
3811073	Geography Research Methods	2	Summer

Number	Courses	Credits	Semester
3821071	Urbanization and Administrative Division Reform	2	Spring
3821075	Historical Geography and Environmental Change	2	Winter
3821076	Advances in Human Geography Research	2	Spring
3821082	Geographical Ideas and Methods	2	Spring
3811069	Frontiers of Human Geography(Ph.D.)	2	Summer
Resource Exploration and Geophysics			
3821092	Solid Geophysics	2	Summer
3821091	Computational Geophysics	2	Winter
3821039	Electromagnetic Wave Theory	2	Autumn
3821041	Applied Geophysics	2	Winter
3821033	Elastic Wave Theory	2	Autumn
3811032	Geodynamics(Ph.D.)	2	Spring
3811003	Frontiers of Geophysics(Ph.D.)	2	Autumn
Remote Sensing and Geographic Information System			
3821002	Remote Sensing Spectrum	2	Autumn
3821045	Theories and Methods of Geographic Information Science	2	Winter
3821067	Remote Sensing Quantitative Theory	2	Spring
3811048	Frontiers of Geographic Information Science and Technology(Ph.D.)	2	Autumn
3811068	Frontier of Remote Sensing Technology(Ph.D.)	2	Winter

Personal Study Plan

Please choose courses based on personal specialization (namely your research direction) to meet the requirements mentioned below for finishing courses part of graduation or being a basis for altering from master to Ph.D.

	Master	Ph.D.	
		3 years	5 years
Minimum course credits	24	12	30
Public Degree Course	5	4	7
Public Quality Course	1	0	1
Professional Degree Course *	⩾6	⩾2	⩾8
Professional Elective Course *	⩾4	⩾2	⩾6

*Professional Degree Course, Professional Elective Course requirements please see corresponding training program requirements.

Selecting Courses Online & Timeline

According to personal study plan, please choose courses online in time.

Steps	Opening Hours	Optional course
Initial	from mid-summer/winter holidays to zero week	Select(withdrew) courses in autumn and winter (or spring and summer)
By-election or withdrew	from the first week to the second week in autumn (spring) term	Select(withdrew) courses in autumn and winter (or spring and summer)
Winter and summer term By-election or withdrew	from the ninth week in autumn (spring) term to the second week in winter (summer) term.	By-election(withdrew) courses in winter(summer) term !Courses in autumn(spring) term or continuing courses in autumn and winter (spring and summer)term cannot been selected(withdraw)!

Examination

Examinations could be open/close-book, or be replaced by presentations, reading reports, papers etc. Who failed in degree courses must retake it until pass the test. Non-degree courses could be re-take or choose other courses.

Research

Proposal

Type	Requirements
Master	Master-Degree Proposal should be filled in the prescribed form and be made an argument about the meaning of the paper, the main research content and the research plan. After approval of the tutor, you are supposed to start your thesis. The master's degree proposal should be completed at the end of the first year of school.
Ph.D.	Doctor-Degree Proposal is supposed to be submitted at the early stage, within one year after admission for 3-year doctorate and two years for 5-year doctorate candidate. A panel of tutors will assess the thesis proposal, then the thesis proposal will be submitted to postgraduate student managing information system and to the department on paper.

Reading Reports

Type	Requirements
Master	4 reading reports. Amongst, 1 is made publicly at Institution/ Faculty's forum, or an oral report in an international/national conference at least..
3-year Ph.D.	6 reading reports. Amongst, 1 is made publicly at Institution/ Faculty's forum, or an oral report in an international/national conference at least..
5-year Ph.D.	10 reading reports. Amongst, 2 is made publicly at Institution/ Faculty's forum, or 2 oral reports in the international/national conference at least..

2 credits are granted for master and 3-year Ph.D. students, 4 credits are granted for 5-year students, if passing the reading reports. Attention: the number of reading reports for the specializations of Geochemistry, Resource Exploration and Geophysics are different, please see training scheme or ask mentors.

Mid-term Assessment

Type	Requirements
Master	Mid-term assessment is supervised by a panel of tutors who check your progress about dissertation and give comments on it.
Ph.D.	Mid-term assessment primarily assesses the thesis progress, achievements, problems, approaches, the next work plan and expected completion time. 3-year Ph.D. is expected to write Mid-term Report of Postgraduate Dissertation at the end of the second semester (the fourth semester for 5-year Ph.D.). Mid-term assessment will be held after tutor's approval and the result will be voted by a committee, which will be related to scholarship.

