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实验室简介

“地表过程分析与模拟”教育部重点实验室是北京大学现代自然地理学的研究基地之一。实验室研究工作针对国家在资源利用、生态保育和环境保护方面的重大目标，围绕人类生存环境这一核心主题，以地球表层的地球化学、生物、物理过程以及这些过程相互作用中的基础科学问题为主要研究对象。

地表生物过程研究的重点方向包括典型生态系统的碳氮通量以及较大尺度物种多样性的发生与变化机制；环境生物地球化学过程研究，侧重微量污染物的区域环境过程、形态与生物有效性关系、界面迁移和风险分析；地表物理过程研究主要探讨第四纪环境演变和高分辨率古环境代用指标和第四纪测年技术的年代学基础研究；土地利用与土地覆被研究是地表过程研究的重要方面，重点探讨区域土地资源优化调控与可持续利用模式及相关的计量模型。除自然过程外，本实验室相关研究都特别注重人地关系，譬如，在碳氮循环研究中强调人为活动和自然过程的相对贡献，在微量污染物研究中延伸到人体暴露和影响，在环境演变和土地覆被研究中注重对人类生存环境的影响。

随着我国经济的高速发展，人地关系中的种种矛盾越来越突出。具有宏观特征的地理科学在研究和解决这些矛盾中日益显示出学科优势，因而受到广泛重视。尽管如此，以地理科学为背景，以国家亟需解决的生态和环境问题为主要目标，充分利用现代实验和模拟手段开展相关研究的实验室国内外都不多见。本实验室目标明确、手段先进、研究特色鲜明（宏观与微观结合、地理学与相关学科的交叉与融合）。不仅能在地理科学和相关交叉学科的应用基础理论研究方面取得创新性成果，为地理科学学科发展作出贡献，而且可以在国家土地资源保育、环境保护和生态建设等重大目标的实现方面贡献力量。

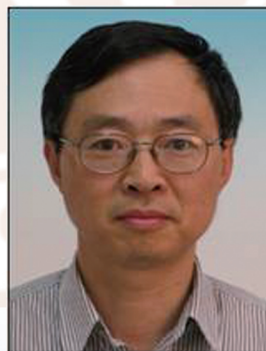


实验室简介—实验室学术委员会

- ◆ 主任：秦大河
- ◆ 副主任：陶澍
- ◆ 委员：秦大河、郑度、傅家谟、刘嘉麒、孟伟、傅伯杰、郭正堂、于贵瑞、张大勇、宋长青、陶澍、方精云、莫多闻、蔡运龙、胡建英

实验室简介—实验室成员

- ◆ 主任：方精云
- ◆ 常务副主任：王学军
- ◆ 副主任：蔡运龙、周力平、贺金生





实验室简介—人员情况

2012年实验室现有人员55人，其中院士2人，双聘院士2人，教授及研究员47人，占85%，副教授15人，从事科研人员占87%。实验室人员平均年龄46岁。

2012年度引进千人计划专家1人（唐艳鸿），教辅人员1人（黄崇），并即将引进青年千人计划（王志恒）。

主要科研成果和影响—科研论文情况

2012年，共发表SCI论文61篇，包括 PNAS, GCB, ES&T等，其中IF>5 文章17篇，IF>3 文章38篇。

期刊	IF	篇数
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA	9.68	1
Global Change Biology	6.86	2
ENVIRONMENTAL SCIENCE & TECHNOLOGY	5.23	13
GLOBAL ECOLOGY AND BIOGEOGRAPHY	5.15	1
WATER RESEARCH	4.87	1
JOURNAL OF CHROMATOGRAPHY A	4.53	1
PLOS ONE	4.09	2
BIOGEOSCIENCES	3.86	1
GEOPHYSICAL RESEARCH LETTERS	3.79	1
ENVIRONMENTAL POLLUTION	3.75	3
ENVIRONMENTAL RESEARCH LETTERS	3.63	1
ATMOSPHERIC ENVIRONMENT	3.47	3
AGRICULTURAL AND FOREST METEOROLOGY	3.39	2
TOXICOLOGY LETTERS	3.23	1
CHEMOSPHERE	3.21	2
QUATERNARY GEOCHRONOLOGY	3.08	2
JOURNAL OF GEOPHYSICAL RESEARCH-ATMOSPHERES	3.02	1
其他期刊	<3	38



