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CAS – Chinese Academy of Sciences
CAE – Chinese Academy of Engineering
SOA – State Oceanic Administration of China
MOC – Ministry of Transport of the People’s Republic of China

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实验室简介
SKLEC Introduction

河口海岸学国家重点实验室缘自1957年由教育部批复建立的华东师范大学河口研究室，依托华东师范大学，于1989年由原国家计委批准筹建，1995年12月通过国家验收并正式向国内外开放。

经过二十多年的建设，实验室已拥有一支结构合理、多学科交叉、专业互补、老中青结合的研究队伍；配备了先进的野外勘测及室内测试与分析仪器。实验室现有固定人员56人，其中研究人员47人（教授／研究员28人，副教授／副研究员14人，讲师／助理研究员5人；全部具有博士学位），技术人员7人，管理人员2人。秉承“开放、流动、联合、竞争”的运行机制，实验室瞄准国际学科前沿，围绕国家重大需求，在河口海岸学科前沿领域深入进行应用基础性研究，已成为代表我国河口海岸最高水平的科研基地与高层次人才培养基地。

State Key Laboratory of Estuarine and Coastal Research (SKLEC) is affiliated to East China Normal University (ECNU), Shanghai. SKLEC was established on the research achievement of China in 1989, and went into operation in December 1995. It is now co-sponsored by East China Normal University and Ministry of Science and Technology of China.

Since 1989, the laboratory has formed a number of multidisciplinary research teams, equipped with advanced instruments both for fieldwork and laboratory analysis. There are 56 fulltime faculties and staff members in the laboratory, which include 47 research faculties (28 professors, 14 associate professors, and 5 lecturers, all research faculties with Ph.D. degree), 7 technicians and 2 administrative staff.

SKLEC carries out a large amount of theoretical and applied research projects to serve the demands of national development, social sustainability, and frontline science. Guided by the philosophy of “Openness, Exchange, Cooperation and Competition”, it has become a high level research and training base for estuarine and coastal studies in China.

大事记
Headlines

运行管理
Operations and Managements

2017年3月15日，中共华东师范大学河口海岸科学研究院和河口海岸学国家重点实验室党委换届选举大会隆重举行。大会审议通过了《河口院、国家重点实验室党员大会选举办法》，并通过无记名投票选举产生俞世恩、张国安、朱建荣、赵常青、童春富等5位同志为新一届院、室党委委员。

On March 15th, 2017, the Party committee general election conference of the State Key Laboratory of Estuarine and Coastal Research (SKLEC) and Institute of Estuarine and Coastal Research (IECR) was held. The conference adopted and passed the Election Methods of Party Conference and elected YU Shi`en, ZHANG Guo`an, ZHU Jianrong, ZHAO Changqing, TONG Chunfu as the members of Party committee.

2017年10月18日，河口海岸科学研究院成立60周年纪念活动举行。60年来，在陈吉余院士等老一辈科学家的带领下，河口海岸人秉承“求是、求实、求新、求成”精神，实践“求实创造、为人师表”校训，为国家和地方经济社会发展做出了重要贡献。

On October 18th, 2017, the 60th anniversary of Institute of Estuarine and Coastal Research (IECR) was held. Over the past 60 years, IECR inherited the spirit of the “Seek Truth, Seek Reality, Seek Innovation, Seek Success”, and practised the motto of the “Seek Truth. Foster Originality and Live up to the Name of Teacher”, and made important contribution to the development of the country and society under the lead of CHEN Jiyu academician and the older generation of estuarine and coastal scientists.

2017年11月15日，河口海岸学国家重点实验室聘任江红为重点实验室行政副主任。

On November 15th, 2017, Dr. JIANG Hong was appointed as the executive deputy director.

2017年12月18日，崇明生态岛中荷联合研究中心（Sino-Dutch Joint Research Centre for Chongming Eco-Island）揭牌仪式在崇明岛举行。该中心是在华东师范大学与代尔夫特理工大学、荷兰三角洲研究院、荷兰皇家科学院生态研究中心等长期合作基础上，依托崇明生态研究院成立的。

On December 18th, 2017, the opening ceremony of Sino-Dutch Joint Research Centre for Chongming Eco-Island was held in the Chongming island. With the backing of Institute of Chongming Ecological Research., the center was established based on the long-term cooperation among the East China Normal University, Delft University of Technology, Dutch Delta Institute and Royal Dutch Academy of Ecological Research.

研究生培养
Student Programs

2017年3月，我室首位中荷联合培养博士生朱琴在荷兰完成答辩并被授予荷方博士学位，6月朱琴被授予中方博士学位。这是我校与荷兰Delft理工大学签订双方联合培养博士生协议后首位获得双方学位的博士生。

In March, 2017, the doctoral ZHU Qin passed the thesis defence and was awarded the Doctor`s degree by the Delft University of Technology. And in June, she was also awarded the Doctor`s degree by East China Normal University. She was the first doctor student who has been awarded a dual Diploma of doctoral research.

学术交流
Academic Communications

2017年4月，海洋生物圈整合研究项目（Integrated Marine Biosphere Research, IMBeR）科学指导委员会会议在实验室召开。来自中国、美国、英国、澳大利亚、德国、法国、日本等国20多位IMBeR科学指导委员会委员，海洋研究科学委员会(Scientific Committee in Oceanic Research, SCOR)执行主任Dr. Edward R. Urban，未来地球项目（Future Earth）代表，及实验室研究人员出席了此次会议。会议以学术报告的形式在物理海洋、海洋化学、海洋生物、海岸带管理等相关领域进行了积极交流。

The Integrated Marine Biosphere Research (IMBeR) scientific steering committee meeting was held from 23-25 April, 2017 at East China Normal University (ECNU) in Shanghai, China. More than 20 IMBeR Scientific Steering Committee (SSC) members from China, the United States, Britain, Australia, Germany, France, Japan, as well as Dr. Edward R. Urban from Scientific Committee in Oceanic Research (SCOR), and researchers at SKLEC attended the meeting. The meeting has strengthened the international academic exchanges in the fields of physical, chemical, biology oceanography, and coastal zone management.

2017年6月，华东师范大学海外青年科学家论坛-海洋科学分论坛在校理科大楼顺利举行。来自美国、德国、荷兰、加拿大、英国、比利时等国多个高校及香港科技大学的12位青年科学家应邀出席。会议以学术报告的形式围绕遥感、海洋生态系统、海洋地质和海洋化学等领域展开交流。此次论坛为我室青年学者提供了良好的海外交流平台。

The 2017 International Forum for Outstanding Oversea Young Scholars in marine science was held from 29-30, June in ECNU. 12 oversea young scholars joined this forum and give talks on physical oceanography, oceanographically remote sensing, marine ecosystem, marine geology and ocean chemistry. This forum provided a platform to enhance the young scholars' communication between SKLEC and oversea institutes.

2017年10月，实验室主办的国际河口海岸学会(Estuarine and Coastal Science Association, ECSA) 2017年大会：脆弱的海陆界面(ECSA2017, Where Land Meets Ocean: The Vulnerable Interface) 胜利召开。来自26个国家和地区的180余名代表参加了大会。

The Estuarine Coastal Sciences Association (ECSA) and the State Key Laboratory of Estuarine and Coastal Research (SKLEC) jointly organized the ECSA 2017 conference during Oct. 16-20, 2017, in Jianguo Hotel Shanghai, China. The theme is 'where Land Meets Ocean: The vulnerable Interface'. More than 180 participants from 26 countries joined ECSA2017.

国际合作
International Cooperation

2017年3月，华东师范大学和加拿大科学出版社合作学术期刊《Anthropocene Coasts》（中译名《人新世海岸》）投稿系统正式上线，开始接收投稿。期刊按照目前国际刊物的发展趋势，采取开放获取方式，以电子期刊形式发行。

Anthropocene Coasts is an innovative international partnership journal, jointly developed and co-owned by Canadian Science Publishing (CSP) and East China Normal University (ECNU). It is open for submissions from 2017 March. It is scheduled to be published in 2017 and to be an open-access journal in electronic version.

2017年4月，为更好地开展河流河口方面的科研合作，与克罗地亚杰尔博士科维奇研究所签署合作备忘录。

In April, 2017, State Key Laboratory of Estuarine and Coastal Research (SKLEC) signed the MOU with Dr. Lujer Croatian Institute to carry out research cooperation in river and estuarine better.

科研项目
Research projects

由我室李秀珍教授领衔的科技部国家重点研发计划“典型脆弱生态修复与保护研究”重点专项: “长三角典型河口湿地生态恢复与产业化技术”获批立项。该项目由华东师范大学牵头，联合上海交通大学、同济大学、南京大学、上海海洋大学等9家科研和应用单位共同完成。

The National Key Research and Development Program of the Ministry of Science and Technology for the Typical Fragile Ecological Restoration and Protection: Ecological Restoration and Sustainable Resource Utilization of Typical Estuarine Wetlands in the Yangtze River Delta hosted by Prof. LI Xiuzhen was approved. The project is led by East China Normal University, and in collaboration with Shanghai Jiao Tong University, Tongji University, Nanjing University, Shanghai Ocean University etc.

由我室何青教授主持申请的上海市科委社会发展领域重大（点）项目“变化环境下长江口-杭州湾水沙响应和地貌模拟技术研究”项目获批。

The Social Development Key Program of Shanghai Science and Technology Commission: Research on water-sediment response and geomorphologic simulation technology under changing circumstances in Yangtze estuary-Hangzhou Bay hosted by Prof. HE Qing was approved.

2017年，我室自然基金委项目申请获得丰收，共获批国家自然科学基金项目18项，包括杰出青年基金项目1项、重点项目1项、国际(地区)合作与交流项目1项、联合基金项目1项、面上项目6项、青年科学基金项目8项。

In 2017, 18 new projects were granted by the National Natural Science Foundation of China (NSFC) including one Distinguished Young Scholars, one Key Program, one Key International (Regional) Cooperation and Exchange Project, one Collaborative Fund Supported Program, six General Projects and eight Young Scientist Funds and so on.

人物
People

2017年沈焕庭教授荣获“中国地理科学成就奖”。

Prof. SHEN Huanting was awarded a China Geological Science Achievement Award from the Geographical Society of China.

侯立军教授获得国家自然科学基金杰出青年基金资助。

Prof. HOU Lijun was supported by the National Science Fund for Distinguished Young Scholars.

2017年，汪亚平教授领衔完成的科研成果“河口海岸沉积动力学及其环境效应”荣获海洋科学技术二等奖。

Research on “Sedimentary dynamics and environmental effects in estuarine and coast” was awarded second prize by the.Marine Science and Technology Award.

高抒教授出任国际著名刊物 Marine Geology 主编。

Prof. GAO Shu was appointed as the editor of Marine Geology.

陈中原教授出任国际著名刊物 Geomorphology 主编。

Prof. CHEN Zhongyuan was appointed as the editor of Geomorphology.

徐江博士入选上海市“晨光计划”。

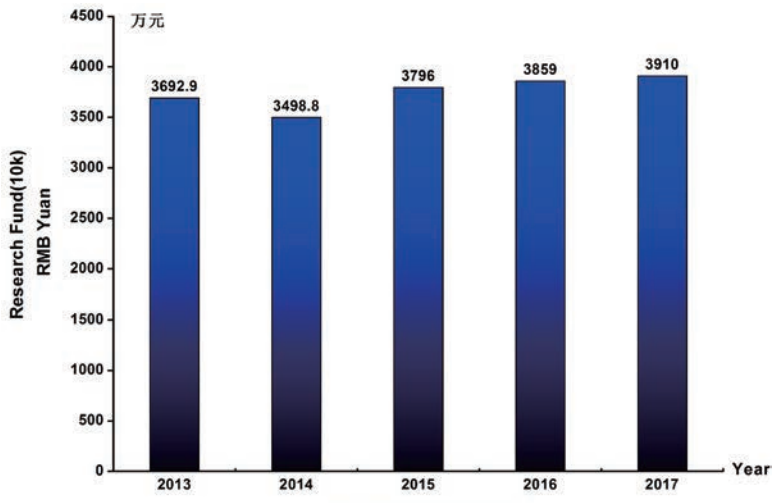
Dr. XU Jiang was selected into the Chen Guang Project of Shanghai.

科研课题与进展
Research Programs and Highlights

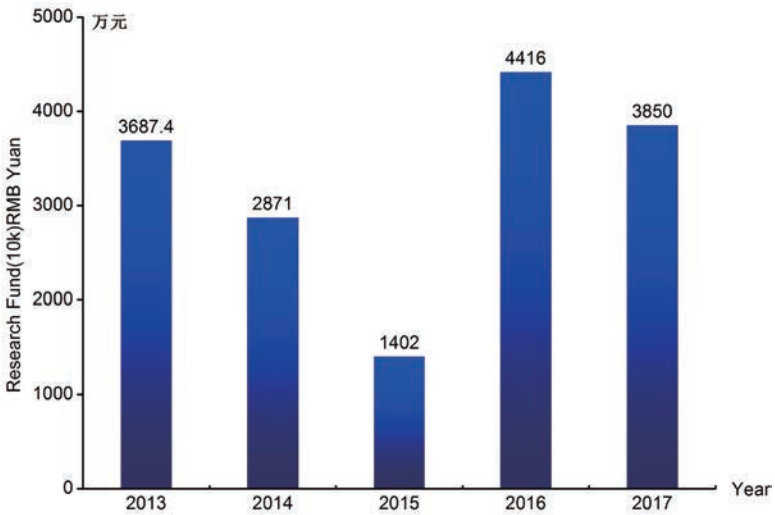
科研课题
Research Programs

2017年度，实验室新增项目68项，新增合同经费3850余万元。其中，新增国际合作项目1项；国家、省部级项目26项，新增合同经费3270余万元。2017年度，实验室合计承担课题150余项，实到经费3910余万元，其中国家和省部级课题100余项，实到经费3122万元。此外，实验室还获得科技部国家重点实验室专项经费700万元，其中300万元用于自主研究课题的部署，400万元用于实验室管理运行和开放课题。

Sixty-eight new projects were granted in 2017 with total funding of 38.50 million RMB. Among them, more than 26 projects were awarded from national or provincial funding agencies, which total 32.70 million RMB. In 2017, more than 150 research projects were carried out with total funding of 39.10 million RMB. Among them, more than 100 projects were granted by national, provincial and ministerial funding agencies, which totaled 31.22 million RMB. In addition, SKLEC received special funding from the Ministry of Science and Technology (MOST) of China, among which 3 million RMB was specifically aimed at scientific research, 4 million RMB for administration and operation of SKLEC.



2013-2017年实到科研经费
Competitive Research Fund Received in 2013-2017



2013-2017年新增合同经费
Contracted Competitive Research Funding in 2013-2017

新增重要项目简介
Brief Introduction of Selected New Projects

科技部国家重点研发计划“典型脆弱生态修复与保护研究”重点专项：长三角典型河口湿地生态恢复与产业化技术（2017YFC0506000）

The National Key Research and Development Program of the Ministry of Science and Technology for the Typical Fragile Ecological Restoration and Protection: Ecological Restoration and Sustainable Resource Utilization of Typical Estuarine Wetlands in the Yangtze River Delta (Grant No. 2017YFC0506000)

该项目由华东师范大学牵头，联合上海交通大学、同济大学、南京大学、上海海洋大学等9家科研和应用单位共同完成。以长三角典型河口湿地为对象，阐明河口湿地生态系统对流域来沙减少、围垦、外来种入侵和水体富营养化等多重胁迫的响应机理，研发沉积动力地貌调控与生态系统自然演化相结合的河口湿地植被修复与功能提升技术，开发基于河口湿地特色资源的新产品，通过把大量秸秆加工成生物炭及绿色材料，以及对互花米草生物矿质液的提取利用，突破其“脱盐”瓶颈，形成饲料、肥料等大宗产品，给高生物量解决出路，形成“控制-利用”并重的互花米草生态管控新模式。本项目将立足长江口，服务长三角，辐射东南沿海，为我国河口湿地的生态恢复和湿地资源可持续利用提供科学支撑。

The project is hosted by East China Normal University, and in collaboration with Shanghai Jiao Tong University, Tongji University, Shanghai Ocean University etc.

Based on the typical estuarine wetlands at the Yangtze Estuary, this project will reveal the mechanism of ecosystem responses to multi-stressors such as reduced sediment input from the catchment, coastal reclamation, exotic species invasion and eutrophication. We will develop estuarine wetland vegetation restoration techniques based on the coevolution between hydro-sediment-morpho-dynamics and natural ecosystem succession, as well as environment friendly Spartina alterniflora control methods. Restored saltmarsh vegetation will produce very high biomass annually. Industrial chain will be formed to make use of the excess biomass from Spartina alterniflora and Phragmites australis during habitat management. Stems can be converted into bio-charcoal, and then combined with dredging mud to form green embankment materials. By extracting the bio-mineral fluid from Spartina, we can remove the salt from the stems while the nutritious residuals can be used as fodders and fertilizers as mass products. With careful spatial and temporal planning, the tall grass can play a key role in coastal protection from storm surges in summer, while the harvesting blank can be used as habitat for migrating birds in winter, thus forming a new model of “control with use” management scheme for Spartina alterniflora. Although the research is focused on the estuarine wetlands at the Yangtze Delta, the project will provide sound basis for the ecological restoration and sustainable resource management at Southeastern China.

部分新增项目
Selected New Projects

国家重点研发计划项目 The National Key Research and Development Program of MOST	
长三角典型河口湿地生态恢复与产业化技术(2017YFC0506000)（项目主持） Ecological restoration and sustainable resource utilization of typical estuarine wetland in the Yangtze river delta (2017.07-2020.12)	李秀珍 LI Xiuzhen
黄河三角洲海岸演变过程与动力机制(2017YFC0405503)（课题主持） Coast evolution process and dynamic mechanism of the Yellow River delta (2017.07-2020.12)	陈沈良 CHEN Shenliang
国际合作项目 International Cooperation Project	
宁波象山三文鱼养殖水水质检测 Water quality testing of Salmon fishery water in Ningbo Xiangshan (2017.06-2017.12)	Richard Bellerby
国家自然科学基金项目-重点国际（地区）合作与交流项目 NSFC Key International (Regional) Cooperation and Exchange Project	
早-中全新世长江与尼罗河三角洲环境演变异同及早期农业文明对比研究(41620104004) A comparative study between the Yangtze and Nile delta: the similarity and discrepancy of the early-middle Holocene environmental evolution and early agricultural civilization (2017.01-2021.12)	陈中原 CHEN Zhongyuan
长江河口最大浑浊带的动力沉积过程对大型工程的自适应机理研究(51761135023) Natural versus anthropogenically driven behavior of hydrodynamics and sediment dynamics in estuarine delta networks, application to the Yangtze Estuary Delta (2017.06-2021.12)	程和琴 CHENG Heqin
国家自然科学基金面上项目 NSFC General Project	
年最大潮汐不对称沉积中心在河口演变中的迁移 (41671007) Change of annual maximum tidal asymmetric sediment during decadal-centurial evolution of estuarine geomorphology (2017.01-2020.12)	李茂田 LI Maotian
杭州湾两翼全新世中期以来地貌演化特征与新石器文明发展的对比研究(41671199) A comparative study on the geomorphological evolution and the Neolithic culture deveolpment since the Mid-Holocene in the north and south flank of Hangzhou bay (2017.01-2020.12)	孙千里 SUN Qianli
河口潮滩N_2O产生途径的定量辨识与调控机理研究 (41671463) Quantitative discrimination and associated influencing mechanisms of N_2O generation pathways in estuarine and intertidal environments (2017.01-2020.12)	侯立军 HOU Lijun
长江口海域胶体中有机碳、氮、磷生物地球化学的初步研究 (41676066) Preliminary study on biogeochemistry of colloidal organic carbon, nitrogen, and phosphorus in the Changjiang (Yangtze River) Estuary (2017.01-2020.12)	高磊 GAO Lei
冬季长时间持续强北风产生沿岸凯尔文波和河口艾克曼输运对长江河口盐水入侵的影响 (41676083) Impact of coastal Kelvin wave and estuarine Ekman transport induced by long term strong north wind in winter on saltwater intrusion in the Changjiang Estuary (2017.01-2020.12)	朱建荣 ZHU Jianrong

长江口和邻近东海微塑料的时空分布、附着生物群落结构及生态学效应(41676109) (2017.01-2020.12) Spatial and temporal distribution, attached biomes structure and ecological effects of microplastic in Changjiang estuary and the adjacent East China Sea (2017.01-2020.12)	李道季 LI Daoji
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基于光释光技术的上海地区全新世贝壳沙堤的年代学研究(2017T100284) 中国博士后基金会 Chronology of Holocene cheniers in the Shanghai area based on optically stimulated luminescence (OSL) dating (China Postdoctoral Science Foundation) (2017.07-2020.06)	年小美 NIAN Xiaomei
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潮汐淹水对湿地热、水、碳交换的影响与机理研究(2016M601540) 中国博士后基金会 Effects of tidal flooding on Jiuduansha wetland-atmosphere exchange of heat, water vapor, and carbon dioxide (China Postdoctoral Science Foundation) (2017.01-2018.12)	黄颖 HUANG Ying
基于潮滩沉积微相识别的杭州湾中全新世海平面曲线重建(2016M601541) 中国博士后基金会 Reconstructing the Early-Mid Holocene sea-level curve of Hangzhou Bay based on interpretation of sedimentary microfacies (China Postdoctoral Science Foundation) (2017.01-2018.12)	刘演 LIU Yan

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获批重要项目
Selected Approved Projects

河口环境过程与生态效应 (国家自然科学基金杰出青年基金项目) Environmental processes and ecological effects in estuaries (NSFC Distinguished Young Scholars) (2018.01-2021.12)	侯立军 HOU Lijun
河口泥沙运动关键过程与滩槽格局转化研究(国家自然科学基金重点项目) Research on key processes of flow and sediment transport and alveolar pattern transform in estuaries (NSFC Key Program)	何青 HE Qing
黄河三角洲地貌演变的动力机制与环境效应(国家自然科学基金联合基金重点支持项目) (U1706214) Dynamic mechanisms and environmental effects of geomorphic deformation in the Yellow River Delta (NSFC Collaborative Fund Supported Program)(2018.01-2021.12)	陈沈良 CHEN Shenliang
长江和钱塘江河口早-中全新世物源演化及其对地貌塑造的意义(国家自然科学基金面上项目) (41771226) Sediment provenance of the Yangtze and Qiantang estuaries during the Early to Mid-Holocene and its geomorphological implication (NSFC General Project) (2018.01-2021.12)	陈静 CHEN Jing
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海岸水体浮游植物粒级的生物光学特性及遥感反演研究(国家自然科学基金面上项目) (41771378) Remote sensing inversion and bio-optical properties of phytoplankton size class in coastal waters (NSFC General Project) (2018.01-2021.12)	沈 芳 SHEN Fang

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基于稳定同位素和脂肪酸技术的中华绒螯蟹溯河洄游期食物来源研究(国家自然科学基金青年项目) (41706128) Diet sources of Chinese mitten crab (Eriocheir sinensis) during its upstream migration indicated by the stable isotopes and fatty acid composition (NSFC Young Scientist Fund) (2018.01-2020.12)	崔 莹 CUI Ying
地下河口对海岸带地下水排放可溶性无机氮通量的调节作用研究(国家自然科学基金青年项目) (41706081) Evaluation of subterranean estuaries on the modulation of dissolved inorganic nitrogen fluxes from submarine groundwater discharge (NSFC Young Scientist Fund) (2018.01-2020.12)	江 山 JIANG Shan
跨陆架水交换控制下苏北沿岸海域水体存留时间的数值研究(国家自然科学基金青年项目) (41706011) Numerical study on water residence time under the contro of cross-shelf water exchange in Subei coast (NSFC Young Scientist Fund) (2018.01-2020.12)	林 磊 LIN Lei
长江口南槽泥沙输移和地貌冲淤机制研究(国家自然科学基金青年项目) (41706093) Research on mechanisms of sediment transportation and geomorphological erosion/deposition in the South Passage of the Changjiang Estuary (NSFC Young Scientist Fund) (2018.01-2020.12)	梅雪菲 MEI Xuefei
不同水环境中铅-210、铯-137和钚同位素定年的对比研究(国家自然科学基金青年项目) (41706089) Intercomparison between lead-210, cesium-137 and plutonium isotopes chronology in different aquatic envirenments (NSFC Young Scientist Fund) (2018.01-2020.12)	王锦龙 WANG Jinlong
潮汐环境中千年尺度风暴强度的沉积记录解译(国家自然科学基金青年项目) (41706095) Sediment records interpretation of millennium-scale storm intensity in tidally dominated coastal environments (NSFC Young Scientist Fund) (2018.01-2020.12)	杨阳 YANG Yang
长江口外低氧现象的成因机制研究(国家自然科学基金青年项目) (41706015) Mechanisms controlling hypoxia formation and sustain off the Changjiang estuary (NSFC Young Scientist Fund) (2018.01-2020.12)	张文霞 ZHANG Wenxia
海南岛南部海岸风暴巨砾沉积揭示的风暴强度(国家自然科学基金青年项目) (41706096) Reconstructing storm intensities responsible for coastal boulder deposits from southern coast of Hainan Island (NSFC Young Scientist Fund) (2018.01-2020.12)	周亮 ZHOU Liang

科技部实验室专项基金
MOST Special Fund

2017年，科技部实验室专项共资助团队项目和人才队伍项目各7项。
Laboratory special fund, supported by the Ministry of Science and Technology (MOST) of China, granted to 14 projects including task team projects and talent funds.