Pre-defense

Type	Requirements
Master	Pre-defense is required before submitting academic dissertation to ensure your final defense goes smoothly. It requires at least 3 associate professors to form a panel to comment on the dissertation and sign it. The recording should be submitted to the graduate office of faculty.
Ph.D.	Doctor student is supposed to apply for the thesis proposal in advance and fill in application form. Thesis proposal should be held publicly and requires a panel of tutors to assess the dissertation, then the process will be submitted to the department on paper. The panel will comment on the content, format, innovation and deficiencies. After passing the thesis proposal, student is expected to submit the application form to postgraduate student managing information system and submit it to the department on paper.

Dissertation

Requirements

- Basic Requirements of the Master Degree Thesis

✓ Standard

The master's degree thesis should systematically introduce research results with the reliable data, rigorous reasoning and reasonable conclusion. The master's degree thesis shall conform to the format requirements (see " Writing Rules for Postgraduate Thesis of Zhejiang University "). The master's degree thesis should include cover, Chinese abstract, English abstract, catalog, symbol description, main body, reference document, appendix, acknowledgment and so on.

✓ High Quality

The master's degree thesis of School of Earth Science should obtain definite and valuable results, among which academic degree requirements are required:

①The thesis should be done independently under the guidance of the tutor. The time of working on dissertation should more than one year.②The thesis should have a strong theoretical or practical value and the results of this thesis are innovative and practical.③ The paper should show that the author has widely read the relevant literature, and the literature review should have a clear description and analysis of the domestic and international situation of the research subject. ④ The thesis should be integrated with basic theory, expertise, experiment and numerical simulation, so it can analyze and study the subject of scientific research and more complex engineering problems. The method should be scientific, the result be credible, and certain technical difficulty or theoretical depth should be contained. ⑤It is required that the thesis writing should have clear concept, reasonable structure, distinct levels, smooth writing and standard layout.

- Basic Requirements of The Doctoral Degree Thesis

The doctoral thesis should reflect the innovative research achievements obtained in the doctoral program. Also, that the doctoral student has mastered the foundation theories which are

solid and broad, along with the specialized knowledge which are systematic and deep. Finally, the student has the ability to independently engage in scientific research.

✓ Topic and Review Requirements

Practical value, profound academic research connotation, inosculation with national development and a close relationship to the major, complex or frontier issues which center on the geosciences related disciplines are required when choosing a topic. The subject should be advanced, so that it is possible for doctoral students to put forward new ideas in the thesis, to create something through research, and to promote the discipline orientation or technology. The topic should be feasible, so that the concept proposed in this thesis can be realized under the existing basic and technical conditions in the expected research period. The innovation, unique thinking and pioneering spirit should be emphasized in the topic while the subject must be in the forefront of this discipline.

The literature review's requests are following: comprehensive collection around the topic, careful screening, reading and summarizing, elaboration of the status and development about domestic and foreign research, objective and critical instead of nitpicking assessment of the relevant views and achievements. Through comprehensive understanding of the current status, deep grasp of the frontier trends and accurate extraction of the issue, a reasonable research plan should be formulated and innovative achievements could be expected. The content must be consistent to the original literature, while piling up articles, selecting literature at will and abandoning conflicts in research must be avoided when writing the literature review.

✓ Standard

The doctoral degree thesis should systematically and fully introduce research results, with distinctive views, reliable data, rigorous reasoning and correct conclusion. Doctoral students should be guided by tutor according to subject requirements and research topics. After systematic training, the following links should be completed:

①Literature review and topic selection report: According the

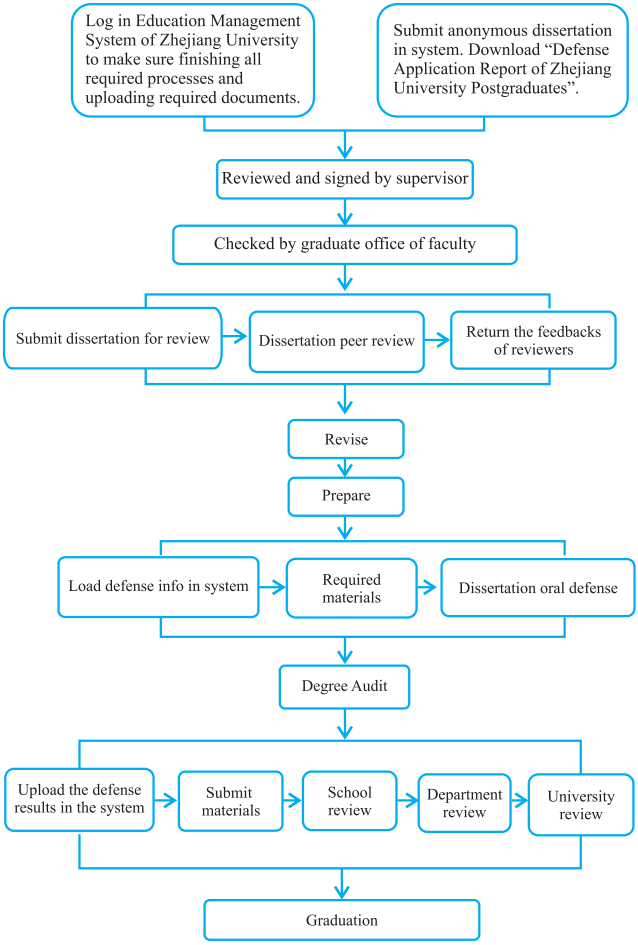
research purpose, technical route and method, main research contents, characteristics and difficulties, expected achievements and possible innovative points of the dissertation, submit the topic selection report and report it. ② Qualification reexamination: Carried out after the curriculum and the topic selection report, especially for the PhD students who doesn't get a master degree before and go ahead for doctoral degree in advance.③Thesis work: The results of the thesis should reflect the independent scientific research ability of the doctoral students, and the results obtained should be innovative and frontier in the field of research. Meanwhile, the thesis should pay attention to standardization in terminology of symbols, data expression and citation.④Published academic papers: a published high-level academic paper which is closely related to the research of the dissertations should be submitted when applying for a degree.

The doctoral degree thesis shall conform to the format requirements prescribed by the nation and the degree conferring institution. Refer to "Writing Rules for Postgraduate Thesis of Zhejiang University". The content, format, English abstract, catalogue, table of content, linguistic description, graphs and index in the doctoral thesis should strictly conform the standard. In the thesis, clear concept, reasonable structure, well arranged levels, unity and coherence and standard format are required. The doctoral degree thesis should include cover, Chinese abstract, English abstract, catalogue, symbol description, main body, reference document, appendix, acknowledgement and so on.

✓ Innovation of Result Requirements

The doctoral students should have their own view in their thesis. And innovations are required in one of the aspects of the research contents, methods and results.

Application for Dissertation Defense

Requirements	Courses √ Research Procedure √ Paper √ Dissertation √ Supervisor Approval √	
Deadline	10th January (Spring)	10th April (Summer)
	10th July (Autumn)	10th October (Winter)
Procedure		

Conditional Defense (Only for Paper Issue)

During the period of studying for degree, those whose scientific research results can not be published in time but the dissertation can reach the requirements for postgraduate students can apply for the special defense. Fill in the “Special Application Form of Dissertation Defense for Zhejiang University Postgraduates” signed by tutor and the director of academic degree committee. If the dissertation defense is passed, the student would apply for the dipolma but not for a academic degree. Notes: The student can apply for the academic degree if the research results that meet the requirements are published within three years after graduation. The university refuse to accept the application for academic degrees if the student didn't meet the requirement of research results in three years or give up applying for the academic degree.

Defense in Advance (Requirements)

Type	Courses Scores	Paper Publishing
PhD students	The results of over 80% of obtained courses are good and the scores of degree courses are more than 70.	(1)First/Second prize of National research achievements (ranked in five)/ Provincial research achievements (ranked in two) (2)Publish more than 3 academic papers in TOP relevant journals
Master students		Publish more than 1 academic paper in TOP relevant journals

Comments: . You should be the first author or the second one when your tutor is the first. Also, Zhejiang University should be written as your workplace. II. 2 granted invention patents authorization can be converted to 1 published paper in TOP journal.

➢ How to apply?

① 2 recommendation letters from professors including your tutor. The reasons to recommend should be explained in the letters like the innovative results achieved in the degree thesis.