主要科研成果和影响—2012年新增项目

2012年度实验室获得国家自然科学基金各类新批项目总计16项，批准总经费超过1656万元，比去年少，与前年持平。

项目类别	获批项数	金额
重点项目	2	640
优秀青年科学基金项目	2	200
面上项目	10	770
青年科学基金项目	1	26
海外及港澳学者合作研究基金	1	20
总计	16	1656

2012新增项目

项目类别	项目数	金额（万元）
创新团队	1	500
重大研究计划	4	1336
国家863计划	2	670
科技支撑计划	3	719
创新研究群体	1	500
重点项目	5	1295
国家杰出青年	2	400
面上项目	35	1925
国际合作与海外项目	8	643
公益性行业专项	3	366
其他	41	730
总计	104	9083

2012在研项目

队伍建设和人才培养—学生培养支持

研究生培养：博士毕业生18人，其中3篇博士论文获评北京大学2012届毕业生优博论文，将候选参评2014年全国优博。其中张彦旭成为全国优博2012年度候选人。本科生培养：对本科生科研的培养力度进一步加大，2012年度支持14个本科生科研项目，本科生参与人数18人。2012年度重点实验室进站博士后9人。



主要科研成果和影响—开放基金

2011年度实验室已支持开发基金科研项目10项。

姓名	合作人员	题目	单位	职称
吕明辉	王红亚	黔中和黔西南水库沉积物分析和土壤 侵蚀状况推估	中国气象局公共气象服务中心	高工
邓红梅	陶澍	湖南桂阳农村烟农室内颗粒物和 多环芳烃暴露特征	中科院广州地化所	副教授
盖艾鸿	方精云	东祁连山高寒灌丛草地碳储量及 分布格局研究	甘肃农业大学资源与 环境学院	副教授
石兆勇	方精云	菌根对森林土壤呼吸的贡献及其 机制	河南科技大学	副教授
张乃莉	王妮	浙江古田山森林凋落物分解 后期真菌的作用机理	中国科学院植物研究 所	助理研究员
宋照亮	刘鸿雁	禾本科植硅体地球化学记录的 植被演化和气候变化	中国科学院地球化学 研究所	副教授
王宝娟	贺金生	青藏高原草地植物解剖特征 及其与环境因子相关性的研究	安徽师范大学	讲师
梁存柱	贺金生	呼伦贝尔温带草地主要植物功能属 性对养分添加的响应	内蒙古大学	教授
马文红	唐志尧	内蒙古锡林郭勒温带灌丛碳储量特 征	内蒙古大学	副教授
徐小牛	唐志尧	皖南亚热带常绿阔叶林碳循环主要 特征	安徽农业大学	教授