专项基金资助一览表
List of Receipients of Special Fund

项目名称 Project	负责人 Investigator
长江未来五十年 Next 50 Years of the Yangtze River	陈中原 CHEN Zhongyuan
综合模型 Community Modelling	朱建荣 ZHU Jianrong
近海动力与环境 Coastal Ocean Dynamics Environment	吴辉 WU Hui
海岸与陆架耦合的生态动力学过程模拟 Marginal Seas (MARSEAS) working group	Richard Bellerby
河口海岸初级生产和食物网 Primary Production and Food Web of Coastal Waters	刘东艳 LIU Dongyan
观测体系建设 Development of Observation System	张卫国 ZHANG Weiguo
科普工作 Popularization of Science	童春富 TONG Chunfu
钚和镭同位素的质谱分析及其钚的海洋环境过程示踪 Determination of Pu and Ra isotopes using ICP-MS and the implication of Pu and Ra isotopes as mairne process tracers	王锦龙 WANG Jinlong
江苏中部海岸全新世风暴强度-频率研究 Intensity and Frequency of Storms on the Central Jiangsu Coast Since the Holocene	杨阳 YANG Yang
海南岛南部全新世晚期风暴事件的风暴巨砾沉积记录 Late Holocene Storm Events Recorded by Storm Boulder Deposits in Southern Hainan Island	周亮 ZHOU Liang
地下河口对可溶性无机氮通量的调节作用研究 Effects of Subterranean Estuary on Groundwater-Derived Dissolved Inorganic Nitrogen Fluxes	江山 JIANG Shan
东南沿海塑料附着生物群落结构研究 Plastic-Associated Microbial Assemblage along the Southeastern Coast of China	赵世烨 ZHAO Shiye
基于Lidar后向散射回波强度数据的河口海岸地带地物特征提取 Feature Extraction for Targets in Estuarine and Coastal Zones Based on Lidar Backscattered Echo Intensity Data	谭凯 TAN Kai
泥炭型河口痕量元素硒与有机质之间的相互作用 The Interaction between Selenium and Organic Matter in The Peatland-Dominated Estuary	常燕 CHANG Yan

科研进展
Research Programs

2017年度，河口海岸学国家重点实验室在科技部、国家自然基金委员会和上海市科委等国家、省部级各类项目和国际合作项目及应用研究项目的支持下，在实验室的三大研究方向上围绕国家重大需求、聚焦前沿科学问题，持续地展开了科学研究，取得以下成果进展。

In 2017, supported by Ministry of Science and Technology (MOST), National Natural Fund Committee (NNFC), Shanghai Science and Technology Committee and international cooperation projects and application research projects, the State Key Laboratory of Estuarine and Coastal Research (SKLEC) focused on vital demand and frontier science, carried out scientific research and made important progress.

实验室人员利用现场观测与模型结合的方法，研究了波浪和潮流共同作用下的潮滩短期变化规律；采用LISST-100C观测研究了洪季最大浑浊带区域泥沙絮凝的时空变化规律，解释了长江口最大浑浊带严重淤积的现象，为更好地实施航道疏浚管理提供指导；考虑了经济发展和人口增加导致的供水需求增加，在长时间尺度上进行了河口淡水资源风险评估，为城市水资源规划提供理论依据；通过动力地貌机制模型（Delf-3D），研究了长江河口年代际地貌演变机制，对河口未来的发展进行了预测，发现由于上游泥沙供给的减少，未来河口拦门沙及其内侧将发生显著冲刷；利用高分辨率多波束观测数据，解释了长江口潮区界大型沙波的表面形态；通过比较1981年和2012年的地形数据和表层沉积物粒径组成，发现了流域水沙变化对河口三角洲冲刷影响的新证据；通过对大量水沙动力数据的分析，揭示了大坝下游河床冲刷调整机制，定量指出三峡大坝下游河床冲刷极限；通过相位平均法断面水沙观测，量化了长江入海泥沙沿浙闽海岸输送的通量。

Explored the short-term variation of tidal flat under the effecting of wave and tide by combining the observations with model simulation. Studied the temporal and special variation of sediment flocculation in turbidity maximum zone in flood season based on LISST-100C observations, explained the severe deposition in the turbidity maximum zone of Changjiang Estuary and provided scientific references for a better management of channel dredging; Assessed the long-term estuarine freshwater risk by considering the increase in water supply caused by economic development and population increase, provided theoretical basis for urban water resources programming. Analyzed decadal morphological evolution of the Changjiang Estuary based on the process-based Delft-3D model, found that overwhelming amount of erosion would likely occur in the inner and mouth bar area of the estuary because of decreasing fluvial sediment supply; Explained the surface morphology of mega-dunes in tidal limit of the Changjiang Estuary based on the observations from high-resolution multi-beam echo sounder; found new evidence about the influences of fluvial water and sediment variations on the estuarine delta erosion by comparing the bathymetric data and grain diameters composition of surface sediment between 1981 and 2012; Explored the adjustment mechanism of river channel below Three Gorges Dam (TGD) based on intensive water and sediment records and quantified the influence region of TGD on downstream channel erosion; Quantified the sediment flux along the Zhejiang-Fujian coast that were delivered from the Changjiang River to the East China Sea through the water and sediment measurements from phase average method.

实验室人员通过矿物学方法揭示了沉积物的来源、输运和沉积机制；发现了磁性矿物在滨、浅海环境中埋藏后的早期成岩作用与沉积速率、沉积环境的氧化-还原条件、硫酸盐供应等因子的密切关系；揭示了全新世海平面和季风作用下，流域和海岸带环境变化及古人类文明的响应和适应性特征等。利用光释光技术，对沉积物、海岸带地层等进行了准确定年，取得了一批创新性的结论。通过实地调查和观测，揭示了盐沼边缘演变过程及其转型控制机制；海岸潮滩水动力和泥沙运动特征等。基于先进的仪器监测技术，综合分析了滩面冲淤与波流联合作用下沉积物输运之间的耦合关系；提出了中强潮砂质海滩台风作用的恢复过程及其响应机制。

In 2017, Scientists revealed the mechanism of sediment source, transportation and deposition with mineralogical methods. After the burial of early diagenesis of magnetic minerals in the foreshore and shallow marine environment is related to deposition rate, redox conditions of depositional environment, sulphate supply, and other factors. Environmental change of the river basin and coastal zone and adaptability of the ancient human civilization, in response to the Holocene sea level changes and monsoon variations. A series of innovative findings have been obtained by using optical luminescence dating technology to determine the accurate age of sediments and coastal

stratigraphy. Through field investigation and observation, the researchers found the process of salt marsh edge evolution and its transition control mechanism, and characteristics of sediment dynamic and sediment movement in coastal tidal flats. The coupling effects between beach deposition and erosion variations and sediment transport by waves and tidal currents was comprehensive analyzed, and the recovery process and response mechanism of meso-macro-tidal sand beach under the action of typhoon event are presented.

实验室人员立足遥感与GIS技术，通过现场调查和数值模拟，自主研发了高浑浊水体大气校正技术与方法，大幅提高了浑浊水体水色参数反演精度； 河口海岸物理海洋参数微波遥感反演与应用，改进了中、低风速下海表风向反演方法，改善了高精度、高空间分辨海表风场的反演精度；构建了长江口及邻近海域海表流场的SAR反演模型；探索了浅海水下地形及水深SAR反演的可行性理论与方法途径。发展了湿地遥感分类技术，对自然与人类活动对湿地演化的影响进行了评价。

Using remote sensing and GIS technologies and based on field investigation and numerical simulation, the SKLEC researchers independently developed techniques and methods for high turbidity water atmospheric correction to significantly improve the turbidity water color parameters inversion accuracy. In the field of physical-ocean parameters inversion and application in estuarine and coast by microwave remote sensing, the SKLEC researchers improved the wind-direction inversion method at medium and low wind speeds, which improved the inversion accuracy of high-precision and highly-resolved sea surface wind fields. Also, the SKLEC researchers constructed a SAR inversion model of the ocean surface flow in the Yangtze estuary and its adjacent sea areas and explored the feasibility and methodology of underwater terrain and water depth inversion in shallow sea by SAR. Additionally, the SKLEC researchers developed wetlands classification using remote sensing to evaluate the impact of nature and human activities on wetland evolution.

实验室人员潜心研究，探索了微塑料分离、筛选和研究方法，开发了近岸海洋雪中微塑料的分析方法；通过野外调研和室外分析，首次对长江河口及邻近海域底层沉积物中微塑料的分布进行了研究；广泛开展了微塑料在生物体中的分布及生物指示研究。对河口氮循环进行了进一步的深入研究，揭示了抗生素对脱氮过程的影响；拓展了毒性污染物对水环境中氮转化过程的影响研究。继续开展新型有机污染物的研究，建立了沉积物中雄激素及其前体孕酮的前处理及分析方法，并分析了长江口雄激素和孕酮的时空分布特征；分析了中国沿海养殖区沉积物中抗生素残留和抗性基因的持久性和风险；揭示了长江口典型药物残留的行为特征；阐明了河口环境条件下药物污染物对中华绒螯蟹的生态毒理效应。

The researchers in the Sate Key Laboratory investigated hard to explore the separation and sorting methods of microplastics, and finally developed the analysis methods for coastal microplastics in marine snow. By conducting field research and outdoor analysis, they also illustrated the distribution of microplastics in the estuary of Yangtze River and nearby seas' sediments. In addition, the scientists also studied the microplastics distribution in organisms and the organisms' indicative effects for microplastics pollution. The scientists further studied the nitrogen cycle in the estuary and revealed the impacts of antibiotics on the denitrification process. These achievements expanded the impact of toxic pollutants on nitrogen conversion process in aquatic environment. Moreover, the researchers continued to carry out investigations on new organic pollutants, by establishing the pretreatment and analysis methods of androgen and its precursor progesterone in sediments. They also analyzed the spatial and temporal distribution of androgen and progesterone in the Yangtze Estuary. Besides, the persistence and risk of antibiotic residues and resistance genes were analyzed in the sediments of coastal aquaculture in China. These results uncovered the behavioral characteristics of typical drug residues in the Yangtze Estuary. Finally, the ecotoxicological effects of drug contaminants on Eriocheir sinensis were also elucidated at the estuary environment.

实验室人员的研究阵地从长江口、东海拓展至北极及相关国际典型河口，实现综合研究。建立了痕量元素及其同位素洁净采样与分析技术平台，深入研究了中国陆架边缘海及开阔大洋中痕量元素生物地球化学行为及其气候与生态效应。基于多重核素示踪技术，阐明了东海海底移动泥输运过程，厘清了核素移动过程对沉积物年代学的影响，并定量评估了我国近海海底地下水及其生态环境效应。针对长江-东海陆架关键生物地球化学过程，刻画了陆源有机物长周期高分辨率分布特征；提出了长江口冲淡水输送“板块化”模式对生源要素转化的影响控制；发现了长江口南北两个低氧区在近底层水营养盐和氧亏损之间的耦合差异。刻画了北极冰川融水中铁和有机物输送特征，定量估算了输出通量对大洋生态系的影响；利用同位素锶(Sr)和钕(Nd)的放射源同位素，揭示了印度河流向海洋输送沉积物的元素地球化学

特征与气候和人文活动的关联。
Team members in marine chemistry research group have conducted field surveys in a few of typical estuaries on a global scale. They have established a series of methods with regard to sample collection and analyses for trace metal. Using these methods, they determined trace metal behaviors in marginal seas around China and open ocean, as well as the linkage between these behaviors and climate change. On the basis of radioactive tracer technique, an exploration on sediment transport in East China Sea was made. They also determined the influence of radioactive tracers on sediment chronology and the ecological impact of submarine groundwater discharge on coastal oceans. In the Changjiang-East China Sea region, a map for distribution of terrestrial organic matter with the characters of longer term and high resolution was drawn. They showed that the "plate format" transport of Changjiang Diluted Water (CDW) significantly influenced transformation of nutrient. They discovered a linkage between nutrient concentration and dissolved oxygen losses in the bottom of CDW. They displayed the distribution of iron and organic matter in glacier melt runoff in Arctic and calculated the magnitude of input to coastal oceans. With the help of radioactive isotope signatures of Sr and Nd, they revealed the interaction among climate change, human activities and elements adsorbed on sediment particles from Indian rivers to adjacent oceans.

实验室人员基于我国海岸带特有种海三棱 草的生态修复示范工程，研究了不同植被恢复模式（材料与定植强度）、沉积物特性和水文条件（泥沙淤积和水动力）下的植被恢复和土壤有机碳积累效果。提出了切实可行的潮间带原生植被种群快速恢复和功能提升（以固碳效益为例）的实践方案，为长江口滨海湿地土著种质资源库和湿地可持续管理提供了实践依据。发展了浑浊水体生物-光学参数定量反演方法和参数化模式，提高了光学参数的反演精度；自主研发了浑浊陆架边缘海生态环境参数的定量遥感技术，发展了硅藻与甲藻赤潮遥感识别方法，改进了浑浊海域浮游植物粒级结构遥感反演模式，揭示了复杂光学水体颗粒有机碳（POC）的光学代理参数及反演模式。
As part of research into the re-establishment of the native species Scirpus mariqueter in the salt marshes of the Yangtze Estuary, the roles of revegetation mode (planting density), site characteristics (sediment texture and hydrological regime) and community age (recently restored and mature marshes) in the storage of soil organic carbon (SOC) and nitrogen (SN) were examined. They put forward the feasible methods for rapid recovery and functional promotion of the intertidal native vegetation species (carbon fixation efficiency, for example). It provided the practice basis for native germplasm repository and sustainable management of the Yangtze river estuary coastal wetlands. The quantitative inversion method and parameterized mode of the turbid water biology-optical parameter were developed, and the inversion precision of optical parameters was improved. The SKLEC researchers independently developed the quantitative remote sensing technology of the ecological environment parameters in the turbidity shelf marginal sea, developed the remote sensing identification method of diatoms and alga, improved the remote sensing inversion model of phytoplankton granule structure in the turbid waters, revealed the optical agent parameters and the inversion model of the particulate organic carbon (POC) in the complex optical water.

基于以上研究，2017年实验室科研人员共发表SCI论文131篇，其中一区、二区论文57篇（top期刊论文37篇）。其中，由我室年小美助理研究员参与编写的论文 "Late Pleistocene archaic human crania from Xuchang, China" 在 Science 杂志上发表；我室外专千人计划特聘教授Richard Bellerby应 Nature Climate Change邀请在学术期刊Nature Climate Change发表特邀评论文章Oceanography: Ocean acidification without borders；由我室侯立军教授指导的论文 "Effects of silver nanoparticles on nitrification and associated nitrous oxide production in aquatic environments" 在 Science Advances 期刊上发表。
In 2017, 131 SCI papers were published, among which 57 were published in above level 2 of JCR journals and 37 were published in Top journals. The paper "The Late Pleistocene archaic human crania from Xuchang", which was written by the assistant researcher Nian Xiaomei, was published in the Science journal. Prof. Richard Bellerby, supported by the Thousand Talents Program for High-level Foreign Experts of China, published a review article "Oceanography: Ocean acidification without borders" in the journal of Nature Climate Change. "The Effects of silver nanoparticles on nitrification and associated nitrous oxide production in aquatic environments", which was directed by Prof. Hou Lijun , was published in the journal of Science Advances.

此外，实验室紧密结合国民经济和社会发展需求，努力解决沿海地区有关重大工程中的关键科学技术问题，为沿海地区国民经济建设和公众教育服务。受上海市水文总站、上海市海洋环境监测预报中心等多个部门的委托，建立风暴潮

和咸潮入侵等预警预报系统，服务于城市安全保障管理；受上海市海洋局委托，进行近岸海域互花米草现状调查；受三门核电有限公司委托，进行三门核电邻近海域沉积物吸附特性的研究；受中国地质调查局南京地质调查中心委托，进行重大水利工程对长江中下游地质环境影响调查评价；受上海城投原水有限公司青草沙水库管理分公司委托，研究青草沙水库库区生态特征变化及有效管控等。

Furthermore, in order to meet the increasing social and economical demands, SKLEC scientists were actively involved in the research that solved the key issues in coastal area developments to provide scientific instructions for the policy makers and to serve the public educations. Some of these researches are listed as follows. Commissioned by Shanghai hydrological terminus, Shanghai marine environment monitoring and prediction center and others departments, the warning and forecasting system of storm surge and salt-tide intrusion was established in Shanghai to serve the urban security management. We studied the current situation of Spartina alterniflora in the coastal waters, commissioned by Shanghai Oceanic Administration. SKLEC scientists assisted Sanmen nuclear power co. LTD to research on the adsorption characteristics of sediments in adjacent sea areas. We studied the impacts of major hydraulic engineering constructions on the geomorphological environment in middle and lower Yangtze River, commissioned by Nanjing Center of China Geological Survey. In order to guarantee the safe freshwater supply of Shanghai City, we studied the ecological change and the effective managements strategy of Qingcaosha Reservoir, under the request of Shanghai Chengtou Raw Water Co., Ltd.

河口演变规律与河口沉积动力学
Estuarine Evolution and Sedimentation Dynamics

Early Holocene groundwater table fluctuations in relation to rice domestication in the middle Yangtze River basin, China

Liu, T., Liu, Y.*, Sun, Q. L., Zong, Y. Q., Finlayson, B., Chen, Z. Y., Quaternary Science Reviews, 2017, 155: 79-85.

The early Holocene environmental amelioration stimulated the trajectory of Neolithic farming cultures and specific geographic settings played a role in determining the nature of these cultures. Using microfossil evidence, the present study reveals that the fluctuations of the groundwater table substantially influenced rice domestication in the Dongting Lake area of the middle Yangtze River basin in the early Holocene. Our ^{14}C-dated sediment core taken from the Bashidang (BSD) Neolithic site contains evidence that the site was a floodplain prior to human occupation ca. 8600 years ago. Poaceae, which contained wild rice (Oryza sp.) as indicated by combined pollen and phytolith evidence, and low counts of freshwater algae indicated a moist site condition. The area then gradually evolved into wetlands as the water table rose, in response to the increasing monsoon precipitation during the early Holocene. This favored rice domestication, assisted by firing and clearing, that continued to flourish for several hundred years. Finally, rice domestication declined during the late stage of the Pengtoushan culture, accompanied by evidence of the expansion of wetlands reflecting the effects of a rising groundwater table that had caused the cessation of rice farming at the Bashidang site after ca. 8000-7900 cal yr BP. This study shows that there are local effects at particular sites that may differ from the trend at the regional scale, necessitating a careful interpretation of the available evidence.