② 2 months before expected time of defense, you should fill in the "Application Form for Graduates Defending in Advance of Zhejiang University" , and hand it combined with recommendation letters、dissertation(master: 3 copies, Ph.D.: 5 copies) in graduate office of school.

③ Application materials should be verified by school, and after audited by the postgraduates educational charge of school, a group of 3 experts or above(exclude the tutor)check the materials and decide whether the student accord with the requirements of defense in advance. If the student does, the materials would be sent to Graduate School.

④ After the materials audited by the Graduate School, it would be sent to headmaster in charge of graduate education.

⑤Approved degree thesis should be sent to double-blind peer review by school. If all the results are good or above, the dissertation defense will be held in advance. If there is any suggestion for overhaul, the procedure of defense in advance

How to obtain the degree?

✓ Complete all the mandatory courses and meet the least required credits.

✓ Successfully accomplished all the education procedure.

✓ Passed the defense of dissertation.

✓ Ph.D.: at least 1 paper published in foreign journal or in SCI with impact factor ⩾1.0, including accepted.

✓ Academic Master: at least 1 paper published in domestic core journal including accepted.

Photo of 2014 master(left)/Ph.D.(right) students joining in the degree ceremony

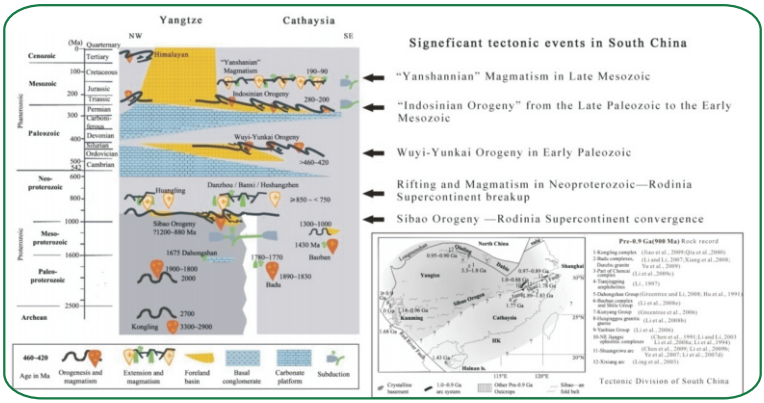
Chapter IV : Activities ►►►►►

The tectonic evolution of the South China Block and the field practice

Geology is a highly practical science, the cultivation of its talent is inseparable from the field practice teaching. Graduate students are more focused on scientific thinking and comprehensive analysis of the ability to cultivate. The South China Tectonic Practice is a good way to explore the practice of geology graduate teaching and enhance the quality of personnel training, which is held once every two years.

The content is about of the geological evolution and corresponding record of the South China Block, including:

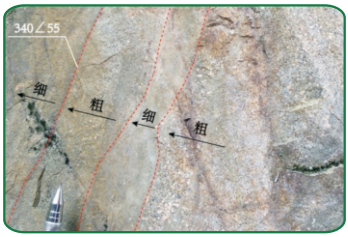
(1) The composition of the Cambrian basement in the eastern part of South China; (2) The supercontinent polymerization and cracking event record of Proterozoic Rodinia; (3) The orogenic event and the evolution record in the basin about the Early Paleozoic Wuyi-Yunkai; (4) Indosinian orogeny record in Early Mesozoic; (5)The record of the magma about the Late Mesozoic Yanshan event; (6)Late Cretaceous Danxia landform and the typical red layer construction.



A schematic diagram of major tectonic events and basin development in south China(Li Z.X.,2009)

Geological Phenomena

The basal conglomerate of the Neoproterozoic Luojiamen Formation deposited on the Shengong unconformity surface (Fuyang City of Zhejiang Province)



Bouma sequence in turbidite facies at the mid-lower Luojiamen Formation in the Neoproterozoic (Fuyang City of Zhejiang Province)

A small fault-bend fold developed in the mud-limestone of the Middle Cambrian Yangliugang Formation (Fuyang City of Zhejiang Province)

The thrust-folding in the limestone of the Middle Carboniferous Huanglong Formation (Jiangshan City of Zhejiang Province)

Geological Field Practice

Prof. Chen Hanlin was instructing graduate studengt field investigation noting

Prof. Li Zhengxiang was introducing the Proterozoic Sibao orogeny

The teachear Zhu Kongyang was explianing the identification of gneiss

Associate prof. Zhang Fengqi was talking about the characters of shear deformation with graduate students

Folk Customs

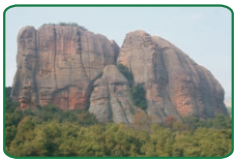
Rural house in mountains

Good wine!