能力建设和基础设施—设备情况

2012年实验室新增20万以上大型设备8台，共计423.7万

主要科研成果和影响—成果获奖

获奖人	奖项名称	颁发单位	时间
彭建	第十一届全国青年地理科技奖	中国地理学会	2011年底



2012年实验室发表论文清单

1. Xiaoqin Wu, Jieqiong Jiang, Yi Wan, John P. Giesy, and Jianying Hu*, Cyanobacterial Blooms Produce Teratogenic Retinoids, Proceedings of the National Academy of Sciences of The United States of America (PNAS), in press.
2. Liu Hongyan; The production of phytoliths in China's grasslands: implications to the biogeochemical sequestration of atmospheric CO₂, Global Change Biology
3. Yang, Yuanhe; Ji, Chengjun; Wang, Shaopeng; Significant soil acidification across northern China's grasslands during 1980s-2000s; GLOBAL CHANGE BIOLOGY
4. Peng Hui; Zhang Kun; Wan Yi; Hu Jianying; Tissue Distribution, Maternal Transfer, and Age-Related Accumulation of Dechloranes in Chinese Sturgeon; ENVIRONMENTAL SCIENCE & TECHNOLOGY
5. Ma, Fujun; Wan, Yi; Yuan, Guanxiang; Meng, Liping; Dong, Zhaomin; Hu, Jianying; Occurrence and Source of Nitrosamines and Secondary Amines in Groundwater and its Adjacent Jialu River Basin, China; ENVIRONMENTAL SCIENCE & TECHNOLOGY
6. Dong, Zhaomin; Hu, Jianying; Development of Lead Source-specific Exposure Standards Based on Aggregate Exposure Assessment: Bayesian Inversion from Biomonitoring Information to Multipathway Exposure; ENVIRONMENTAL SCIENCE & TECHNOLOGY
7. Peng, Shushi; Piao, Shilong; Nan, Huijuan; Surface Urban Heat Island Across 419 Global Big Cities; ENVIRONMENTAL SCIENCE & TECHNOLOGY
8. Shen, Guofeng; Tao, Shu; Wei, Siye; Zhang, Yanyan; Wang, Rong; Wang, Bin; Li, Wei; Shen, Huizhong; Huang, Ye; Chen, Yuanchen; Chen, Han; Yang, Yifeng; Wang, Wei; Wang, Xilong; Liu, Wenxin; Emissions of Parent, Nitro, and Oxygenated Polycyclic Aromatic Hydrocarbons from Residential Wood Combustion in Rural China
9. Wang, Rong; Tao, Shu; Wang, Wentao; Liu, Junfeng; Shen, Huizhong; Shen, Guofeng; Wang, Bin; Liu, Xiaopeng; Li, Wei; Huang, Ye; Zhang, Yanyan; Lu, Yan; Chen, Han; Chen, Yuanchen; Wang, Chen; Zhu, Dan; Wang, Xilong; Li, Bengang; Liu, Wenxin; Black Carbon Emissions in China from 1949 to 2050; ENVIRONMENTAL SCIENCE & TECHNOLOGY