早全新世长江中游地表水位波动与水稻栽培的联系

过去的研究表明，全新世气候条件改善，促进了长江三角洲地区新石器稻作农业的诞生。因三角洲地区独特的地理位置，海陆交互过程显著，受限于海平面波动、地貌环境演变等因素，导致三角洲平原的稻作农业出现时间不早于距今7000年前。有趣的是，位于长江中游的洞庭湖流域，人类活动的历史可以追溯至距今12000年前。因远离河口区，洞庭湖流域的早期人类活动主要受到洞庭湖的水位波动影响。

研究在彭头山文化的八十档遗址附近获取了一个沉积物剖面(BSD)，利用^{14}C测年和孢粉、植硅体分析方法，恢复了彭头山文化期间（距今9000-7900年）的环境变化和人类活动过程。孢粉证据表明，在距今8600年前洞庭湖水位相对较低，八十档地区的水稻栽培开始出现。在随后的数百年中，洞庭湖保持低水位状态，人类活动和稻作农业得以持续发展。但在彭头山文化末期，洞庭湖区水面扩张，八十档遗址附近地表水位抬升。同时，禾本科花粉和水稻植硅体的记录表明，人工栽培水稻急剧减少，代表人类活动强度的碳屑含量也处于极低值，暗示了八十档遗址的废弃。研究揭示了长江中游地区环境变化与人类活动的关系密切，即使在全新世总体气候条件改良的背景下，局地的环境变化仍然制约着新石器的人类活动。

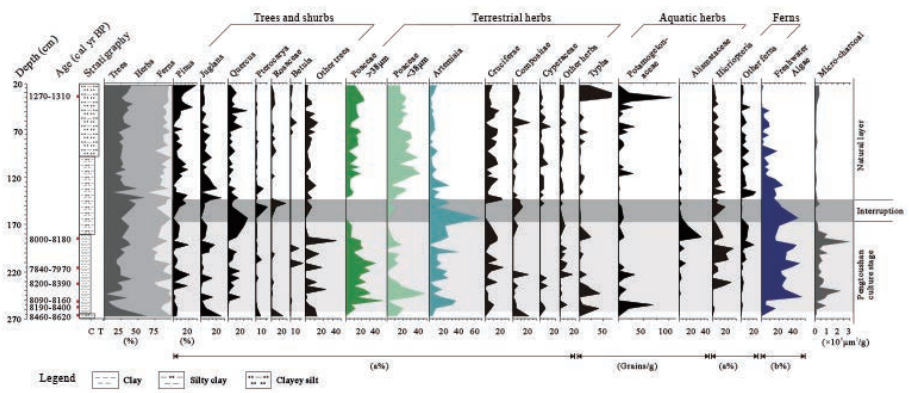


Fig. 2. Pollen-spore diagram of the Bashidang site with ^{14}C dates and sediment lithology. Arboreal pollen, terrestrial herbs and pteridophyte spores are presented as percentages (a%) of the total pollen and spore sum. Freshwater algae are calculated as a percentage (b%) of the sum of terrestrial pollen and freshwater algae. Aquatic herbs are shown in concentration (grains/g). Areal concentration of microscopic charcoal is presented in mm^2/g.

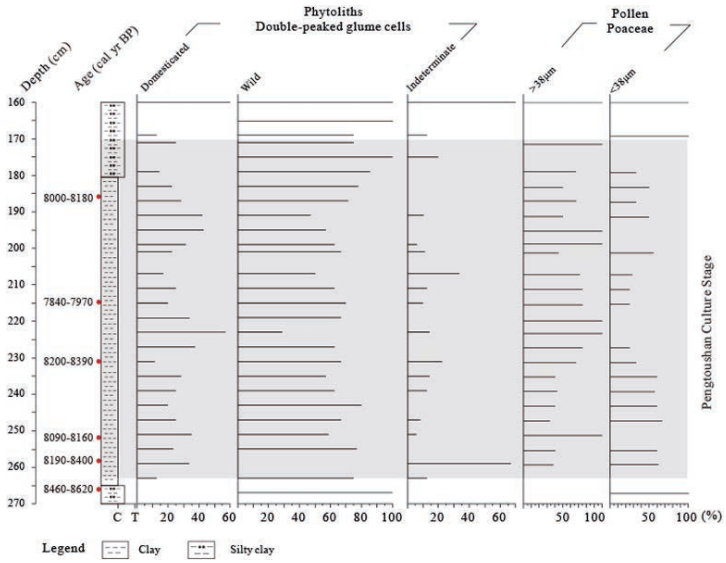


Fig. 3. Double-peaked rice phytoliths and Poaceae pollen identified in the cultural layer of the Bashidang site.

Recent morphological changes of the Yellow River (Huanghe) submerged delta: Causes and environmental implications.

Jiang, C., Pan, S.Q., Chen, S.L., Geomorphology, 2017, 293: 93-107.

The Yellow River (Huanghe) submerged delta (YRSD) has been under the threat of erosion and retreat during the Anthropocene due to the dramatic climatic and anthropogenic changes in the Yellow River basin. The analysis of field data shows that over the period of 1977-2005, the changes in climate (decrease in precipitation and increase in air temperature) and human interventions (increase in water diversion projects) throughout the watershed have resulted in the sharp reductions of river flow and sediment discharges into the Bohai Sea. Consequently, over the decadal timescale, morphological evolution of the YRSD has gone through three stages: i.e. rapid accumulation in 1977-1985, moderate accumulation in 1986-1995 and slow accumulation in 1996-2005. Climatic change within the catchment characterized by the rapid increase of air temperature contributed significantly to the transitions from the rapid accumulation to the moderate accumulation, and to the subsequent slow accumulation. The decadal morphological changes of the YRSD also show peculiar deposition/erosion characteristics over the medium timescale under river input reduction. Within the three decades, the patterns of the main sedimentary body exhibit irregular ellipses with the long axis parallel to the -5 or -10 m isobaths and short axis perpendicular to the isobaths. The depocentres of the YRSD are located between the -10 and -15 m isobaths close to the respective river mouths, with a high vertical accretion rate of ~ 1.20 m/yr. The time series data of annual volumetric change of the YRSD and river sediment load from 1977 to 2005 further demonstrate significant linear positive relationships between deltaic geomorphic change and fluvial input over shorter timescales (annual and 3-year). The critical sediment discharges for maintaining the deposition/erosion equilibrium state of the YRSD over the annual and 3-year timescales are found to be 1.79×10^8 t/yr and 1.29×10^8 t/yr, respectively. The analysis from the latest hydrological data (2006-2015) suggests that over the decadal timescale, the evolution state of the YRSD currently has transitioned from constructive to destructive due to the weakened fluvial input. Moreover, there exists a close quantitative link between the progradation of the Yellow River subaerial delta (YRAD) and the YRSD over the five-year timescale, indicating that every 1×10^8 m^3/yr increase of the YRSD's yearly volumetric change will result in a 3.28 km^2/yr increase of the YRAD's yearly land-accretion area, and the YRAD will reach the extension/retreat balance state when yearly morphological change of the YRSD is at 0.73×10^8 m^3/yr. The insights obtained from this study can provide valuable quantitative references for the sustainable development of the Yellow River delta, and be regarded as a typical case for the deltaic systems that are currently subject to catchment-scale natural and anthropogenic influences.

黄河水下三角洲近期地貌演变：原因与环境指示

黄河三角洲是黄河携带大量泥沙在弱动力河口淤积而成，曾是世界上淤进最快的大河三角洲。近几十年来，受流域气候变化及强烈的人类活动影响，黄河入海水沙骤减，三角洲正面临严峻的侵蚀危机。研究黄河三角洲对流域水沙变化的响应是一项迫切的工作。以往的研究多关注陆上三角洲。研究利用系列遥感影像及水下地形数据，分析了黄河水下三角洲不同时间尺度地貌演变及其分布，建立了陆上与水下三角洲地貌演变的联系。结合入海水沙及流域水文气象数据，量化了水下三角洲地貌过程对流域水沙变化的响应，研究了流域自然过程与人类活动对水下三角洲地貌演变的影响。研究表明，在1976-2005年间，水下三角洲年淤积量呈明显下降，年际波动显著，其与流域来沙量密切相关，年入海沙量每增加1×10^8 t/a将引起水下三角洲淤积增加1.14×10^8 m^3/a。在年与年际尺度上，水下三角洲淤积侵蚀平衡的临界入海泥沙通量分别为1.79×10^8 t/a和1.29×10^8 t/a。水下三角洲年代际地貌演变经历了快速、中度及缓慢淤积三个阶段，其堆积体均呈长轴平行于等深线的不规则椭圆形；堆积中心位于口外10~15 m等深线之间。流域自然过程对水下三角洲演变影响显著。在年际时间尺度上，水下三角洲体积增长与陆上三角洲面积增长密切相关，水下三角洲淤积量每增加1×10^8 m^3/a将引起陆上三角洲面积增长3.28 km^2/a。

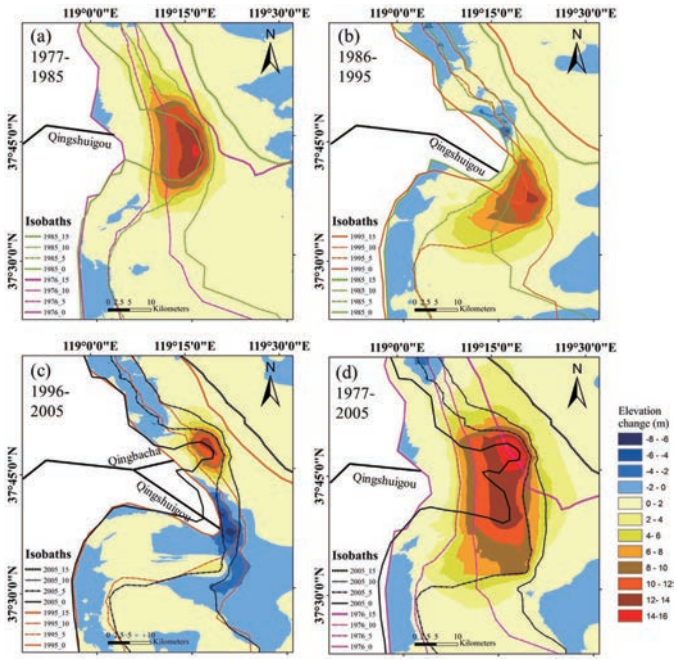


Fig. 1. a) Map of the Yellow River basin, with geographic locations of major hydrological stations, reservoirs, tributaries and the YRD (as boxed); b) topographic map of the YRD with bathymetry survey profiles.

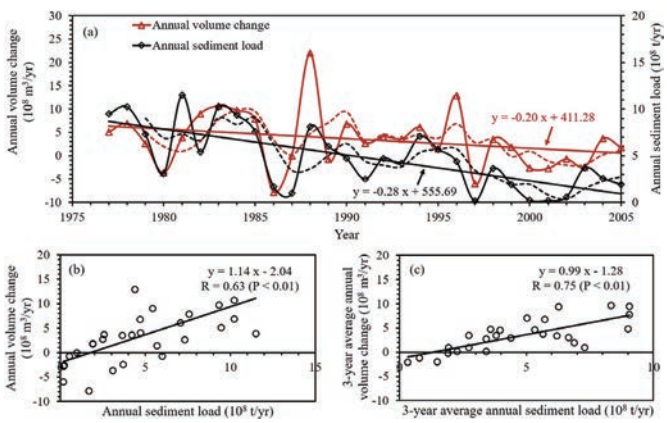


Fig. 7. Temporal variations in annual volume change of the YRSD (V) and sediment load (Qs) between 1977 and 2005 (the dash lines for the 3-year moving averages) (a), and relationships between volume change and sediment load over the annual (b) and 3-year (c) timescales.

Process-based morphodynamic modeling of the Yangtze Estuary at a decadal timescale: Controls on estuarine evolution and future trends

Luan, H. L., Ding, P. X.*, Wang, Z. B., Ge, J. Z., Geomorphology, 2017, 290: 347-364

Understanding the decadal morphodynamic evolution of estuaries and deltas and their controls is of vital importance regarding management for estuarine function and sustainable development. This work addresses this issue by applying a process-based model system (Delft3D) to hindcast and then forecast the morphodynamic evolution of the Yangtze Estuary at a decadal timescale. Forced by the river and tides, the model considers sandmud mixture and the variations of river water discharge and sediment discharge. The morphodynamic model is validated against three periods, i.e., an accretion period (1958–1978), an erosion period (1986–1997) and a recent accretion period with human activities (2002−2010). Model results show good performance with respect to spatial erosion and deposition patterns, sediment volume changes, and hypsometry curves. The model reveals quite different behaviors for mud transport between the dry and wet seasons, which is subject to the prescription of river boundary conditions and bed composition. We define six scenarios to project evolution to the year 2030 under decreased river inputs and increased relative sea level. The simulations reveal that overwhelming amount of erosion will likely occur in the inner and mouth bar area of the estuary. Particularly, the mouth zone will shift from net deposition before 2010 to net erosion by 2030, mainly because of decreasing sediment supply. Changes in water discharge have minor effects on the projected trend. Net erosion will be considerable when the sediment supply is extremely low (100 Mt yr^{-1}) due to the abundance of erodible modern sediment in the Yangtze Estuary. Erosion within the mouth bar area may be unexpected, including the deepening of the tidal inlet at East Chongming mudflat and the formation of a flood channel on the seaward side of Jiuduansha Shoal. Overall, the model results provide valuable information for sustainable delta management under changing conditions for both the Yangtze system and other similar estuaries and deltas with diminishing sediment supplies.

基于过程的长江河口年代际冲淤演变模型的建立与应用

根据长江河口年代际冲淤演变过程和主控因子的认识，基于国际上广泛应用于河口近岸水沙地貌研究的Delft3D 模型，建立了长江河口年代际冲淤演变模型。模型通过对多年月平均径流量和输沙量的概化来考虑季节性水沙输入，保证水沙总量与实测值相同，基于2015年9月长江口大面积底质调查资料在模型中考虑多种泥沙组分，地貌加速因子的取值通过敏感性实验来确定。为检验地貌模型的可靠性，选取3个特征历史时期（2002-2010、1986-1997和1958-1978）进行后报模拟，冲淤分布、冲淤体积和水深面积曲线的验证结果证明模型在定性和定量上均具有较高的可靠性，具备预测未来几十年演变趋势的能力。

利用建立的长江河口年代际冲淤演变模型，以“长江口综合整治规划”中二十年时长为例，预测 2010-2030 年冲淤演变趋势，模拟情景考虑未来径流量和输沙量的变化、相对海平面上升及规划河口工程。结果表明长江河口整体上将以冲刷为主，前缘潮滩将出现不同程度的蚀退，口内河段保持净冲刷态势，而拦门沙地区则由2010年以前的净淤积转变为净冲刷。长江河口年代际冲淤演变模型建立的方法具有普适性，其演变趋势的预测结果对河口综合整治可提供一定的科学指导。

Dramatic variations in water discharge and sediment load from Nanliu River (China) to the Beibu Gulf during 1960-2013

Li, S. S., Dai, Z. J.*, Mei, X. F., Huang, H.*, Quaternary International, 2017, 440: 12-23.

River discharge and sediment variation is vital to material transport between river and sea, which is the focus of research on riveresea interaction. This study takes Nanliu River, a typical independent river into the sea in Beibu Gulf as an example, analyzing river regimen and river bed morphology variations during 1960s-2013 in response to climate change and human activities based on wavelet analysis and ManeKendall test methods. The results indicate that river discharge and sediment in Nanliu River have significant seasonal characters with over 70% and 90% river discharge and sediment occur in summer half year. Compared with 1960s-1980s, the time of peaked monthly river water discharge and Suspended Sediment Concentration (SSC) during 1990s-2000s had shifted from June/August to July and from April to July, respectively. Meanwhile, both river flow and SSC present 4e6 years and 11 years fluctuations. In the recent 50 years, annual river discharge and SSC present downward trends with discharge decreased by 13.9% and 22.28% respectively in up-

stream and downstream while SSC decreased by 33.72% and 49.05% in upstream and downstream, respectively. Rating-curve between flow and SSC turns from clockwise rotation with enveloped area during 1965-1989 to a relatively narrow appearance during 1990-2012 in upstream, but indicates relatedly mild variation in downstream. Evolution of river bed morphology is characterized by "erosion in flood season and deposition in dry season". Moreover, the river flow entering the sea is dominated by precipitation while the sediment entering to the sea is controlled by middle and lower reaches supply. Human activities, including soil erosion, forest conservation and hydraulic engineering along the river, are responsible for the decrease of river water and sediment discharge entering the sea.

1960s-2013年北部湾南流江入海水沙变化研究

河流入海水沙变化关乎陆海物质循环和物质迁移，是陆海相互作用研究关注的焦点。尽管我国一直对长江、珠江以及黄河开展了大量研究，但西南地区独流入海河流水沙变化的研究鲜有报道。基于此，研究基于南流江长期实测水沙以及河槽断面变化等资料，分析北部湾北部典型独流入海河流——南流江的水文过程。结果发现，近50年来该河流下半年平均流量和输沙量占全年比例分别是70 %和90 %以上；与1960s-1980s相比，1990s-2000s的月平均流量与月平均含沙量峰值分布从6、8月变为7月，从4月变为7月；河流水沙有4-6年和11年的振荡周期；同时，近50年来上游水沙分别年均下降13.9 %和22.28 %。相对而言，下游入海水沙年均下降则是33.72 %和49.05 %，水沙比率曲线呈现逆时针规律。河槽对水沙变化的响应特征为：洪季冲刷，枯季淤积。此外，河流径流受降雨量控制，河流入海水沙的减小与植被保护、水利工程等人类活动有关系。该研究有助于揭示我国西南河流水沙输运及其河口沉积的响应特征，有重要的科学意义和应用价值。

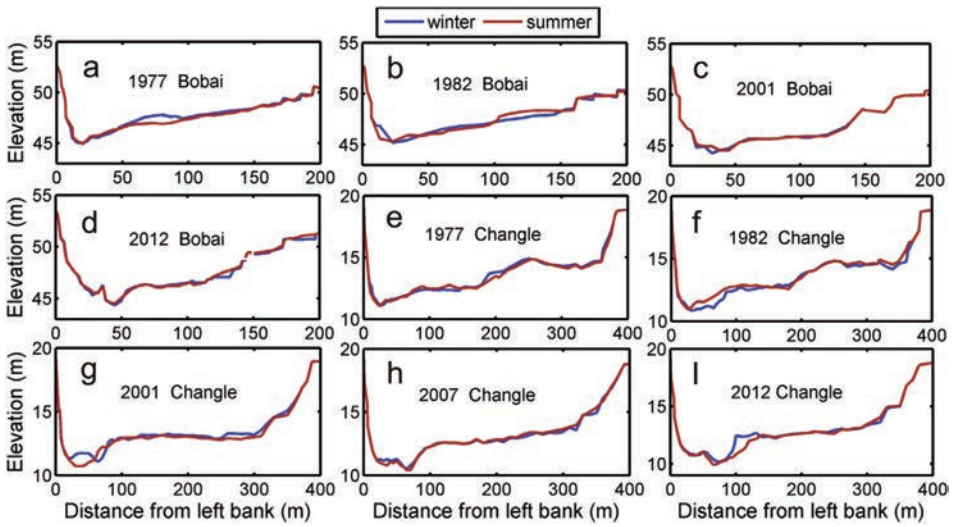


Fig. 8. Decadal rating curves between monthly river discharge and Suspended Sediment Concentration (SSC) (a. Bobai; b. Changle).

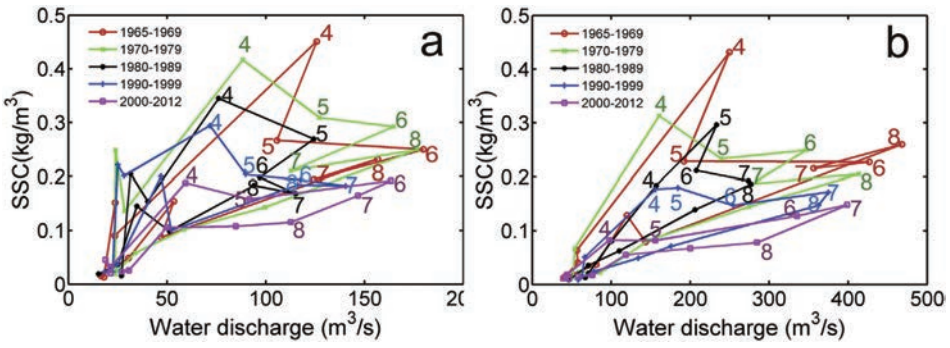


Fig. 13. Comparison of cross sections between summer and winter at Bobai and Changle stations.

Erosion potential of the Yangtze Delta under sediment starvation and climate change

Yang, H. F., Yang, S. L.*, Xu, K. H., Wu, H., Shi, B. W., Zhu, Q., Zhang, W. X., Yang, Z., Scientific Reports, 2017, 7: 10535.

Deltas are widely threatened by sediment starvation and climate change. Erosion potential is an important indicator of delta vulnerability. Here, we investigate the erosion potential of the Yangtze Delta. We found that over the past half century the Yangtze's sediment discharge has decreased by 80% due to the construction of >50,000 dams and soil conservation, whereas the wind speed and wave height in the delta region have increased by 5–7%, and the sea level has risen at a rate of 3 mm/yr. According to hydrodynamic measurements and analyses of seabed sediments, the period when bed shear stress due to combined current-wave action under normal weather conditions exceeds the critical bed shear stress for erosion (τ cr) accounts for 63% of the total observed period on average and can reach 100% during peak storms. This explains why net erosion has occurred in some areas of the subaqueous delta. We also found that the increase with depth of τ cr is very gradual in the uppermost several metres of the depositional sequence. We therefore expect that the Yangtze subaqueous delta will experience continuous erosion under sediment starvation and climate change in the next decades of this century or even a few centuries.

泥沙匮乏和气候变化情境下长江三角洲侵蚀展望

在全球气候变化和流域来沙减少的情况下，三角洲正面临越来越严峻的威胁。长江是世界上最大的河流之一，其输沙量和径流量都曾排在世界前列。然而，由于大量水库修建和流域水土保持工程，长江入海泥沙通量已经由上世纪60年代的>500 Mt/y下降到目前（2013~2015）的~120 Mt/yr。研究基于多点水动力观测和底床沉积物的测定分析，探讨了长江水下三角洲底床沉积物的侵蚀潜力。研究发现，平静天气下潮周期内的波流联合剪切应力大于底床沉积物的临界侵蚀剪切应力的时段平均占63%，而风暴期间波流联合剪切应力大于临界剪切应力的时段可达100%（Fig.3），这从动力机制上说明长江水下三角洲是可侵蚀的。长江水下三角洲柱状样的分析表明，上层几米沉积物的临界剪切应力变化不大，均处于可侵蚀状态。与上世纪50年代相比，近几年长江水下三角洲海域年平均风速和波高增加了5-7%。研究推测，在未来几十年或甚至几个世纪，长江水下三角洲将持续发生侵蚀，这一认识对三角洲海岸管理有借鉴意义。

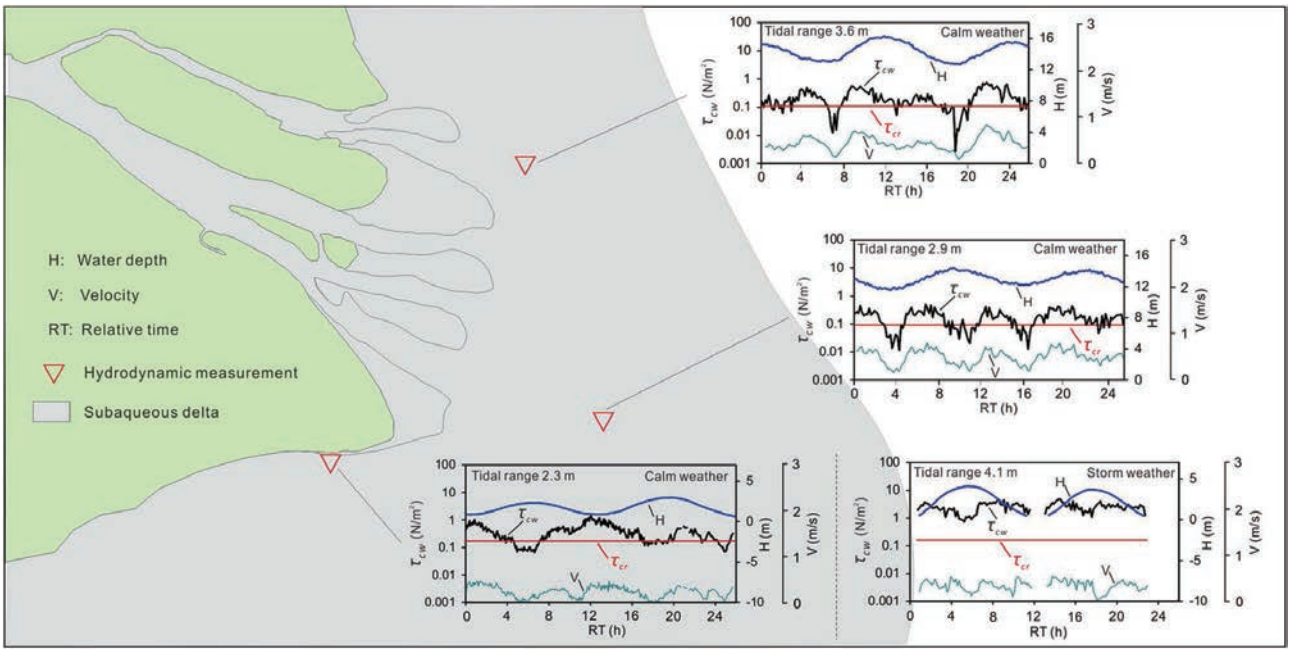


Figure 3. Four examples showing intratidal variations in the water depth, near-bed velocity and combined current-wave shear stress (τcw) compared to the critical bed shear stress (τcr) at the observation stations. A complete exhibition of all the observations was in the attached Supplementary Fig. S1. The figures were created using ArcGIS 10.1 (www.esri.com/software/arcgis) and CorelDRAW Graphics Suite X6 (http://www.coreldraw. com/en/product/graphic-design-software).