Ancient temple

Landscape and Sightseeing

“Sailing”



Elephants-like rocks in Danxia landform

“Child-mother orangutans”

Applied Geophysical Practice

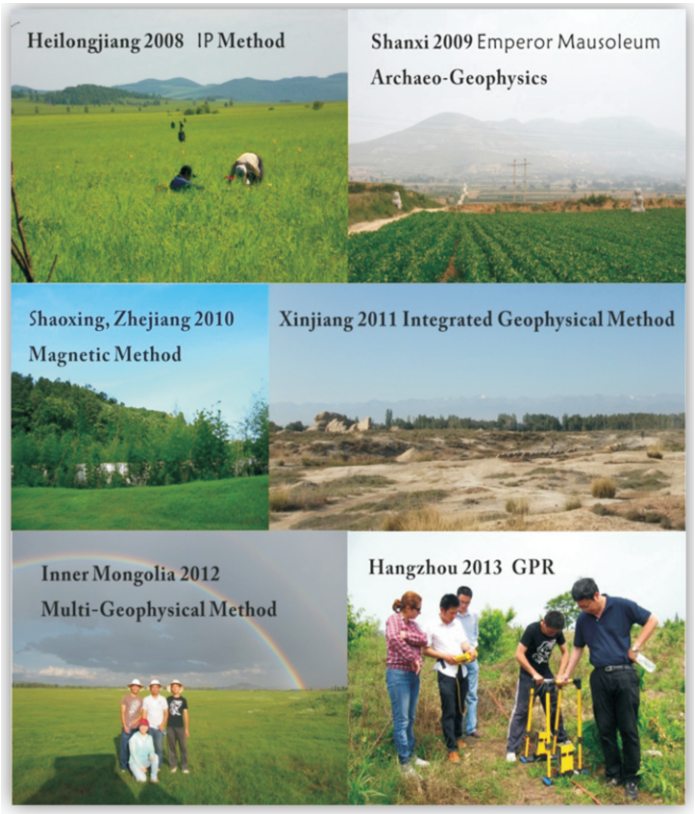
Applied geophysical practice is an important teaching program for geophysical graduate students. It is also the content of geophysical series courses, the important link between teaching and practice, and also the extension of the theoretic knowledge. The practice is important to improve the quality of personnel training, and to cultivate students' scientific thinking and innovative spirit, which is set up from time to time in different places every year. But it is guaranteed that each graduate student has one field practice opportunity at least.

The contents include as follows: (1) Field program plan; (2) Geophysical survey work; (3) Gravity, magnetic, ERT, electromagnetic, seismic, and radioactive exploration with different purposes; (4) Report writing.

1、Method

(a) GPS Base Station;
(b) GPS Mobile Station;
(c) ERT; (d) GPR;
(e) Seismic;
(f) Radioactive Method;
(g) Magnetic; (h) GEM.

2、Field site over the past years



Remote Sensing and GIS Practice

Remote sensing and geographical information system (GIS) is a subject which pays great attention to practice and the graduate students should pay more attention to the combination of scientific thinking and practice. Principle and field operation of unmanned aerial vehicle is one of the most important measures to improve the practical ability of remote sensing and geographic information system graduate students. This practice was organized every year.

High performance GIS computing is an important research area of remote sensing and GIS. The Institute provides high-performance computing clusters for learning and Practice and organizes graduate students to carry out practical activities to other companies, such as the 800 trillion Zhengzhou Supercomputer Center for large-scale spatial data distributed parallel computing experiments.