10. Shen, Guofeng; Tao, Shu; Wei, Siye; Zhang, Yanyan; Wang, Rong; Wang, Bin; Li, Wei; Shen, Huizhong; Huang, Ye; Chen, Yuanchen; Chen, Han; Yang, Yifeng; Wang, Wei; Wei, Wen; Wang, Xilong; Liu, Wenxing; Wang, Xuejun; Reductions in Emissions of Carbonaceous Particulate Matter and Polycyclic Aromatic Hydrocarbons from Combustion of Biomass Pellets in Comparison with Raw Fuel Burning; ENVIRONMENTAL SCIENCE & TECHNOLOGY
11. Shen, Guofeng; Tao, Shu; Wei, Siye; Zhang, Yanyan; Wang, Rong; Wang, Bin; Li, Wei; Shen, Huizhong; Huang, Ye; Yang, Yifeng; Wang, Wei; Wang, Xilong; Retene Emission from Residential Solid Fuels in China and Evaluation of Retene as a Unique Marker for Soft Wood Combustion; ENVIRONMENTAL SCIENCE & TECHNOLOGY
12. Shen Guofeng; Wei Siye; Wei Wen; Zhang Yanyan; Min Yujia; Wang Bin; Wang Rong; Li Wei; Shen Huizhong; Huang Ye; Yang Yifeng; Wang Wei; Wang Xilong; Wang Xuejun; Tao Shu; Emission Factors, Size Distributions, and Emission Inventories of Carbonaceous Particulate Matter from Residential Wood Combustion in Rural China; ENVIRONMENTAL SCIENCE & TECHNOLOGY
13. Wang, Rong; Tao, Shu; Shen, Huizhong; Wang, Xilong; Li, Bengang; Shen, Guofeng; Wang, Bin; Li, Wei; Liu, Xiaopeng; Huang, Ye; Zhang, Yanyan; Lu, Yan; Ouyang, Huiling; Global Emission of Black Carbon from Motor Vehicles from 1960 to 2006; ENVIRONMENTAL SCIENCE & TECHNOLOGY
14. Zhang, Kun; Wan, Yi; Hu, Jianying; Occurrences and Fates of Hydroxylated Polybrominated Diphenyl Ethers in Marine Sediments in Relation to Trophodynamics; ENVIRONMENTAL SCIENCE & TECHNOLOGY
15. Guo, Xiaoying; Wang, Xilong; Zhou, Xinzhe; Kong, Xiangzhen; Tao, Shu; Sorption of Four Hydrophobic Organic Compounds by Three Chemically Distinct Polymers: Role of Chemical and Physical Composition; ENVIRONMENTAL SCIENCE & TECHNOLOGY
16. Zhou, Xinzhe; Shu, Liang; Zhao, Huibin; Guo, Xiaoying; Wang, Xilong; Tao, Shu; Suspending Multi-Walled Carbon Nanotubes by Humic Acids from a Peat Soil; ENVIRONMENTAL SCIENCE & TECHNOLOGY
17. He, Jin-Sheng; Effect of geographical range size on plant functional traits and the relationships between plant, soil and climate in Chinese grasslands; GLOBAL ECOLOGY AND BIOGEOGRAPHY
18. Jia, Ai; Wan, Yi; Xiao, Yang; Hu, Jianying; Occurrence and fate of quinolone and fluoroquinolone antibiotics in a municipal sewage treatment plant; WATER RESEARCH