Morphology and mechanism of the very large dunes in the tidal reach of the Yangtze River, China

Zheng, S. W., Cheng, H. Q.*, Wu, S. H., Shi, S. Y., Xu, W., Zhou, Q. P., Jiang Y H. Continental Shelf Research. 2017, 139: 54-61.

Large-scale development of dunes easily causes the waterway to silt up, and it may pose a threat to the safety of water-related projects and coastal areas. High-resolution multibeam data was used to interpret the surface morphology of very large dunes (VLDs) in the tidal reach of the Yangtze River, China. These VLDs can be divided into three categories according to their surface morphological characteristics. (1) VLDs-I: those with a smooth surface and cross-section; (2) VLDs-II: those accompanied by secondary dunes; (3) VLDs-III: those accompanied by secondary dunes and numerous elliptical pits. Parameters and spatial distribution of VLDs, and bed surface sediment were analyzed in the laboratory. Overall, channel morphology is an important factor affecting the development of VLDs, and channels with narrow and straight and certain water surface slope are facilitating the development of VLDs by constraining stream power. Meanwhile, distribution density of VLDs depicts a decreasing trend from Chizhou towards the estuary, are probably influenced by channel morphology and width. Associated pits in VLDs-III change the 3D dune morphology by distributing in secondary dunes as beads. The Three Gorges Dam project (TGP) leads to the bed surface sediment activity frequently and leads to the riverbed surface sediment coarsens, which promotes the further development of dunes. Moreover, other human activities, such as river regulation project, sand mining and Deep Water Channel Regulation Project have changed the regional river boundary conditions and hydrodynamic conditions are influential on the development of VLDs.

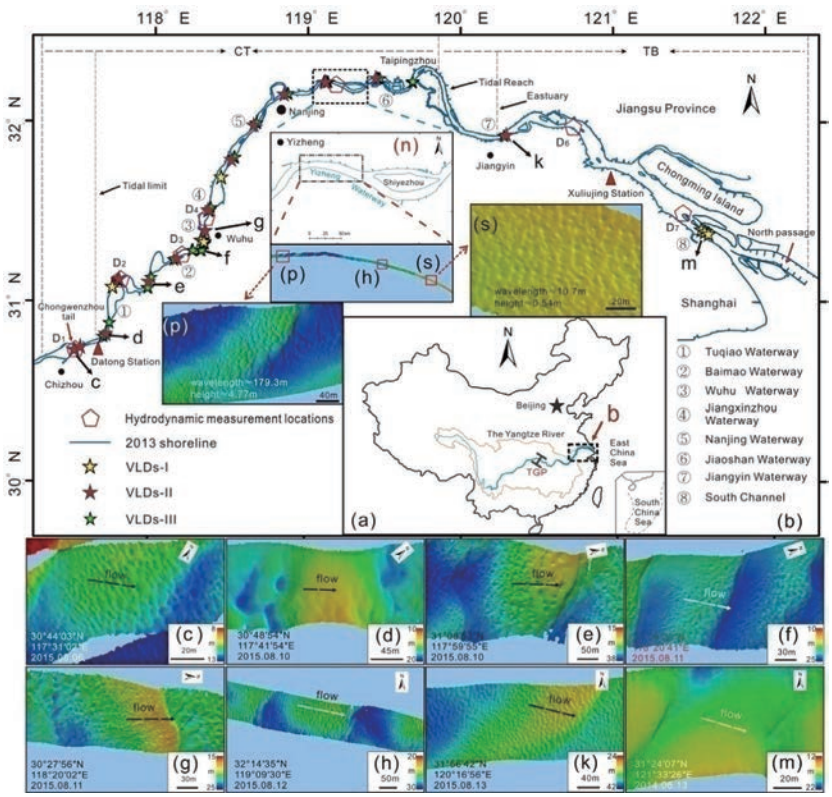


Fig. 1. Diagram of the Yangtze River drainage area and distribution of VLDs. (a) Diagram of the Yangtze River drainage area and the study segment; (b) Diagram of the divisions of the study segment, the hydrodynamic measurement locations (flow velocity measured by an acoustic Doppler current profiler (ADCP)). (c)–(h), (k), (m) and (p) Images of VLDs in the study segment (n) Enlarged of the Yizheng Waterway and the water depth image measured by using a Seabat 7125 multibeam echo sounder (s) The image of dunes in the Yizheng Waterway, CT is Chizhou to Taipingzhou and TB is Taipingzhou branch to the north passage of the Yangtze River estuary. TGP is Three-Gorges Dam Project in (a).

长江感潮河段巨型沙波的形态特征与发育机制

沙波是一种浅海、河流以及河口常见的横向底形之一。研究利用高分辨率多波束测深数据对长江感潮河段巨型沙波进行了观测，依据表面形态特征将其分为三类：第一类为表面形态与横剖面曲线光滑；第二类为发育次级沙波；第三类为同时发育次级沙波与大量的椭圆形凹坑。对这三类巨型沙波的形态参数以及空间分布特征进行了统计与分析，认为河道形态是影响巨型沙波分布的重要因素之一，其中束窄、顺直且坡度变化不大的河道因为水流较稳定有利于巨型沙波的发育。同时，巨型沙波的分布密度从上游向下游呈逐渐降低的趋势。伴生凹坑的存在改变了巨型沙波的横断面特征。三峡大坝导致河床表层沉积物粗化有利于沙波的发育，然而其他人类活动，如采砂、河道整治和深水航道工程等改变了河流边界条件，均对巨型沙波的发育有一定的影响。

Provenance discrimination of the clay sediment in the western Taiwan Strait and its implication for coastal current variability during the late-Holocene

Chen, J.*, Ma, J. Q., Xu, K. H., Liu, Y., Cao, W. H., Wei, T. Y., Zhao, B. C., Chen, Z. Y., Holocene, 2017, 27(1): 110-121.

This study aims to quantify the contribution of Yangtze clays to the sediment accumulation in the western Taiwan Strait and reconstruct the strength of Chinese Coastal Current (CCC) since middle-Holocene driven by East Asian Winter Monsoon (EAWM). Both down-core and surficial sediment samples were collected for grain size, radiocarbon, and clay mineral analyses. One 250-cm-long core was collected from the southern Yangtze distal mud wedge in western Taiwan Strait which receives Yangtze-derived clays transported by the Zhejiang-Fujian Coastal Current (ZFCC), the southern part of CCC. Clay minerals were examined in surficial sediment samples which were influenced by the Yangtze, Zhejiang-Fujian, western Taiwanese rivers, and the inner-shelf mud wedge. Ternary diagrams of smectite–kaolinite–chlorite revealed that three endmembers represented the Yangtze, Min, and western Taiwanese rivers, respectively. The estuaries seaward of the tidal current limits of Zhejiang-Fujian rivers, especially the Qiantang and Ou, were influenced by Yangtze-derived sediments through energetic tidal mixing. It was found that smectite can be used as a fingerprint of the Yangtze fine-grained sediment because among all the studied rivers, the Yangtze is the only one supplying smectite. Clay mineral results in core sediments revealed a dramatic provenance change at the depth of 113 cm, dated at ~4.0 cal. kyr BP. Smectite disappeared in the upper core, suggesting decreased contribution of Yangtze clays to the southern distal mud wedge. Decreased grain size of the fine population in the upper core also indicated that the ZFCC weakened during the late-Holocene. Such a decline also occurred in Subei Coast Current (northern part of CCC), revealed by the previous studies.

台湾海峡西部粘土级沉积物来源及其对晚全新世沿岸流的指示

陆源碎屑是海洋沉积物的重要来源，尤其是在大陆架浅海区域。陆源物质入海后的输移受控于洋流，洋流的强弱及路径的变化对沉积物的搬运沉积过程起着决定性的作用。台湾海峡西部地区浙闽泥质条带末端沉积物来源即受控于浙闽沿岸流以及台湾暖流，既有大陆东南沿海河流泥沙，也有台湾西部河流泥沙。实验室古环境研究中心分析了该区域中晚全新世粘土沉积物的来源，并反演东亚冬季风驱动下的浙闽沿岸流变化。

现代河流表层沉积物粘土矿物特征显示，蒙脱石可作为区分长江和浙闽河流（钱塘江、瓯江、闽江）以及台湾西部河流（浊水溪、大安溪、大甲溪、乌溪）的物源指纹，蒙脱石-绿泥石-高岭石三端元图可以较好的区分这些河流的物源；台湾海峡西部钻孔F15孔沉积物粘土矿物分析结果显示，约4.0 cal. kyr BP前，沉积物中粘土矿物蒙脱石出现的频率较为频繁，偏向长江物源端。4.0 cal. kyr BP至今，粘土矿物更加接近台湾西部和浙闽河流端元。这一物源变化揭示了相对于6.0-4.0 cal. kyr BP阶段，晚全新世浙闽沿岸流有所变弱，苏北沿岸流也有类似的现象。这可能与东亚冬季风的演化有关，6.0-4.0 cal. kyr BP阶段全球经历多次冷阶段，冬季风加强，相应的中国沿岸流也有所加强，之后转弱。这一变化也造成了浙闽泥质区沉积速率在4.0 cal. kyr BP以来有所减缓。

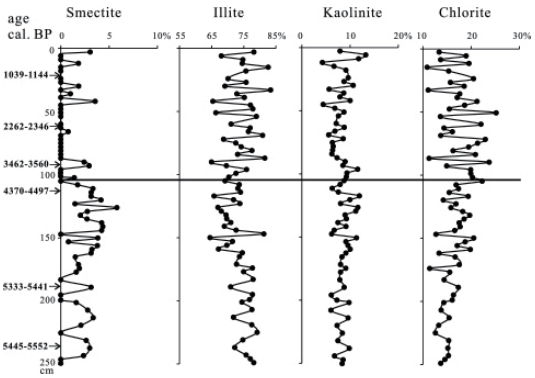


Figure 4. Clay minerals of core F15.

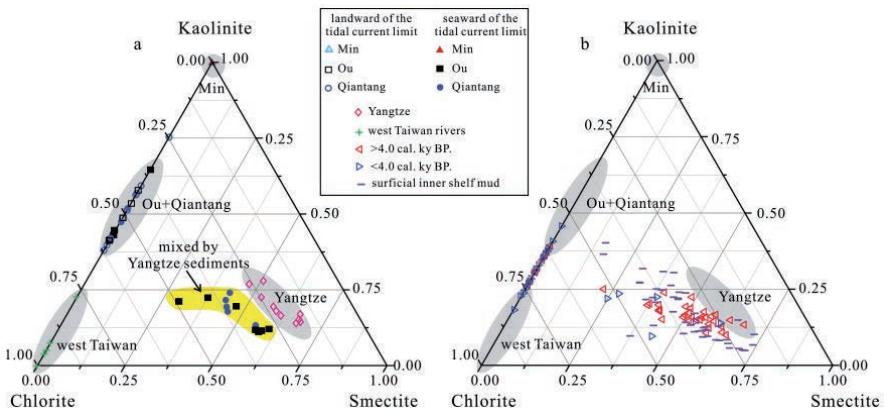


Figure 5. Ternary diagram of kaolinite–chlorite–smectite of (a) riverine sediments including surficial and TSS samples of this study and Xu et al. (2009a); and (b) the inner-shelf mud and core F15. Smectite is amplified by a factor of 10 times for easier comparison.

Tracing Sediment Erosion in the Yangtze River Subaqueous Delta Using Magnetic Methods

Ge, C., Zhang, W. G.*, Dong, C. Y., Wang, F., Feng, H., Qu, J. G., Yu, L. Z., Journal of Geophysical Research: Earth Surface, 2017: 2064-2078.

A sediment core can be typically divided into oxic, ferriginous, sulphidic and methanic zones with increasing depth, which can be magnetically identified. Sediment erosion will lead to incomplete diagenetic zonation in the core. We assessed the usefulness of magnetic properties for tracing sediment erosion in a deltaic environment. Surface and core sediments from the Yangtze River subaqueous delta were subjected to magnetic, granulometric, geochemical, and radionuclide analyses. Based on magnetic properties and particle size, the surface sediments can be divided into three groups. Groups I and II have a similar particle size distribution and geochemical composition, but the former has higher values of magnetic susceptibility (χ) and saturation isothermal remanent magnetization (SIRM). We interpret Group I as consisting of modern sediments, while Group II represents previously buried sediments that have undergone significant reductive diagenesis and that have been subsequently exposed by erosion. Group III has coarser particle size, which reflects the mixing of delta sediments with Pleistocene relict sands. Two cores from the areas occupied by Groups I and II have significantly different magnetic profiles. Core A3-4 (Group II) records a partial loss of magnetic mineral concentration due to diagenesis and has much lower χ, SIRM, and S_300 values than core A6-2 (Group I). Radionuclide dating reveals that core A3-4 sediments are older. We conclude that core A3-4 location has undergone erosion, which is consistent with recent bathymetric survey results. We propose that the ratio of SIRM/Fe can be potentially used to trace mobilized old sediment in this environment. Our study demonstrates that magnetic properties provide a robust approach for studying sediment dynamics in this type of environment. In addition, our findings provide insights into the nature of biogeochemical processes associated with deltaic erosion.

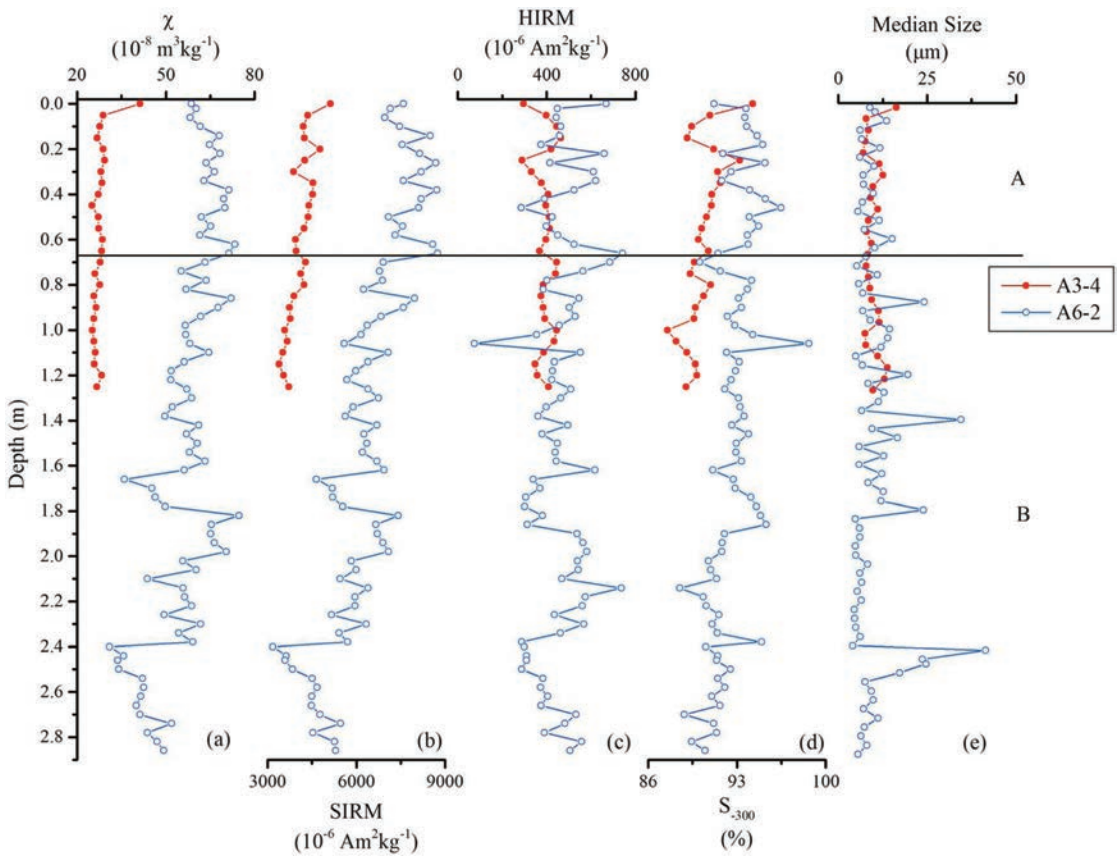


Figure 4. Down core variations of magnetic properties (a) χ, (b) SIRM, (c) HIRM, (d) S300, and (e) median size for cores A3-4 and A6-2. In core A6-2, χ, SIRM, and S300 are stable in the upper 0.68 m (unit A) and then decline to the base of the core (unit B). χ, SIRM, and S300 values are much lower in core A3-4 compared to those in core A6-2, although they have similar median size and HIRM values.

Will river erosion below the Three Gorges Dam stop in the middle Yangtze?

Lai, X., Yin, D., Finlayson, B. L., Wei, T., Li, M., Yuan, W., Yang, Z., Dai, S., Chen, Z.*, Journal of Hydrology, 2017, 554: 24-31.

The environmental impact of the Three Gorges Dam has been a subject of vigorous academic, political and social debate since its inception. This includes the key issue of post-dam river channel erosion, which was predicted by the feasibility study to extend to the river mouth. In this paper we examine the geomorphic response of the channel of the middle Yangtze for 660 km downstream of the dam. Using data on channel characteristics, bed material and sediment transport, we show that in the decade following the dam closure, pre-dam seasonal erosion has been replaced by year-round erosion, a pattern most marked at the upstream end of the study area. The sediment carrying capacity of the river channel has been largely reduced below the dam. The locus of bed scour has moved progressively downstream, ceasing as the bed material became too coarse to be transported (e.g. D50: 0.29 mm pre-dam coarsened to 20 mm below the dam by 2008). About 400 km below the dam there is a reduction in channel slope that changes the sediment carrying capacity from 0.25 kg m^3 to only about 0.05 kg m^3, which is insufficient to move bed sediment. The new long-term hydro-morphological equilibrium that will be established in this section of the middle Yangtze will prevent the further incision downstream initiated by the Three Gorges Dam. The results suggest that the full extent of adverse environmental impact predicted by the pre-dam studies will not eventuate.

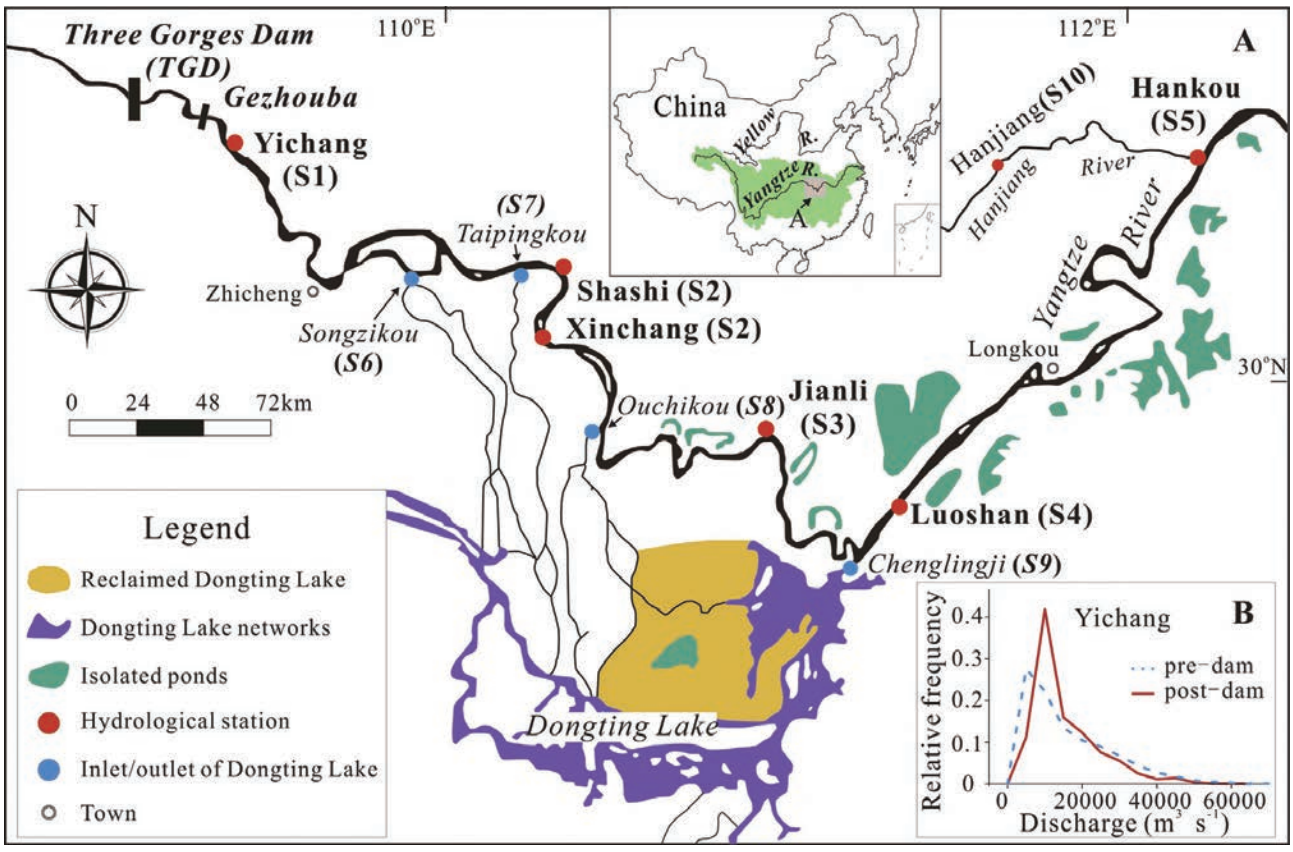


Fig. 1. The study area in the middle Yangtze River basin.