1、UAV(Unmanned Aerial Vehicle) Teaching

Unmanned aerial vehicle (UAV) and airborne high precision wide-angle camera principle teaching, unmanned aerial vehicle (UAV) field operation, teaching and student practice

Teaching and operating practice of wide angle camera for unmanned aerial vehicle (UAV) -- image mosaic result of unmanned aerial vehicle (UAV) in Zhoushan campus of Zhejiang University

2、Visiting Supercomputing Center

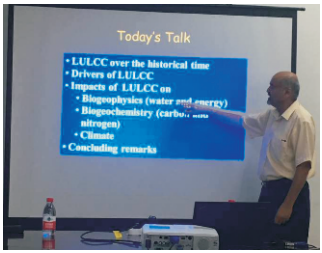
800 trillion cluster architecture learning and high-performance GIS solution testing, Zhengzhou Supercomputer Center

International Collaboration on the Research and Education of Climate Change

Atmospheric science is a highly interdisciplinary subject. Global climate change, being the most cutting-edge research area of atmospheric sciences, requires strong international collaboration. Department of Atmospheric Sciences fosters this international collaboration by organizing international workshops, inviting renowned scientists to teach courses, and inviting world experts to deliver lectures.

International workshop on atmospheric radiation hosted by Department of Atmospheric Sciences and the School of Earth Sciences.

International workshop on global climate change hosted by the Institute of Weather & forecast Information and the School of Earth Sciences



Professor Atul Jain, Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign, teach graduate course on global climate change and the carbon cycle

Field Practice of Human Geography

Resources, environment and regional planning is a highly practical science. The field investigation and social practice are important parts of postgraduate training.

1、Investigate the Land Use Patterns Around Big Cities

By studying the land use around many large cities in the Midwest of the United States, Sinclair proposed a model of land use around the city that is entirely opposite to the Du cycle, called "Anti Thunen circle". Sinclair believes that the theory of Thunen in developing countries, even now, is basically consistent with reality. However, in the cities around the developed countries, it shows the geographical distribution contrary to the theory circle of Thunen. In the urban areas where industrialization and urbanization are developing rapidly, the "disorderly development", which is developed by speculators, developers and farmers who expect land prices to rise, can be seen everywhere. For the farmers near the city, because they can be converted to residential and urban land at any time, they will have less capital and labour inputs, and may abandon farming or just temporary farming. However, for the farmers who are far away from the city, because of the difficult conversion of farmland to urban land, invest more in farmland, and engage in land management with relatively high intensity and great agricultural use value.

2、The Development of History and the Change of Settlements

Taking settlement as the main space unit to discuss the spatial change of settlement along with the development process of human beings.

(1) The Settlements and the Traffic Development

In the historical stage of the development of different means of transportation, settlements affect the industry of settlements, human phenomena, social and economic development, and the spatial distribution of landscapes. For example, after the canal was replaced by land and rail traffic, the impact on the settlements along the canal, such as two traditional Chinese towns Wuzhen and Nanxun.

Landscape along the canal



(2) The Population Characteristics of Settlements and the Change of Settlements Structure

In view of the natural changes, social changes, and demographic characteristics of the population.

(3) Industrial Development and land Use in Settlements

Explore how the characteristics of local industrial development reflect the spatial distribution of land use, the background and geographical or historical origin of these industries, and how to present the landscape patterns of the land surface.


Urban Wetland Landscape -- Xixi Wetland

Chapter V : Development ►►►►►

Academic Development

There have been 196 postgraduate students graduated from 2012 to 2016 from School of Earth Sciences, Zhejiang University. Amongst, 154 chose to go to work, 7 students chose to do further study and 3 students went abroad for further study.

There have been 71 doctoral student graduated from 2012 to 2016 from School of Earth Sciences, Zhejiang University. 69 of these students chose to work after graduation(included 12 students chose to do further study abroad).

Career Development

We have collected the information about 340 graduated students(included master students and doctoral students) : There were 53 students went to work in the state-owned enterprise, 28 students chose to work in the three kinds of foreign-invested enterprises or ventures, 28 students went to work in the government organizations, 20 students chose to work in the scientific research institution, 17 students went to work in the higher educational institution, 6 students entered in the primary and secondary educational institution, the other 188 students went to work in others enterprises and institutions.

Chapter VI : Service Guide ►►►►►

International Education of Zhejiang University	http://iczu.zju.edu.cn/english/
Graduate School of Zhejiang University	http://grs.zju.edu.cn
School of Earth Sciences	http://gs.zju.edu.cn
Network Center of Zhejiang University	http://networking.zju.edu.cn
Integrated Services Network of Campus Card	http://ecard.zju.edu.cn
Library of Zhejiang University	http://libweb.zju.edu.cn/libweb
Higher Education Student Information Network	http://www.chsi.com.cn/

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