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19. Ding, Huanhuan; Peng, Hui; Hu, Jianying; Simultaneous determination of mono- and disubstituted polyfluoroalkyl phosphates in drinking water by liquid chromatography-electrospray tandem mass spectrometry; JOURNAL OF CHROMATOGRAPHY A
20. Geng, Yan; Wang, Yonghui; Yang, Kuo; Wang, Shaopeng; Zeng, Hui; He, Jin-Sheng; Soil Respiration in Tibetan Alpine Grasslands: Belowground Biomass and Soil Moisture, but Not Soil Temperature, Best Explain the Large-Scale Patterns; PLOS ONE
21. Hongyan Liu; Growth Decline Linked to Warming-Induced Water Limitation in Hemi-Boreal Forests; PLOS ONE
22. He, Jin-Sheng; Organic and inorganic carbon in the topsoil of the Mongolian and Tibetan grasslands: pattern, control and implications; BIOGEOSCIENCES
23. Wu, Weichao; Tan, Wenbing; Zhou, Liping; Xu, Yunping; Sea surface temperature variability in southern Okinawa Trough during last 2700 years; GEOPHYSICAL RESEARCH LETTERS
24. Liu, WenXin; Cheng, FangFang; Li, WeiBo; Tao, Shu; Desorption behaviors of BDE-28 and BDE-47 from natural soils with different organic carbon contents; ENVIRONMENTAL POLLUTION
25. Ding, Junnan; Yang, Yifeng; Li, Bengang; Shen, Guofeng; Wang, Chen; Li, Wei; Shen, Huizhong; Wang, Bin; Wang, Rong; Huang, Ye; Zhang, Yanyan; Cao, Hongying; Zhu, Ying; Tao, Shu; Occurrence and exposure to polycyclic aromatic hydrocarbons and their derivatives in a rural Chinese home through biomass fuelled cooking; ENVIRONMENTAL POLLUTION
26. Wang, Xuejun; Model description of trophodynamic behavior of methylmercury in a marine aquatic system; ENVIRONMENTAL POLLUTION
27. Zeng, Zhenzhong; Piao, Shilong; Yin, Guodong; Peng, Shushi; Global evapotranspiration over the past three decades: estimation based on the water balance equation combined with empirical models; ENVIRONMENTAL RESEARCH LETTERS
28. Zhang, Wei; Tong, Yindong; Hu, Dan; Ou, Langbo; Wang, Xuejun; Characterization of atmospheric mercury concentrations along an urban-rural gradient using a newly developed passive sampler; ATMOSPHERIC ENVIRONMENT
29. Hu, Dan; Zhang, Wei; Chen, Long; Chen, Cen; Ou, Langbo; Tong, Yindong; Wei, Wen; Long, Wenjing; Wang, Xuejun; Mercury emissions from waste combustion in China from 2004 to 2010; ATMOSPHERIC ENVIRONMENT
30. Wang, Xuejun; Emissions of carbon monoxide and carbon dioxide from uncompressed and pelletized biomass fuel burning in typical household stoves in China; ATMOSPHERIC ENVIRONMENT
31. Chen, Xiaoqi; Xu, Lin; Temperature controls on the spatial pattern of tree phenology in China's temperate; AGRICULTURAL AND FOREST METEOROLOGY
32. Liu, Hongyan; Vegetation responses to mid-Holocene extreme drought events and subsequent long-term drought on the southeastern Inner Mongolian Plateau, China; Agricultural and Forest Meteorology
33. Zhang, Zhaobin; Hu, Ying; Sun, Libei; Jiao, Jian; Zhao, Liang; Li, Ruobao; Hu, Jianying; The estrogenic potential of salicylate esters and their possible risks in foods and cosmetics; TOXICOLOGY LETTERS
34. Ma, Fujun; Yuan, Guanxiang; Meng, Liping; Hu, Jianying; Contributions of flumequine and nitroarenes to the genotoxicity of river and ground waters; CHEMOSPHERE
35. Hou, Linlin; Li, Kaiyang; Ding, Yuanzhao; Li, Xiqing; Removal of silver nanoparticles in simulated wastewater treatment processes and its impact on COD and NH₄ reduction; CHEMOSPHERE
36. Guo, Yu-Jie; Zhang, Jia-Fu; Hu, Gang; Zhou, Li-Ping; Luminescence dating of the Yellow River terraces in the Hukou area, China; QUATERNARY GEOCHRONOLOGY
37. Zhang, Jia-Fu; Zhou, Li-Ping; Optically stimulated luminescence and radiocarbon dating of sediments from Lop Nur (Lop Nor), China; QUATERNARY GEOCHRONOLOGY
38. Li, Yan; Zhao, Xinyi; An empirical study of the impact of human activity on long-term temperature change in China: A perspective from energy consumption; JOURNAL OF GEOPHYSICAL RESEARCH-ATMOSPHERES
39. Li, Xiqing; Tracking colloid transport in real pore structures: comparisons with correlation equations and experimental observations; WATER RESOURCES RESEARCH