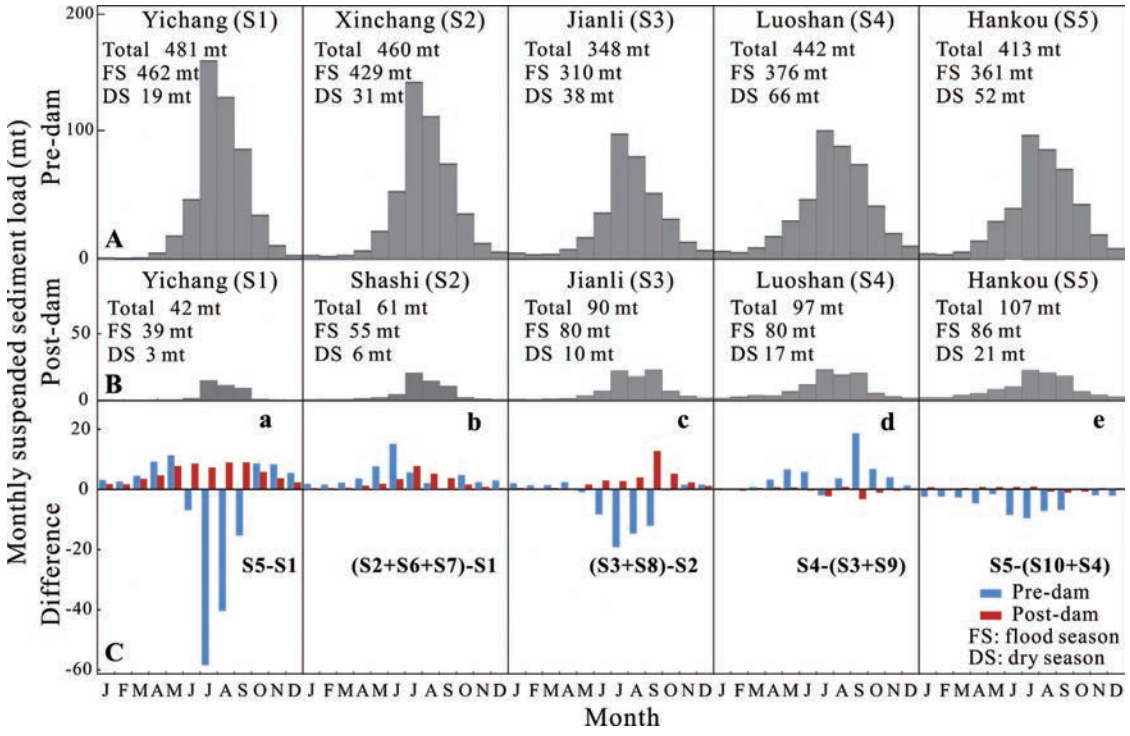


Fig. 2. Monthly suspended sediment loads at the five gauging stations on the Yangtze channel before (A) and after (B) the construction of the Three Gorges Dam. (C) Net changes in sediment load pre-and post-dam: (a) – over the whole study reach; (b) – between S1 and S2 less losses into Dongting Lake via S6 and S7; (c) – between S2 and S3 less losses into Dongting Lake via S8; (d) – between S3 and S4 plus gains from Dongting Lake at S9; (e) – between S4 and S5 plus gains from the Hanjiang River at S10.

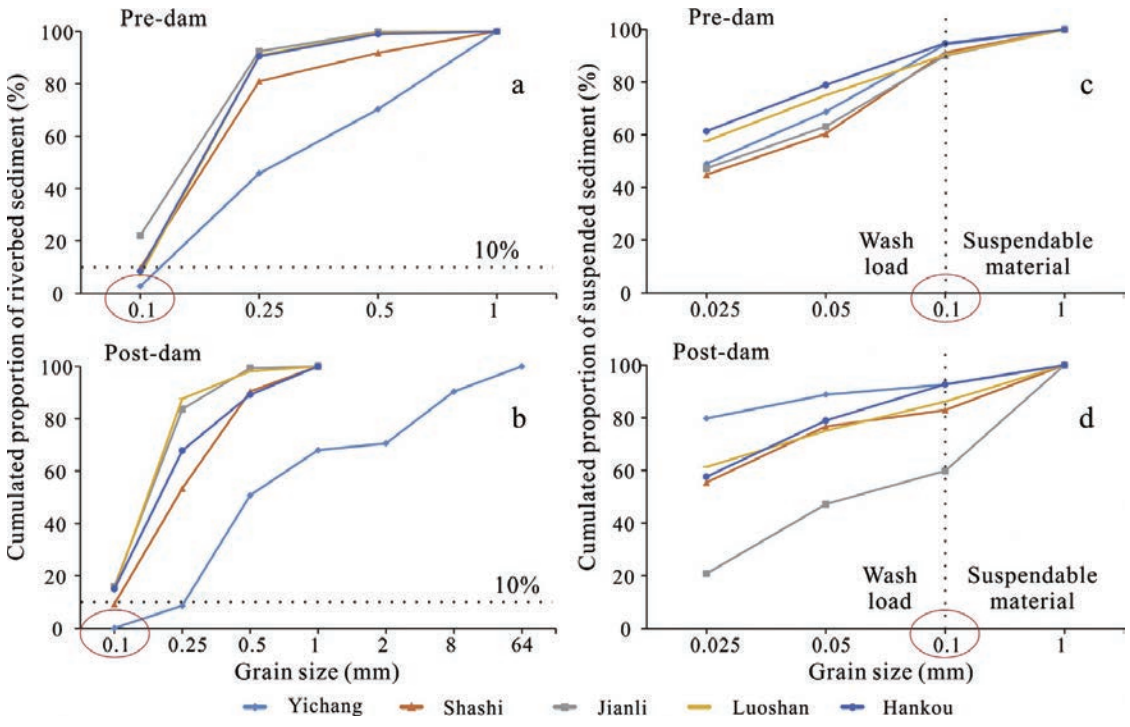


Fig. 3. Distribution of riverbed sediment of 5 gauging stations (S1-S5) pre- (a) and post-dam (b); distribution of suspended sediment of 5 gauging stations (S1–S5) pre- (c) and post-dam (d). Note: the grain size at 10% of riverbed sediment (a, b) is used to separate between wash load (%) and suspendable material (%) (c, d).

A study of in-situ sediment flocculation in the turbidity maxima of the Yangtze Estuary

Guo, C., He, Q.*, Guo, L., Winterwerp, J.C., Estuarine, Coastal and Shelf Science, 2017, 191, 1-9.

In order to improve our understandings of temporal and vertical variations of sediment flocculation dynamics within the turbidity maxima (TM) of the highly turbid Yangtze Estuary (YE), we deployed LISST-100C, a laser instrument for in-situ monitor of the sizes and concentrations of flocculated particles in a wet season. Field data in terms of vertical profiles of flow velocity, suspended sediment concentration (SSC), salinity, flocculated particle size distribution and volume concentration were obtained, based on field works conducted at consecutive spring, moderate, and neap tides.

Data analyses show that the mean floc diameters (D_M) were in the range of 14-95 μm, and flocculation exhibited strong temporal and vertical variations within a tidal cycle and between spring-neap cycles. Larger D_M were observed during high and low slack waters, and the averaged floc size at neap tide was found 57% larger than at spring tide. Effective density of flocs decreased with the increase of floc size, and fractal dimension of flocs in the YE was mainly between 1.5 and 2.1. We also estimated the settling velocity of flocs by 0.04-0.6 mm s^{-1} and the largest settling velocity occurred also at slack waters. Moreover, it is found that turbulence plays a dominant role in the flocculation process. Floc size decreases significantly when the shear rate parameter G is > 2-3 s^{-1}, suggesting the turbulence breaking force. Combined effects of fine sediment flocculation, enhanced settling process, and high sediment concentration resulted in a large settling flux around high water, which can in part explain the severe siltation in the TM of the YE, thus shedding lights on the navigation channel management.

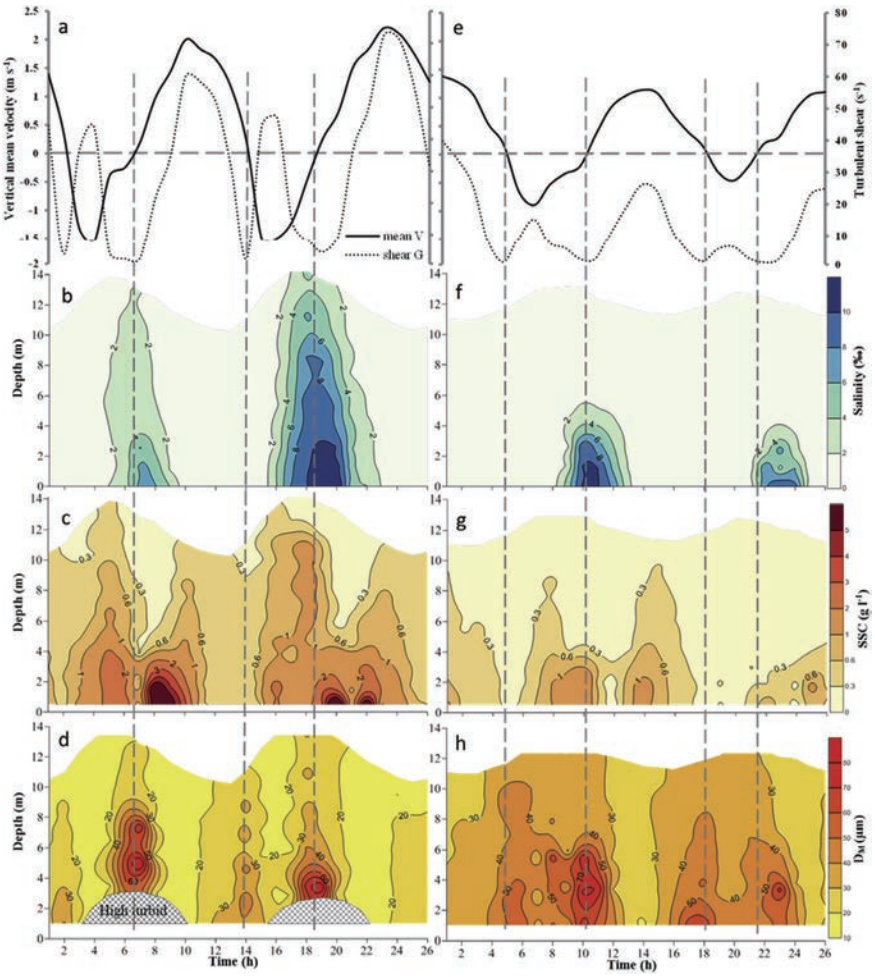


Fig. 2. (a, e) Vertical mean flow velocity and turbulent shear (ebb is positive), (b, f) salinity in‰, (c, g) suspended sediment concentration in g l1, and (d, h) distribution of mean floc size in mm. Left panels are results at spring tide, and right four panels are the results at neap tide.

Climate change and human occupations in the Lake Daihai basin, northcentral China over the last 4500 years: A geo-archeological perspective

Xu, L. C., Liu, Y., Sun, Q. L.*, Chen, J., Cheng, P., Chen, Z. Y., Journal of Asian Earth Sciences, 2017, 138: 367-377.

High-resolution climate variations since the last 4500 years in the monsoonal-arid transition zone ofnorth-central China were revealed through the integration of proxies from sediment cores in the Lake Daihai basin. Human occupations in the lake basin deduced from archeological findings and historical literatures were then incorporated into the climate sequence to demonstrate the patterns of human responses to the climate changes, and the recent anthropogenic effects. It indicated that: (1) Climate dominated human-environment adaptations prevailed prior to 2700 cal yr BP. An amicable climate setting before 4100 cal yr BP would facilitate the growth of the Laohushan Culture (LC) in the lake basin, while a pronounced deterioration of water thermal condition after that had led to human exodus and the collapse of the LC. The reduced human activity in the lake basin indicated at 3800–3500 cal yr BP and a subsequent cultural blank at 3500–2700 cal yr BP, were both in response to the climate and lake level fluctuations during 3800–2800 cal yr BP. (2) Transition to a positive human adaptation was seen at 2700–1100 cal yr BP, represented by the exploitation of arable land for cultivation and animal husbandry as the lake contracted. (3) An increasing human presence that affected environmental processes became more severe over the last 1100 cal yr BP. This was basically due to the ongoing lake shore reclamation for cropping, and more recently heavy metals emissions from fossil fuel combustion and local industries.

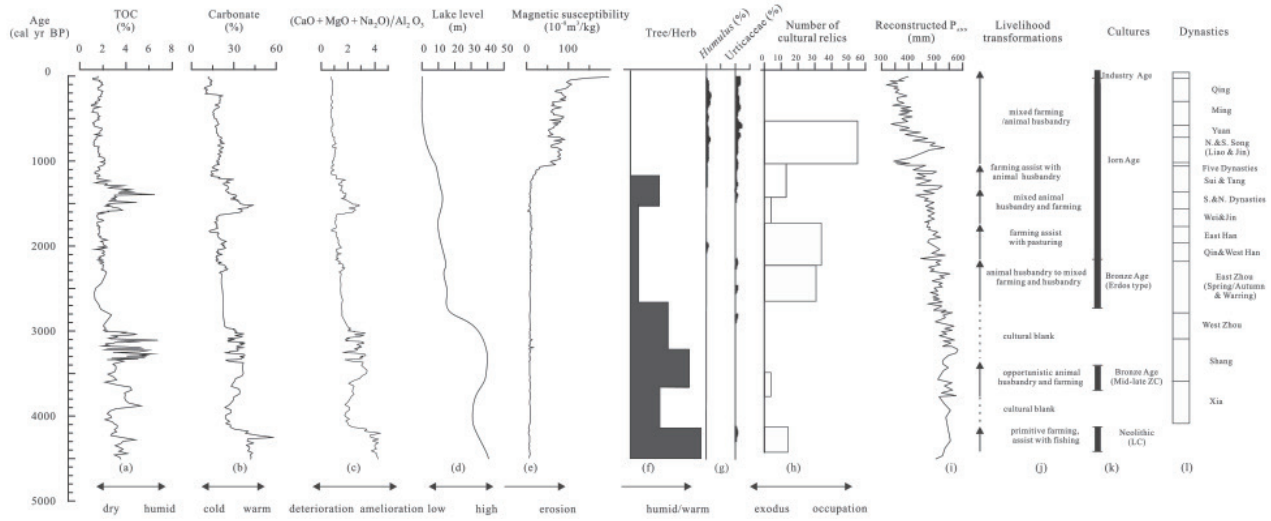


Fig. 6. Multi-proxies of DH03-2 sediment core. (a) TOC, an indicator of precipitation changes; (b) carbonate content ($CaCO_3$), an indicator of temperature changes; (c) (CaO + MgO + Na_2O)/Al_2O_3, a combined indicator of chemical weathering intensity, reflecting the water thermal setting of the lake basin; (d) lake level changes (Sun et al., 2009); (e) magnetic susceptibility; (f) humidity changes, reflected by percentage of tree/herb pollen of DH99A sediment core (Xiao et al., 2004); (g) Humulus and Urticaceae pollen of DH99A sediment core, indicating the increasing human activities in the lake basin (Xiao et al., 2004; Xu et al., 2004); (f) numbers of cultural relics discovered, showing the human occupations in the lake basin; (i) the pollen-based reconstruction of annual precipitation (PANN) from the Gonghai Lake (Chen et al., 2015b); (j) livelihood transformations; (k) cultural stages; (l) the Dynasties of China (Institute of History, Chinese Academy of Social Sciences, 2002).

Migration of the Intertropical Convergence Zone in North Africa during the Holocene: Evidence from variations in quartz grain roundness in the lower Nile valley, Egypt

Zhao, X. S., Liu, Y.*, Salem, A., Marks, L., Welc, F., Sun, Q. L., Jiang, J., Chen, J., Chen, Z. Y., Quaternary International, 2017, 449: 22-28.

This study reports the high-resolution (50-100 yr) temporal variations of quartz roundness used as a climate proxy in the sediment core FA-1 recovered in the Faiyum Basin of the lower Nile. A higher proportion of transparent angular quartz can be found in sediment transported from the upper to the lower Nile via runoff when the Intertropical Convergence Zone (ITCZ) migrated northwards during the Holocene. The stained rounded quartz in the core sediment can be linked to windblown input into the Faiyum Basin from the Sahara Desert when the ITCZ shifted southwards. Using this theory, we reconstructed the series of Holocene climate changes in relation to the ITCZ migration. Our quartz evidence revealed: 1) the African Humid Period (AHP) occurring in the basin at 9200-4200 cal. yrs BP; 2) a shortterm (5800-5400 cal. yrs BP) aridification occurred during the AHP; and 3) the rapid onset of hyperaridification at ca. 4200-4000 years ago, which then persisted. These ITCZ related climate pulses, have basin-wide implications supporting relevant paleoclimate studies in North Africa. In addition, our results suggested at least 3 times when hydro-geoengineering works were implemented to source water from the Nile for local farming during the hyper-aridification period.

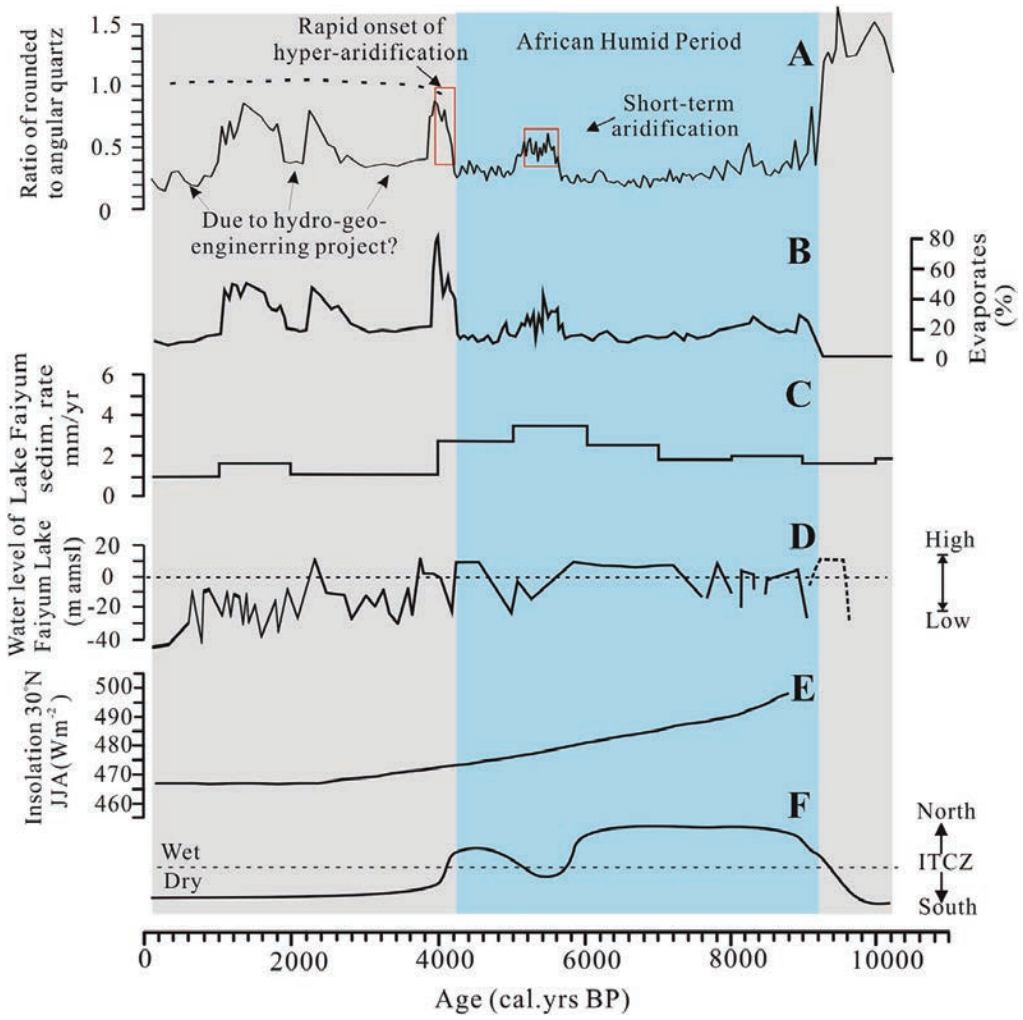


Fig. 5. A: Ratio of stained rounded quartz to transparent angular quartz; B: Evaporites (%); C: Millennia-averaged sedimentation rate of FA-1; D: Reconstructed water level of the Faiyum Lake (modified after Hassan, 1986; Hassan et al., 2012); E: the Holocene insolation at 30 N for June-July-August (Laskar et al., 2004); F: Reconstruction from the data of this study of the ITCZ position.

Morphological evolution of Jinshan Trough in Hangzhou Bay (China) from 1960 to 2011

Liu, Y. F.*, Xia, X. M., Chen, S. L., Jia, J. J., Cai, T. L., Estuarine Coastal and Shelf Science, 2017, 198: 367-377.

An extensive system of tidal channels, starting with Jinshan Trough in the east, is located along the north shore of Hangzhou Bay, China. This contribution investigates the morphological evolution of Jinshan Trough by using 17 bathymetric charts from a series covering a period of 51 years from 1960 to 2011. Three stages of evolution during this period are distinguishable based on the morphology and annual mean volume data. The first stage (1960-1987) is characterized by extension of the trough; the second stage (1987-1996) is a relatively stable period with some adjustments in the trough morphology; the third stage (1996-2011) is marked by the processes of erosion and deposition in the beginning of the period and a subsequent slow erosion process. Spatio-temporal variability of the trough was evaluated by using empirical orthogonal function (EOF) analysis. The first eigenfunction indicates that erosion is the main evolution process and there exists three stages similar to those distinguished from volume variations. The second eigenfunction mainly reflects erosion and deposition in the northwest part of the trough located in the flood tidal current shadow area of the artificial headland in Jinshan. The third eigenfunction mainly reflects annual fluctuations of erosion and deposition in the side slope at the artificial headland in Jinshan. A particularly intense erosion process occurred between 1996 and 1998. The major effects on morphological evolution in Jinshan Trough from 1960 to 2011 were investigated and tentative conclusions were presented. Continuous coastal reclamations in Jinshan had the most pronounced effect on the morphological evolution during the first and the second stages. The storm surge had a pronounced effect on the evolution at the beginning of the third stage.

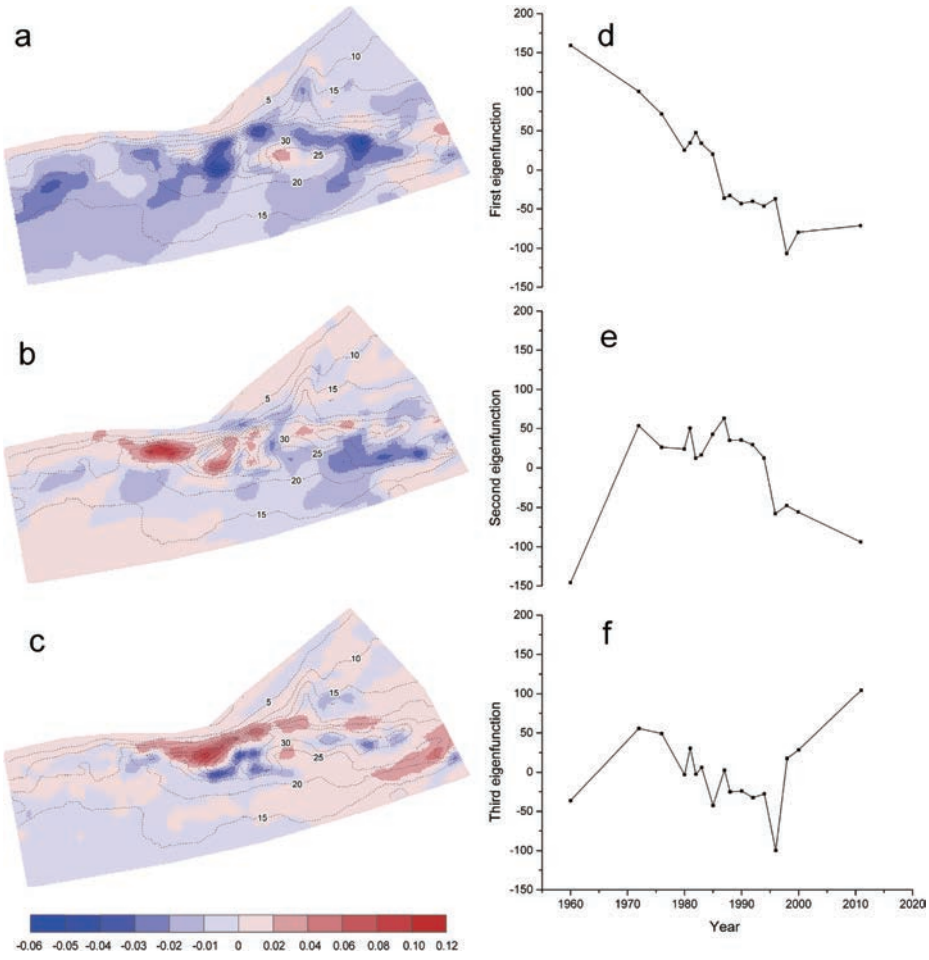


Fig. 4. Characteristics of the first three eigenfunctions; (a), (b), and (c) are the contoured first, second, and third spatial eigenfunctions, respectively; (d), (e), and (f) are curves of the first, second, and third temporal eigenfunctions, respectively. Contours in 2000 are displayed in meters below the Wusong Height Datum.

River-sea transitions of sediment dynamics: A case study of the tide-impacted Yangtze River estuary
Yang, H.F., Yang, S.L.*, Xu, K.H., Estuarine, Coastal and Shelf Science, 2017, 196: 207–216.

Hydrodynamics and sediment dynamics vary greatly in tide-dominated estuaries worldwide, but there is a paucity of data of large tide-dominated estuary systems due to difficulties of observation in a large spatial scale. In this study, we investigate sediment dynamic transitions in a 660-km long section between the tidal limit and mouth of the Yangtze River. We found that tidal effects are almost undetectable in the uppermost 100-km section, but the mean tidal range gradually increases downstream to nearly 3 m at the river mouth. Flow is generally unidirectional in the uppermost 400-km section, although its velocity changes in response to flood/ebb tidal dynamics; in the lowest 250-km section, flow is bidirectional, and ebb flow durations decrease towards the sea. In the lowermost 100 km, the ebb flow durations decreases to below 60%, and the flow is dominated by tidal currents. Salinity is only detectable in the lowest 100-km section due to the dominance of Yangtze River water discharge. Bed sediments mainly include sand in the uppermost 500-km section, whereas mud dominates in the remaining areas. In contrast, the median grain size of the suspended sediments was found to be greater in the lowest 100- km section (8-13 mm) than in the upper sections (5-6 mm) due to strong exchanges between suspended and near bed sediments. The suspended sediment concentration (SSC) was found to be low (<0.1 g/L) and homogenous in the uppermost 100-km section, downstream of which the SSC increased rapidly to >1 g/L and both surface-bottom and intratidal variabilities occurred. The rates of sediment parameter changes were rapid in the river-sea transitional zone, and this zone may shift upstream and downstream in response to the relative contributions of the river, tides and waves. A conceptual model of the river-sea transition of sediment dynamics for the Yangtze estuary was established, and this model shed light on quantitative studies of sediment dynamics in other large tide-impacted estuaries worldwide.

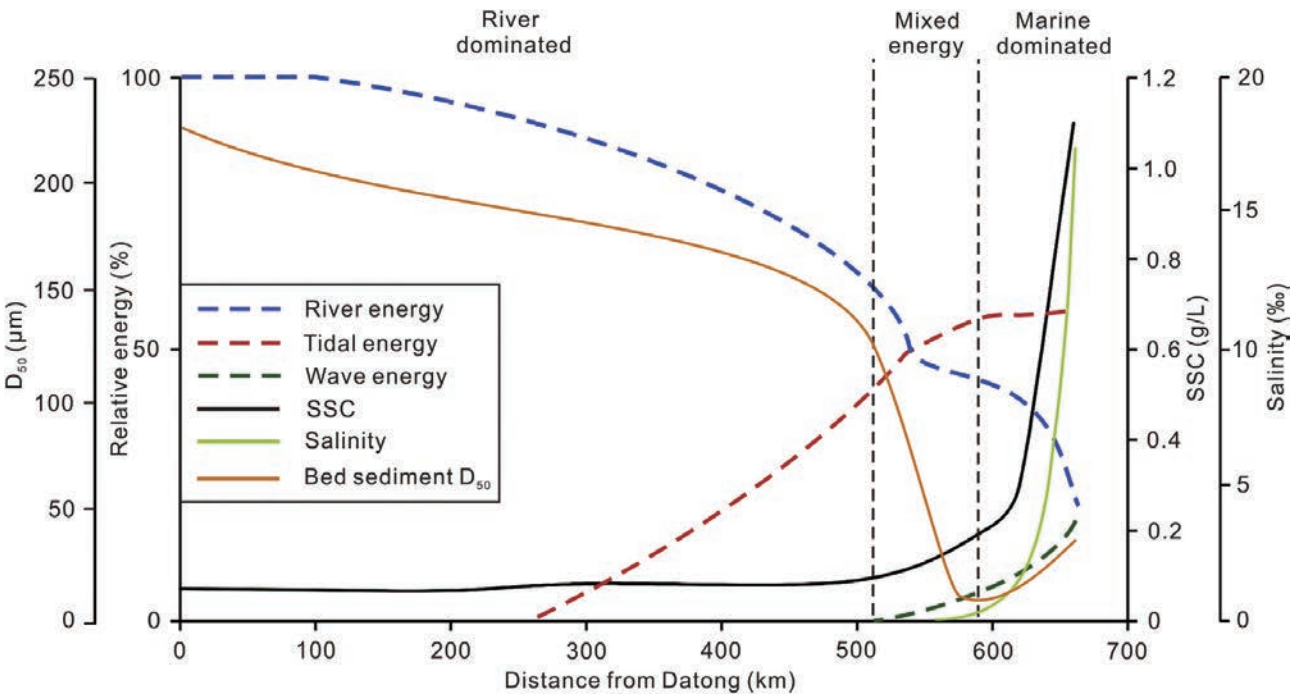


Fig. 7. Conceptual diagram of variations in relative energy, mean depth-averaged SSCs of the tidal cycle and surficial sediment distributions from Datong to the outer river mouth.

Mineral magnetic properties of Holocene sediments in the subaqueous Yangtze delta and the implications for human activity and early diagenesis

Pan, D. D., Chen, T., Zhan, Q., Wang, Z. H.*, Quaternary International, 2017, 459: 133-143.

This study examines the temporal and spatial distribution of magnetic properties in Holocene sediment cores taken from the subaqueous Yangtze delta, China, to evaluate depositional environmental changes including the sediment with an anthropogenic provenance and changes in the bottom-water chemistry. Our approach is to compare the magnetic properties in Holocene cores with those from a suite of surficial sediment samples taken at various locations from the Yangtze delta and the adjacent continental shelf. The results indicate that the magnetic properties in sediment cores change generally with sedimentary facies, mainly due to their in-phase changes with sediment grain size and redox conditions, but that they have also been significantly altered by effects of human activity and early diagenesis. Magnetic parameters that exhibit soil erosion associations show remarkable increases over the past ~800 years, reflecting an increase in the terrestrial supply of fine-grained magnetic minerals induced by the intensification of human activity in the Yangtze River catchment. Early diagenesis was strong in core HZK8, located at the depocenter of the subaqueous Yangtze delta, including dissolution of fine-grained ferrimagnetic minerals and the precipitation of authigenic greigite and pyrite, as evidenced by both room-temperature and thermo-magnetic analyses. The dissolution of ferrimagnetic minerals coincides with changes in sedimentation rate at different sites and time periods, suggesting that this factor is important for controlling the rate of early diagenesis. Authigenic iron sulfides suggest the function of sulfate-reducing bacteria, which implies a hypoxic environment at this site from ~6000 cal. yr BP.

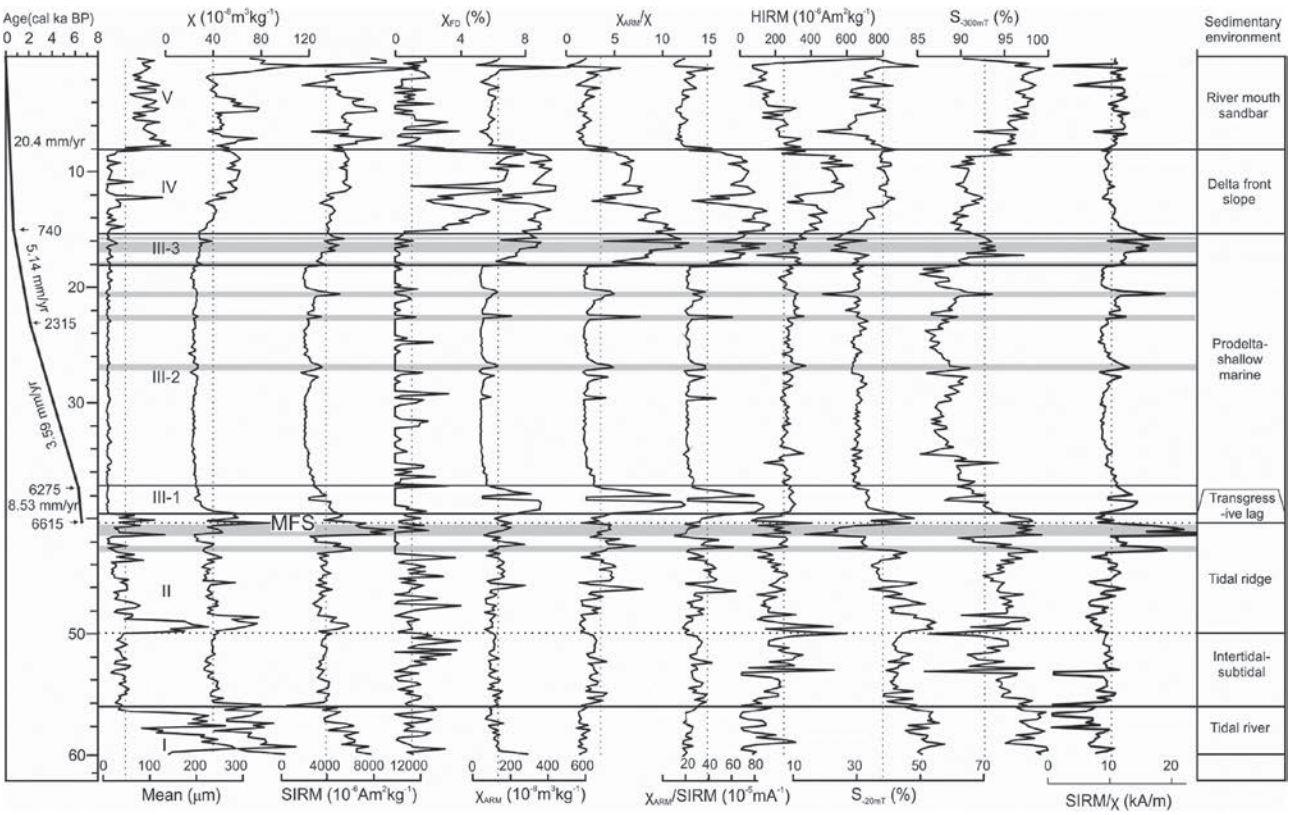


Fig. 5. Vertical distribution of mean grain-size and magnetic parameters in core HZK8. Gray shaded parts indicate occurrence of authigenic greigite. The greigite in the top of unit II in HZK8 is coarse-grained as reflected by the low value of cARM, implying its reworking origin of the tidal ridge.

A mid- to late-Holocene record of vegetation decline and erosion triggered by monsoon weakening and human adaptations in the south-east Indian Peninsula

Cui, M., Wang, Z. H.*, Rao, K. N., Sangode, S J, Saito, Y., Chen, T., Kulkarni, Y R, Naga Kumar, K Ch V, Demudu, G, Holocene, 2017, 27(12): 1976-1987.

The mid- to late-Holocene monsoon decline led to aridification of the Indian Peninsula impacting the early agricultural practices in the region. Our analysis of organic carbon, mineral magnetic properties and AMS ^{14}C dating of a 54.2-m-long sediment core (CY) from the Godavari Delta, India, showed changes in the organic carbon source and sediment provenance, which are linked to the changes in vegetation and soil/rock erosion caused by widespread aridification and associated human adaptation in central India. Our results show a decline in the concentration of ferrimagnetic minerals, indicating reduced input from the basalts of the Deccan Plateau after ~6.0 cal. ka BP in response to the weaker Indian monsoon. $\delta^{13}C$ values show a distinct increase from ~4.9 cal. ka BP, indicating an increase in C4 plant sources under the continued weak monsoon phase, whereas a higher ferrimagnetic mineral concentration in the sediment suggested an increased Deccan basalt source. Abrupt increase in $\delta^{13}C$ values and decrease in TOC content accompanied with a significant increase in ferrimagnetic mineral concentration from ~3.2 to 3.1 cal. ka BP reflected a shift of organic carbon and sediment source and a severe decline in vegetation coverage. Such phenomena indicate intensified deforestation and soil/rock erosion in the Deccan Plateau producing higher ferrimagnetic mineral inputs, which is in agreement with significant expansion of agricultural activities in the Deccan Chalcolithic cultural period. In addition, C3 plants recovered and magnetic concentration declined during the wet events (4.6 and 4.0 cal. ka BP) of Neolithic time, while both C3 plants and magnetic parameters increased during the wet events (3.1–2.8 and 2.1 cal. ka BP) of the Chalcolithic cultural period. This implies increased agricultural activity and the onset of human modification of the ecosystem.

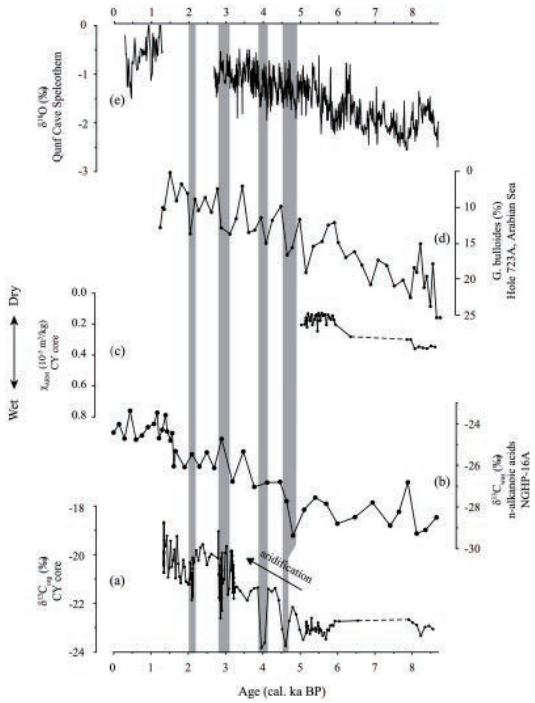


Figure 8. (a) $\delta^{13}C$org record in core CY from the Godavari delta plain (this study). (b) $\delta^{13}C$wax record (weight-averaged for n-alkanoic acids C26–C32) in core NGHP-16A off the Godavari delta (Ponton et al., 2012). (c) χARM record in core CY which reflects sediment contribution from the Deccan Plateau (this study). Values during 4.9–1.3 cal. ka BP are not presented because of a dominant information of human activity. (d) Percentage of foraminifera representative of upwelling, Globigerina bulloides, which reflects the strength of Indian monsoon from the Arabian Sea (Gupta et al., 2003). (e) Speleothem $\delta^{18}O$ record from Qunf Cave, Oman (Fleitmann et al., 2003).

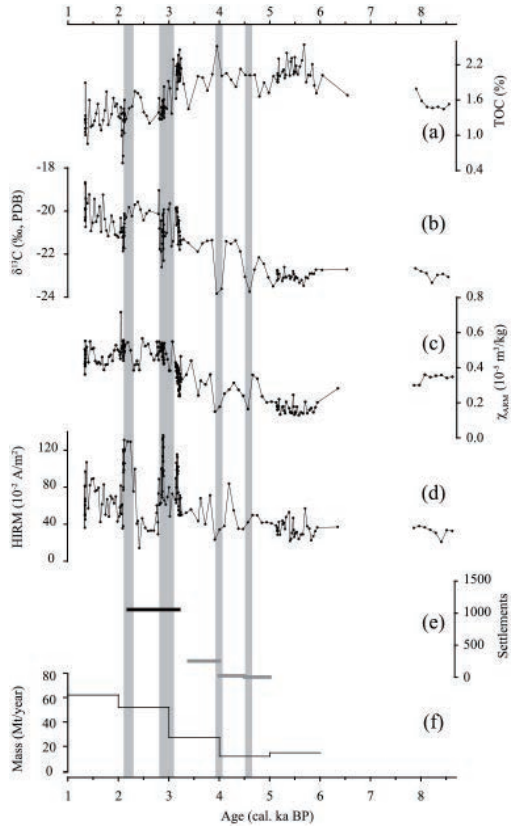


Figure 9. (a–d) TOC, $\delta^{13}C$, χARM and HIRM in the sediments of core CY. (e) Number of settlements in Neolithic (solid grey) and Chalcolithic (solid black) cultures in the Deccan Plateau (after Ponton et al., 2012). (f) Total quantity of sediment accumulated in the Godavari delta on the millennial scale (Nageswara Rao et al., 2015).

海岸动力地貌与动力沉积过程
Coastal Morphodynamics and Sedimentary Process

An improved spectral optimization algorithmfor atmospheric correction over turbid coastal waters: A case study from the Changjiang (Yangtze) estuary and the adjacent coast

Pan, Y. Q., Shen, F.*, Verhoef, W., Remote Seneing of Environment, 2017, 191: 197-214.

Remote sensing-based retrieval of the concentrations of water components relies largely on the accuracy of the atmospheric correction. Although a variety of atmospheric correction algorithms have been developed for turbid waters, the water-leaving reflectance is still underestimated in extremely turbid waters, such as in the Changjiang (Yangtze) estuary and the adjacent coast. To address this issue, this paper proposes an improved algorithmthat is based on a spectral optimization algorithm(ESOA)with a coupled water-atmosphere model. The model combines an aerosol model that is constructed from Aerosol Robotic Network (AERONET) observation data and a simple semi-empirical radiative transfer (SERT)model (Shen et al. 2010) for water component retrieval. Four unknown parameters are involved in the coupledmodel: the relative humidity (RH), fine-mode fraction (FMF), aerosol optical thickness in the near-infrared (NIR) wavelength τa(λ0) and suspended particulate matter (SPM) concentration (Cspm). These parameters are estimated by a global optimization approach that is based on a genetic algorithm (GA) without any initial inputs. Validation results of the atmospherically corrected remote sensing reflectance Rrs(λ) from matchups between Geostationary Ocean Color Imager (GOCI) data and in situ data show that the algorithmhas satisfactory accuracy. The rootmean square error (RMSE) and the absolute percentage difference (APD) are 0.0089 and 35.12, respectively. By contrast, the Rrs(λ) values retrieved from the same matchups using the GOCI data processing system (GDPS) have higher RMSE and APD of 0.0104 and 69.15, respectively. The ESOA method can be implemented conveniently within the open source code of SeaDAS (v7.1) as an alternative and operational tool for atmospheric correction of ocean color data, including GOCI, MERIS and MODIS, over highly turbid estuarine and coastal regions, such as the Yangtze estuary, the Hangzhou Bay and most of the coastal ocean in Eastern China.