2012年实验室发表论文清单

40. Zhao, Yanbin; Hu, Jianying; Development of a molecular biomarker for detecting intersex after exposure of male medaka fish to synthetic estrogen; ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY
41. Huang, Chong; Wu, Shimin; Chang, Hong; Zhao, Yanbin; Hu, Jianying; MODULATION OF ESTROGEN SYNTHESIS THROUGH ACTIVATION OF PROTEIN KINASE A IN H295R CELLS BY EXTRACTS OF ESTUARY SEDIMENTS; ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY
42. Wang, Xilong; Zuo, Qian; Duan, Yonghong; Liu, Wenxin; Cao, Jun; Tao, Shu; Factors affecting spatial variation of polycyclic aromatic hydrocarbons in surface soils in North China Plain; ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY
43. Yang, Yu; Shu, Liang; Wang, Xilong; Tao, Shu; Mechanisms regulating bioavailability of phenanthrene sorbed on a peat soil-origin humic substance; ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY
44. Gao, Yang; Huang, Jiao; Li, Shuang; Li, Shuangcheng; Spatial pattern of non-stationarity and scale-dependent relationships between NDVI and climatic factors-A case study in Qinghai-Tibet Plateau, China; ECOLOGICAL INDICATORS
45. Shen, Ze-Hao; A novel thermal index improves prediction of vegetation zones: Associating temperature sum with thermal seasonality; ECOLOGICAL INDICATORS
46. Zhao, Shuqing; The Grain for Green Project induced land cover change in the Loess Plateau: A case study with Ansai County, Shanxi Province, China; ECOLOGICAL INDICATORS
47. Shu, Tao; A Cylindrical Thermal Precipitator with a Particle Size-Selective Inlet; Aerosol Science and Technology
48. Shu, Tao; Performance study of a disk-to-disk thermal precipitator; Journal of Aerosol Science
49. Chen, Xiaoqiu; Xu, Lin; Phenological responses of *Ulmus pumila* (Siberian Elm) to climate change in the temperate zone of China; INTERNATIONAL JOURNAL OF BIOMETEOROLOGY
50. Ju, Li; Zhang, Wei; Wang, Xuejun; Aggregation kinetics of SDBS-dispersed carbon nanotubes in different aqueous suspensions; COLLOIDS AND SURFACES A-PHYSICO-CHEMICAL AND ENGINEERING ASPECTS
51. Ma JianJing; Ji ChengJun; Han Mei; Zeng Hui; He JinSheng; Comparative analyses of leaf anatomy of dicotyledonous species in Tibetan and Inner Mongolian grasslands; SCIENCE CHINA-LIFE SCIENCES
52. Wang, Hongya; Liu, Hongyan; Zhao, Fengjun; Yin, Yi; Zhu, Jiangling; Carbon cycling of Chinese forests: From carbon storage, dynamics to models; SCIENCE CHINA LIFE SCIENCE
53. Peng, Jian; Liu, Yinghui; Early- and mid-Holocene palaeoenvironments as revealed by mineral magnetic, geochemical and palynological data of sediments from Bai Nuur and Ulan Nuur, southeastern inner Mongolia Plateau, China; QUATERNARY INTERNATIONAL
54. Ouyang HuiLing; Kong XiangZhen; He Wei; Qin Ning; He QiShuang; Wang Yan; Wang Rong; Xu FuLiu; Vegetation coverage change and associated driving forces in mountain areas of Northwestern Yunnan, China using RS and GIS; ENVIRONMENTAL MONITORING AND ASSESSMENT
55. Fu, Xiao; Zhang, Jia-Fu; Zhou, Li-Ping; Effects of five heavy metals at sub-lethal concentrations on the growth and photosynthesis of *Chlorella vulgaris*; CHINESE SCIENCE BULLETIN
56. Stephanie L. DeVries, Wenjie Liu, Neng Wan, Pengfei Zhang and Xiqing Li; Comparison of the properties of various optically stimulated luminescence signals from potassium feldspar; RADIATION MEASUREMENTS
57. Li, Bengang; Su, Shenshen; Yuan, Huishi; Tao, Shu; Biodegradation of MIB, geosmin, and microcystin-LR in Taihu sediment; Water Sci. Technol. Water Supply
58. Hongyan Liu; Spatial and temporal variations of AOD over land at the global scale; INTERNATIONAL JOURNAL OF REMOTE SENSING
59. Zhu, Gaoru; Xu, Xuegong; Ma, Zongwen; Xu, Lifan; TOPOGRAPHY-CONTROLLED SOIL WATER CONTENT AND THE COEXISTENCE OF FOREST AND STEPPE IN NORTHERN CHINA; Physical Geography
60. Xu Lin; Chen XiaoQiu; Spatial Dynamics and Zoning of Coastal Land-Use Change along Bohai Bay, China, during 1979-2008; JOURNAL OF COASTAL RESEARCH
61. He, Jin-Sheng; Spatial modeling of the *Ulmus pumila* growing season in China's temperate zone; SCIENCE CHINA-EARTH SCIENCES