一种改进的基于光谱优化算法面向浑浊海岸水体的大气校正方法：以长江口及其邻近海岸为例

基于水色遥感的水色组分反演，很大程度上依赖于大气校正的精度。尽管当前存在多种针对浑浊水体的大气校正算法，但在高浊度水体仍然存在遥感反射率被低估的问题，比如长江口及其邻近海岸地区。针对这一问题，提出了一种基于光谱优化算法的大气校正模型（ESOA）。该模型耦合了基于AERONET观测网建立的气溶胶模型和一个简单的半经验辐射传输模型(SERT)。该耦合模型中包含四个未知参数：相对湿度(RH)，细模式指数(FMF)，近红外波段气溶胶光学厚度τ a（λ0）和悬浮物（SPM）浓度（Cspm）。这些参数使用一种全局优化算法——遗传算法进行优化求解，使用带有不同噪声的模拟数据集对优化求解的精度进行了验证，结果表明该方法有很好的精度表现。结合该优化方法，并假设研究区内气溶胶类型空间同一，对模型进行简化，使得算法消耗时间大幅度降低，从而使得该方法可以应用于遥感影像的业务化大气校正处理，使用GOCI卫星影像与地面实测Rrs数据建立的匹配数据集，对模型大气校正精度进行了验证，结果显示该方法具有满意的表现，均方根误差RMSE和绝对百分比误差APD分别为0.0089和69.15。ESOA模型可以方便地嵌入到SeaDAS软件系统，作为海洋水色卫星在高浊度海岸地区，包括黄海、长江口等海岸带地区的一种备选可操作的大气校正方案。

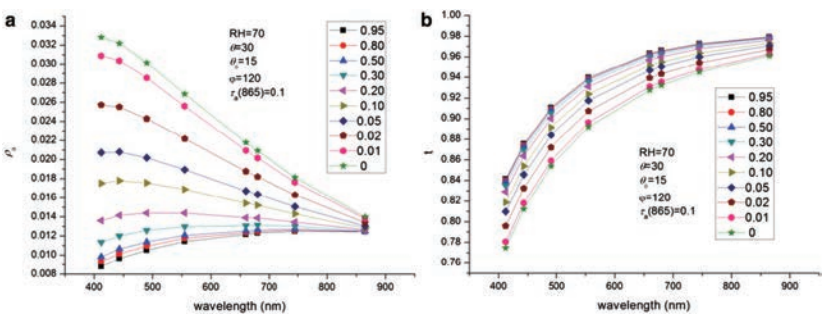


Fig. 1. Aerosol reflectance ρa(λ) (a) and diffuse transmittance fromthe sea surface to the sensor t(λ) (b) calculated by the aerosolmodel developed by Ahmad for different FMFs (upper to lower curves) for RH = 70%, solar zenith angle θ0 = 15°, sensor zenith angle θ = 30°, relative azimuth angle φ=120° and τa(865)= 0.1.

Historical changes in ^{239}Pu and ^{240}Pu sources in sedimentary records in the East China Sea: Implications for provenance and transportation

Wang, J. L., Baskaran, M., Hou, X. L., Du, J. Z.*, Zhang, J., Earth and Planetary Science Letters, 2017, 466: 32-42.

Concentrations and isotopic compositions of plutonium (Pu) are widely used for its source identification and to determine transport processes of Pu-associated particulate matter and water. We investigated the concentrations of ^{239}Pu and ^{240}Pu and their ratios in a number of sediment samples from the East China Sea (ECS) collected in the summer of 2013 (August 6–28). The $^{239+240}$Pu activity concentrations in surface sediment samples were found to range between 0.048 and 0.492 Bq kg−1 and the ^{240}Pu/^{239}Pu atom ratios showed a similar trend as that of the $^{239,\ 240}$Pu activities; the Pu atom ratios ranged from 0.158 to 0.297 and were mostly higher than the mean global fallout value of 0.18. The $^{239,\ 240}$Pu inventories in the ECS varied widely, from 2 to 807 Bqm^{-2}, with the highest values commonly found in the coastal areas. In the Yangtze Estuary, the mean $^{239+240}$Pu activity concentration is close to the estimated value of the suspended material from the Yangtze River catchment (0.18 Bq kg^{-1}), and the ^{240}Pu/^{239}Pu atom ratio was found to be -0.18, which indicates that the Yangtze River input is the dominant source of Pu for this area. The total annual Yangtze River input of $^{239+240}$Pu was estimated to be 2.4 × 10^{10} Bq, which is small compared to the total amount of 239+240Pu buried, 3.1 × 10^{13} Bq in the whole ECS. The Pacific Proving Ground input appears to be the dominant source of Pu to the ECS, accounting for 45%–52% of the total inventory. The fractional amount of $^{239+240}$Pu scavenged from the total $^{239+240}$Pu transported by the Kuroshio Current (KC) and Taiwan Warm Current (TWC) into ECS sediments is estimated to be -10%. Our study shows that the ^{240}Pu/^{239}Pu atom ratio is useful not only to obtain a better insight of the biogeochemistry influenced by the KC, but also to trace the long-range transport of other particle-reactive species. Besides, the sedimentation rates obtained based on the penetration depths of $^{239+240}$Pu and vertical profiles of excess ^{210}Pb agree within uncertainties, which suggests that $^{239+240}$Pu can potentially be used as a chronostratigraphic time marker in the marine environment.

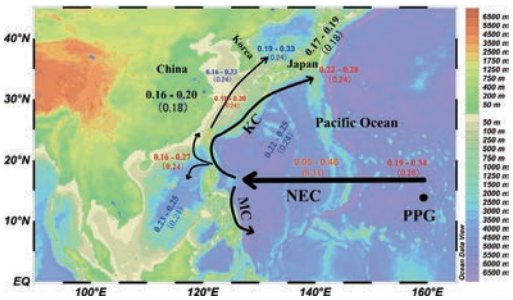


Fig. 2. Spatial distribution of the ^{239}Pu, ^{240}Pu, $^{239+240}$Pu activities and ^{240}Pu/^{239}Pu atom ratios of surface sediment in August of 2013.

东海沉积物中^{239}Pu和^{240}Pu的沉积记录及其物源输运指示

钚同位素（^{239}Pu，^{240}Pu）作为重要的人工核素，在环境示踪过程中具有巨大的应用前景。通过对东海沉积物中Pu的分析发现，太平洋核试验场（PPG）局部沉降输入是东海Pu的主要来源，这些Pu在黑潮输送下进入东海，并通过边界清除埋藏在沉积物中。其中，埋藏在长江口及其浙闽沿岸区域的Pu占到整个东海的80%左右。因此，该研究提出Pu同位素可以作为示踪黑潮对东海等西太平洋边缘海区域生物地球化学过程影响的示踪剂。同时，Pu同位素还可以示踪其他颗粒活性核素（如^{210}Pb和^{231}Pa等）、有机和无机污染物等的长距离输运。

研究发现，Pu的储量变化可以被用来指示长江口泥沙的侵蚀以及浙闽沿岸区域泥沙的淤积现象。通过对比Pu同位素、^{137}Cs和^{210}Pb在东海的定年应用， Pu同位素具有更长的半衰期，在海洋环境中颗粒活性更高等优点，相比^{137}Cs是更佳的定年手段，在实际运用时可以与^{210}Pb相互校正。

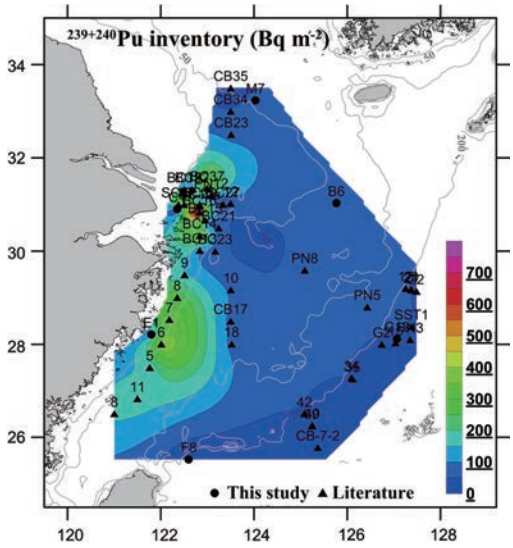


Fig. 6. Spatial distribution of $^{239+240}$Pu inventories in sediment, including literature data (Nagaya and Nakamura, 1992; Huh and Su, 1999; Su and Huh, 2002; Wang and Yamada, 2005; Pan et al., 2011; Liu et al., 2011).

Longshore suspended sediment transport and its implications for submarine erosion off the Yangtze River Estuary

Deng, B.*, Wu, H., Yang, H. L., Zhang, J., Estuarine, Coastal and Shelf Science, 2017, 190: 1-10.

Coastal currents that originate from large rivers play a key role in delivering sediment to shelf regions. Quantifying their transport capability is therefore essential to understanding the sediment budgets and the consequent deposition or erosion of coastal areas. In February 2012, we observed the sediment transport carried by the Min-Zhe Coastal Current that originates from the Yangtze River mouth and calculated a flux of 18.7 tons per second on a cross-shore section. In this period the coastal current was at a typical status, which allowed us to estimate a total annual sediment transport of 0.27billion tons southward. This result was more than three times the present annual Yangtze River sediment discharge, suggesting that considerable net sediment removal occurs in the coastal regions. The sediment transport 0.27 billion tons/year is probably the deposition/erosion threshold for the East China Sea coast north of our study site. Analysis of historical Yangtze River sediment influx records showed, that the onset and acceleration of coastal erosion was closely linked with the operation of the Three Gorges Dam (TGD) upstream of the Yangtze River.

沿岸流悬浮沉积物输送对长江水下三角洲海岸侵蚀的影响

起源于大河口的沿岸流系统是沉积物向陆架输送与分配的重要途径。沿岸流的沉积物输送通量的定量估算，是认识近岸区域的沉积物收支乃至冲淤平衡的关键。长江流域人类活动影响下，入海泥沙通量变化对近海地区的影响不仅取决于入河流因素，还受海洋因素的控制。在长江口外近海泥沙平衡的源汇关系中，浙闽沿岸流的泥沙输送通量是最为重要的系统输出项。

沿岸流泥沙通量的定量估算的困难一方面在于潮汐作用的影响，另一方面是由于沿岸流可横跨几十公里，在这一空间尺度下获取相对高的时间与空间的分辨率是本研究的关键。通过采用相位平均法（PAM），我们于2012年2月典型冬季风期间开展观测，并估算出向南沿岸输送通量约为每秒18.7吨，这一通量远远高于当前长江入海泥沙输送。剖面中沿岸流的向南沿岸核心泥沙主输送通道位于水深17米至24米区域，占输送总量约65%，单位输送通量可以达到70 g/m^2/s，近岸端与远岸端分别占7%与28%（Fig.2）。在垂直陆架分量上，受底层Ekman效应影响，水深小于20米的近岸区域表现为离岸输送，水深大于20米区域总体为向岸输送。如果观测结果外推至整个冬季风作用时期，沿岸流悬浮沉积物年输送可达2.7亿吨/年，这一结果约是当前长江年输沙量的三倍（Fig.6）。

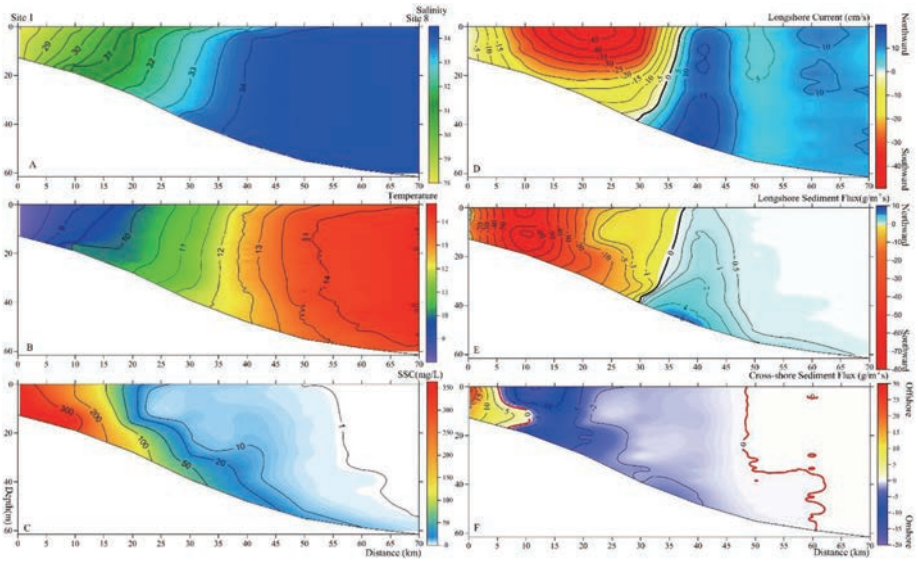


Fig. 2. Panel AeF: Integrated de-tidal longshore and cross-shore sediment flux (g/m^{2}s). Distribution of (A) salinity, (B) temperature (C), (C) suspended sediment concentration (SSC, mg/L) in the cross-shelf profile from sites 1 to 8. (D) De-tidal longshore current (cm/s). (E) De-tidal longshore sediment flux (g/m^2/s). Southward longshore current and sediment transport of The Min-Zhe Coastal Current (MZCC) presents at a water depth of <40 m, whereas the Taiwan Warm Current (TWC) flows northward at >40 m. (F) De-tidal cross-shore sediment flux (g/m^2/s). Seaward transport was found at a water depth of <20 m, and onshore mobilization was present at a water depth of >20 m.

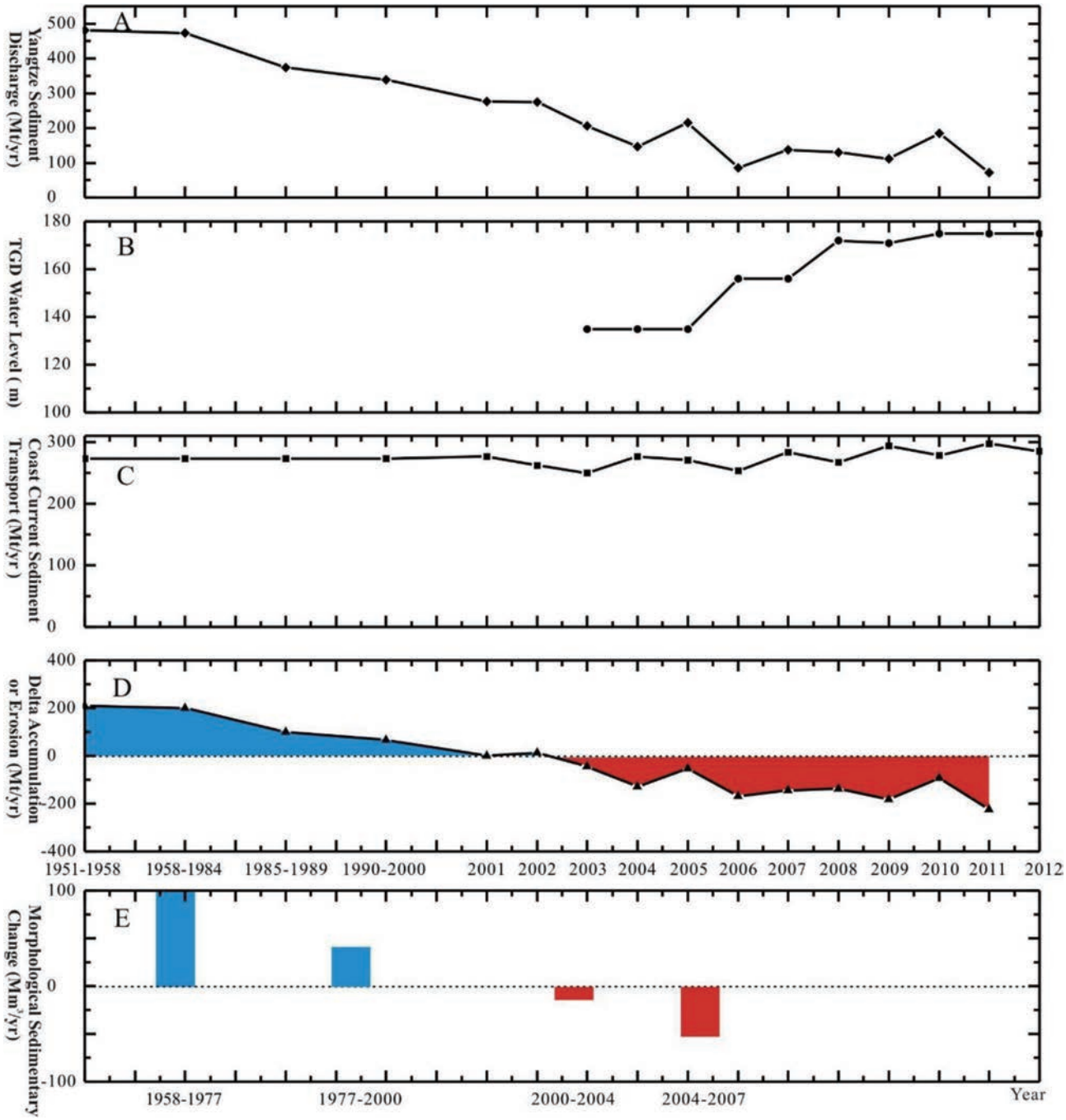


Fig. 6. The coastal erosion or accumulation change in the last 60 years. (A) Historical change of the Yangtze River sediment discharge. The data were obtained from the Yangtze River Water Resource Commission at Datong hydrographic station. (B) The Three Gorges Dam (TGD) reservoir maximum water level above sea-level under different operational conditions. (C) Predicted alongshore coastal sediment transport. The winter wind data for the calculation of the coastal current durationwas from the ECMWF. The wind data before 2001 was calculated using a 12-year average from 2001 to 2013. (D) Predicted delta accumulation/erosion. The data was estimate from predicted alongshore coastal sediment transport and Yangtze River sediment discharge. The blue bar suggests accumulation and the red bar indicates erosion. (E) Measured morphological sedimentary change (billion m^3/ year) in the Yangtze subaqueous delta, the area is shown in Fig. 1 (1300 km^2), and data were collected from Yang et al., 2011. The blue bar suggests accumulation and the red bar indicates erosion. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Application of terrestrial laser scanner on tidal flat morphology at a typhoon event timescale

Xie, W. M, He, Q.*, Zhang, K. Q., Guo, L. C., Wang, X. Y., Shen, J., Cui, Z., Geomorphology, 2017, 292: 47-58.

Quantification of tidal flat morphological changes at varying timescales is critical from a management point of view. High-resolution tidal flat morphology data, including those for mudflats and salt-marshes, are rare due to monitoring difficulty by traditional methods. Recent advances in Terrestrial Laser Scanner (TLS) technology allow rapid acquisition of high-resolution and large-scale morphological data, but it remains problematic for its application on salt-marshes due to the presence of dense vegetation. In this study, we applied a TLS system to retrieve high-accuracy digital elevation models in a tidal flat of the Yangtze Estuary by using a robust and accurate Progressive Morphological filter (PM) to separate ground and non-ground points. Validations against GPS-supported RTK measurements suggested remarkable performance. In this case the average estimation error was about 0.3 cm, while the Root Mean Square Error (RMSE) was 2.0 cm. We conducted three TLS surveys on the same field including salt-marshes and mudflats at the time points 5 days before, 3 days after, and 45 days after a typhoon event. The retrieved data showed that the mudflats suffered from profound erosion while the salt-marshes slightly accreted during the typhoon period. The average elevation change of the total area was about 4 cm (0.28 cm per day). However, both the mudflats and salt-marshes deposited in the post-typhoon period and the accretion over salt-marshes occurred at a higher rate than that during the typhoon. The elevation of the total area increased by 15.9 cm (0.37 cm per day), suggesting fast recovery under calm conditions. Quantification of the erosion and deposition rates was aided by the high quality TLS data. This study shows the effectiveness of TLS in quantifying morphological changes of tidal flats at an event (and post-event) timescale. The data and analysis also provide sound evidence on vegetation impact in stimulating salt-marsh development and restoration, shedding lights on bio-morphological interactions.

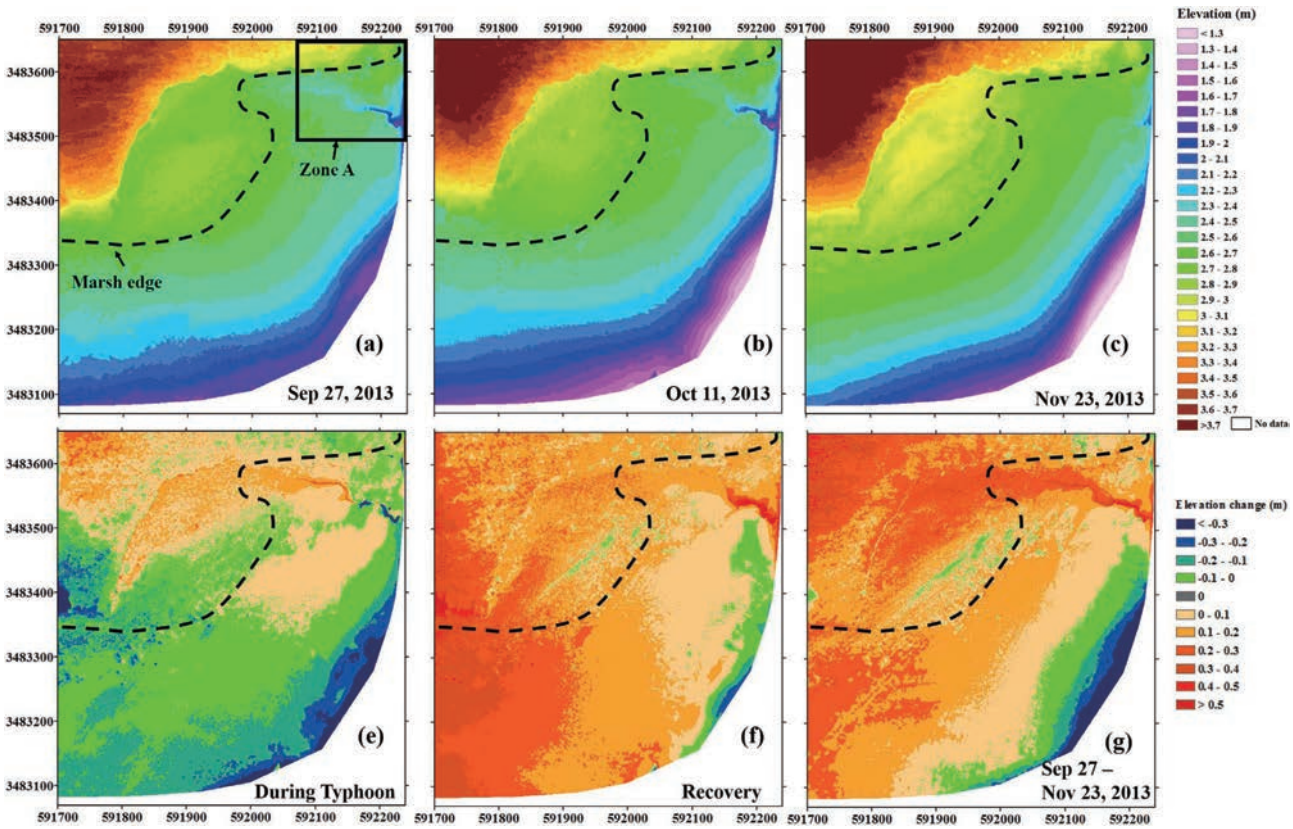


Fig. 6. Topographies of the study area surveyed on Sept. 27, 2013 (5 days before typhoon, (a)), Oct. 11, 2013 (3 days after typhoon, (b)) and Nov. 23, 2013 (45 days after typhoon, (c)), respectively. The horizontal coordinates of grids are in meters with datum Beijing 54, and the vertical datum is referenced to the theoretical low-tide datum at Wusong. The grid data with grid size of 0.05 m were generated by TIN to Raster using ArcMap. Elevation change during Typhoon Fitow (e) and the post-storm recovery (f). The difference between Sept. 27 and Nov. 23, 2013 is shown in the last panel (g).

Bed-level changes on intertidal wetland in response to waves and tides: A case study from the Yangtze River Delta

Zhu, Q., van Prooijen, B. C., Wang, Z. B., Yang, S. L.*, Marine Geology, 2017, 385: 160–172.

Short-term bed-level variability in tidalwetlands has important implication both for ecology and engineering. In this study, we combined in situ measurements with model simulations to quantify short-termbed-level changes on a meso-macrotidal wetland in the Yangtze River Delta. On themiddle flat, we observed erosion during neapto- mean tides under onshoremoderate-to-strongwinds, and bed recovery during subsequent spring tides,when windswere both offshore andweaker, suggesting thatwinds can overturn the neap–spring cyclicity of bed-level changes even on meso–macrotidal mudflats. The magnitude of bed-level changes was smaller on both sides of the middle flat, while the smallest changes occurred on the saltmarsh. Observed bed-level changes were reconstructed using a single-point bed-level changemodel,which incorporates in situ measured parameters of hydrodynamics (waves and currents), suspended sediment concentrations, and bed sediment properties.We conclude that the relative importance of waves and tides in intertidal wetland erosion and accretion can vary temporally (due to changes in balance between wave and tidal energies) and spatially (because of changes in elevation and vegetation in the cross-shore profile). Our study also reflects the advantage of combination of in situ measurement with simulation in detecting short-term variability of tidal flats.

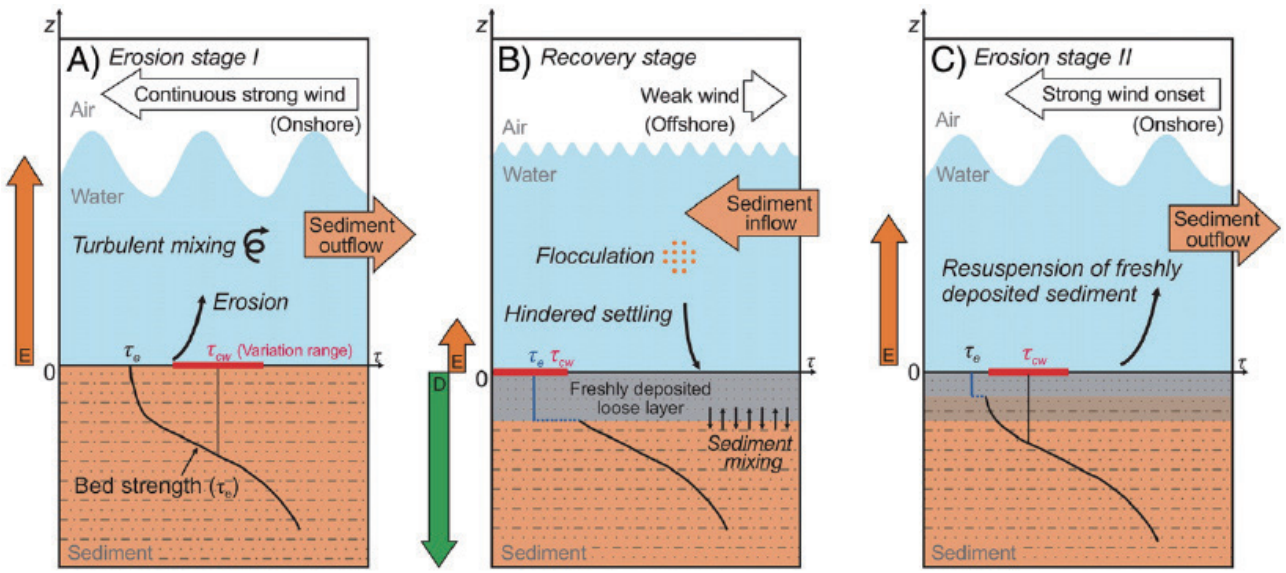


Fig. 8. Schematic diagrams inllustrate the key processes in three stages. Original vertical distribution of bed strength, representing τe, is redrawn afterWinterwerp et al. (2012).

LIDAR-based detection of the post-typhoon recovery of a meso-macro-tidal beach in the Beibu Gulf, China

Ge, Z. P., Dai, Z. J.*, Pang, W. H., Li, S. S., Wei, W., Mei, X. F., Huang, H., Gu, J. H., Marine Geology, 2017, 391: 127-143.

Because of global sea-level rising with frequent storm activities, most beaches in the world experience widespread erosion, which poses a significant hazard to beach management. The morphodynamic process of the evolution of a beach in response to storm activities is of increasing concern. Using a terrestrial laser scanner, the topography of Yintan beach was continuously observed for 33 days with a 25 cm spatial resolution digital elevation model (DEM) of that covered an area of 15 ha before and after typhoon Rammasun. The short-term beach recovery was explored using a comprehensive approach, which included grey relational analysis, terrain analysis, Gaussian fitting, Gamma fitting, and Delft3D wave simulation methods. The results show that the Yintan beach recovery process can be divided into three stages with two transition points. Stage one began at the end of Rammasun,

which indicated a weakly stable state with an average daily net erosion of 588 m^3, a mean beach slope that ranged from 0.96° to 1.28° , and a landform with no obvious alterations. After the vast accretion of 6874 m^3 of first transition, stage two, which was characterized by oscillations, occurred in the region with an average daily net erosion of 396 m^3 and a conspicuous beach slope reconstruction in the range of 0.94° –2.16° . During this stage, sandbar reconstruction played a key role. The second transition event arose at the end of stage two with a vast accretion of 5762 m^3. Afterwards, the daily net accretion of 200 m^3 and the beach slope range of 0.93° –1.74° dominated the region during stage three, and the beach surface became similar to that of the pre- Rammasun. Within the entire observation period, intense beach elevation changes that ranged from 15 cm to 6 cm and 6 cm to 15 cm mainly occurred in the sandbar and foreshore zones, respectively. Additionally, slight elevation changes (ranging from 4 cm to 4 cm) were densely distributed in the backshore and dunes, and moderate elevation changes (ranging from 6 cm to 4 cm and 4 cm to 6 cm) emerged along the entire beachface. It was concluded that the spatial distribution of the bottom shear stress that was induced by wave action was responsible for the reconstruction of the foreshore and sandbar after Rammasun, whereas the shortterm beach recovery process was affected by the beach states in various wave breaking conditions.

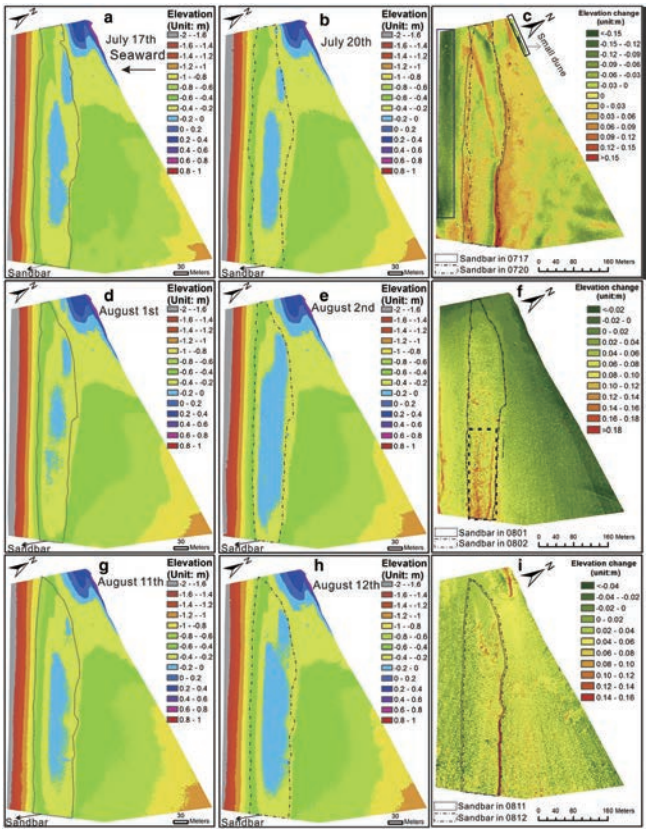


Fig. 7. DEMs of July 17th (a), July 20th (b), August 1st (d), August 2nd (e), August 11th (g) and August 12th (h). (c), (f) and (i) are the results of raster subtraction between (b) and (a), (e) and (d), (h) and (i), respectively. (c) is the elevation change caused by the typhoon, and (f) and (i) correspond to the first and second extreme accretion events, respectively.

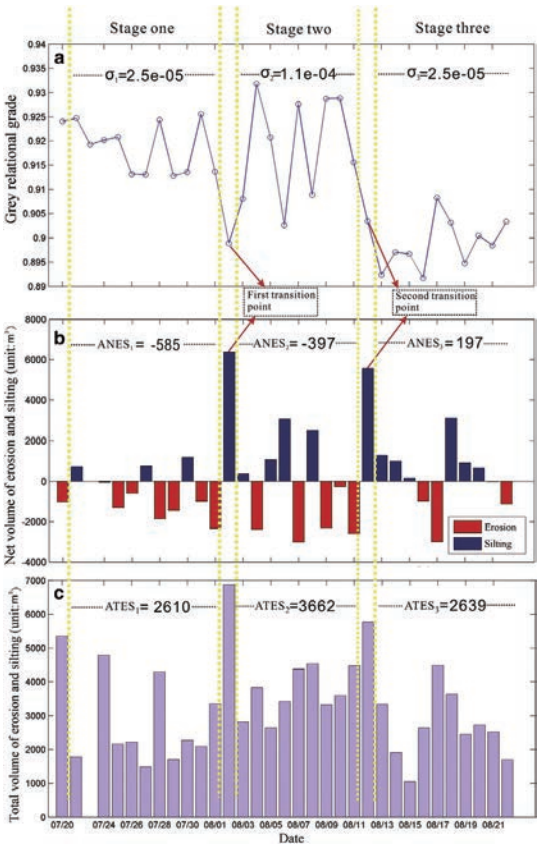


Fig. 9. Three stages of the short-term beach recovery. (a) Daily grey relational grade results; σi (i=1, 2, 3) represents the variance of the grey relational grade in each phase. (b) The results of the daily net volume of erosion and accretion; ANEAi (i= 1, 2, 3) means average daily net volume of erosion and accretion. (c) The results of the daily total volume of erosion and accretion; ATEAi (i= 1, 2, 3) means average daily total volume of erosion and accretion. The first special note is that the x-coordinate “7/20” is “7/20–7/17” for both of (b) and (c). The second special note is that the erosion and accretion of (b) and (c) occurred in the previous days. For example, the beach topography of August 1st was obtained at 00:42, and the beach topography of August 2nd was acquired at 01:21, therefore, the DEM differences between August 1st and August 2nd come from the topographical changes occurring in August 1st (see Section3.1).

Shoal morphodynamics of the Changjiang (Yangtze) estuary: influences from river damming, estuarine hydraulic engineering and reclamation projects.

Wei, W., Dai, Z. J.*, Mei, X. F., Liu, J. P., Gao, S., Li, S. S., Marine Geology, 2017, 386: 32-43.

Concerns regarding estuarine shoal morphodynamics have increased worldwide because of intensive anthropogenic activities. The link between the morphodynamic processes of the Nanhui Shoal (NHS), which is located along the southern margin of the Changjiang estuary, the largest estuary in Asia, and artificial interferences, including river damming, estuarine hydraulic engineering and reclamation projects, is discerned in this study. The results reveal that the NHS exhibited secular polarization during 1998-2013, with a significant accretion of 1.8×10^8 m^3 landward from the tidal ridge and an erosion of 0.3×10^8 m^3 on the seaward edge, respectively, forming a steep slope with an elevation between -2 and -3 m. Meanwhile, the NHS morphodynamics could be divided into 3 stages: mild accretion with an undisturbed tidal channel during 1998-2002, strong sedimentation with a disrupted tidal channel during 2003-2008, and large-scale landward accretion with an infilled tidal channel after 2009. Moreover, the NHS' s volume variations exhibited an 18-month cycle, even though an increased area of 35 km^2 above -2 m and a decreased area of 45 km^2 between -2 and -5 m were observed. The primary causes of theses periodic changes in the NHS' s volume are determined as the fluctuating Changjiang water discharge and cyclically altered hydrodynamics of the South Passage. The Deep Waterway Project (DWP) and reclamation projects were responsible for the polarization of seaward erosion and landward accretion, respectively. Moreover, these reclamation projects dominated the staggered changes in NHS morphodynamics by inducing continuous accretion within the tidal channel. Compared to estuarine engineering, river damming induced dramatic declines in distal sediment may have played a minor role in flat changes of NHS. The results presented hereof for NHS of the Changjiang estuary could be well applied to estuarine shoals with similar conditions to determine their responses to artificial interferences, and inform the further protection and exploitation of estuarine shoals under the threat of rising sea level and anthropogenic engineering.

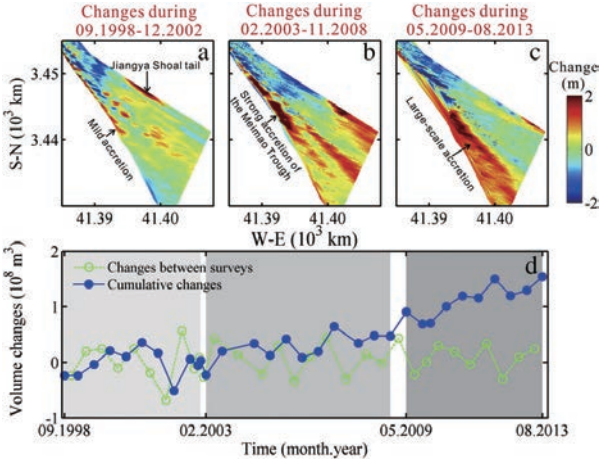


Fig. 5. a–c) Bathymetric changes of NHS during each stage, and d) temporal volume changes of NHS, with volume changes between surveys shown by dashed green line and cumulative volume changes shown by solid blue line.

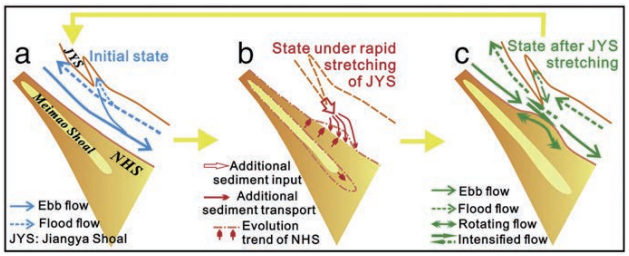


Fig. 12. Sketch that shows cyclic evolution of the NHS relative to the Jiangya Shoal's stretching, with a) the initial state, b) the state under the rapid stretching of Jiangya Shoal, and c) the state after the Jiangya Shoal's stretching.

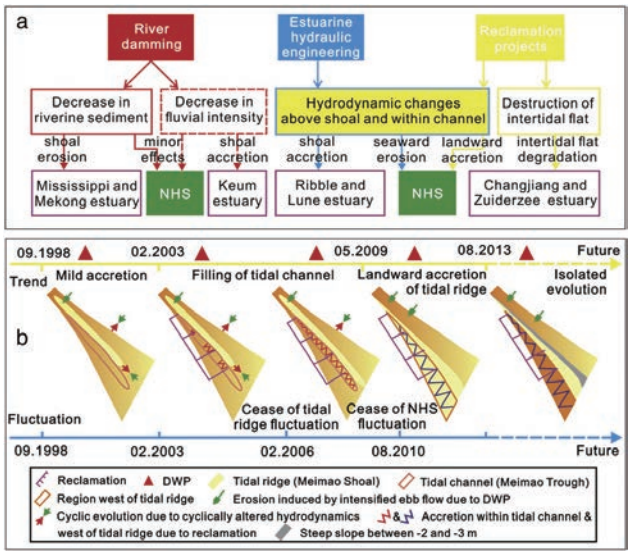


Fig. 14. a) Conceptual model depicting linkage between specific artificial engineering projects and morphodynamics of NHS and other estuarine shoals, and b) timeline of the NHS's evolution.

Validation and Calibration of QAA Algorithm for CDOM Absorption Retrieval in the Changjiang (Yangtze) Estuarine and CoastalWaters

Wang, Y. C., Shen, F.*, Sokoletsky, L., Sun, X. R., Remote Sensing, 2017, 9, 1192.

Distribution, migration and transformation of chromophoric dissolved organic matter (CDOM) in coastal waters are closely related to marine biogeochemical cycle. Ocean color remote sensing retrieval of CDOM absorption coefficient (ag(l)) can be used as an indicator to trace the distribution and variation characteristics of the Changjiang diluted water, and further to help understand estuarine and coastal biogeochemical processes in large spatial and temporal scales. The quasi-analytical algorithm (QAA) has been widely applied to remote sensing inversions of optical and biogeochemical parameters in water bodies such as oceanic and coastal waters, however, whether the algorithm can be applicable to highly turbid waters (i.e., Changjiang estuarine and coastal waters) is still unknown. In this study, large amounts of in situ data accumulated in the Changjiang estuarine and coastal waters from 9 cruise campaigns during 2011 and 2015 are used to verify and calibrate the QAA. Furthermore, the QAA is remodified for CDOM retrieval by employing a CDOM algorithm (QAA_CDOM). Consequently, based on the QAA and the QAA_CDOM, we developed a new version of algorithm, named QAA_cj, which is more suitable for highly turbid waters, e.g., Changjiang estuarine and coastal waters, to decompose ag from adg (CDOM and non-pigmented particles absorption coefficient). By comparison of matchups between Geostationary Ocean Color Imager (GOCI) retrievals and in situ data, it reveals that the accuracy of retrievals from calibrated QAA is significantly improved. The root mean square error (RMSE), mean absolute relative error (MARE) and bias of total absorption coefficients (a(l)) are lower than 1.17, 0.52 and 0.66 m 1, and ag(l) at 443 nm are lower than 0.07, 0.42 and 0.018 m 1. These results indicate that the calibrated algorithm has a better applicability and prospect for highly turbid coastal waters with extremely complicated optical properties. Thus, reliable CDOM products from the improved QAA_cj can advance our understanding of the land-ocean interaction process by earth observations in monitoring spatial-temporal distribution of the river plume into sea.

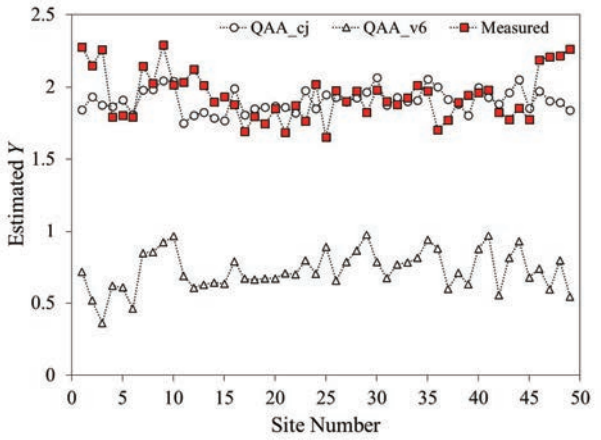


Figure 6. Comparison of in situ and predicted Y values. The filled squares are in situ Y values, empty circles and triangles denote Y values derived from QAA_cj and QAA_v6, respectively.

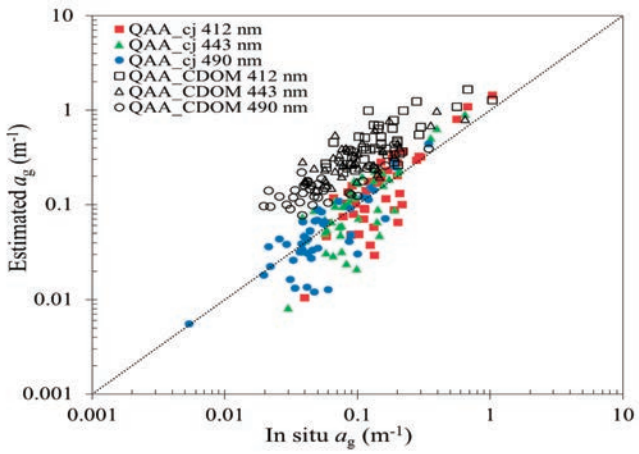


Figure 8. Comparison of in situ and predicted ag(λ) based on an in situ data set collected from the Changjiang estuarine and its adjacent coastal waters. The filled and empty symbols denote retrievals following QAA_cj and QAA_CDOM algorithms, respectively.

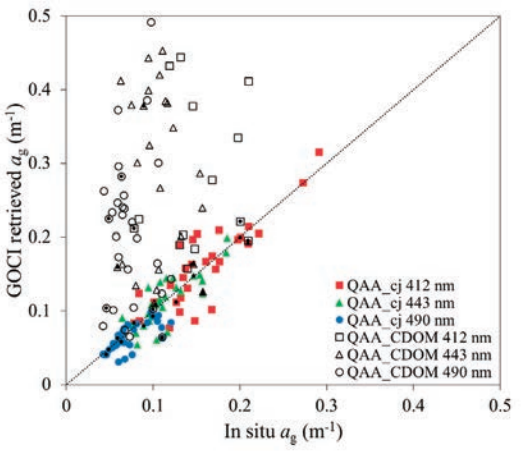


Figure 10. A scattering plot of GOCI retrieved ag(λ) vs. in situ ag(λ) data with using the QAA_cj algorithm (filled symbols) and QAA_CDOM algorithm (open symbols) at wavelengths of 412, 443, and 490 nm. The symbol with a filled dot inside represents the match point within the time window

Fractal properties of shoreline changes on a storm-exposed island

Zhong, X. J., Yu, P., Chen, S. L.*, Scientific Reports, 2017, 7:8274.

Extreme storm events and their consequent shoreline changes are of great importance for understanding coastal evolution and assessing storm hazards. This work investigates the fractal properties of the spatial distributions of shoreline changes caused by storms. Wavelet analysis and upper-truncated power law (UTPL) fitting are used to study the power spectra of shoreline changes and to evaluate the upper limits of the cross-shore erosion and accretion. During a period affected by storms, the alongshore shoreline change patterns are strong on the 15 km scale but are weak with lower spectral power on the 20 km scale. The areas adjacent to the eroded shoreline are usually accrete, and the cross-shore extent of erosion is larger than that of accretion when the coast is affected by storms. The fractal properties of shoreline changes due to storms are found to be temporally continuous: the effects of later storms build on the preceding shoreline conditions, including both the effects of previous storms and the subsequent shoreline recoveries. This work provides a new perspective on the various scales of the spatial variations of the morphodynamics of storm-affected shorelines.

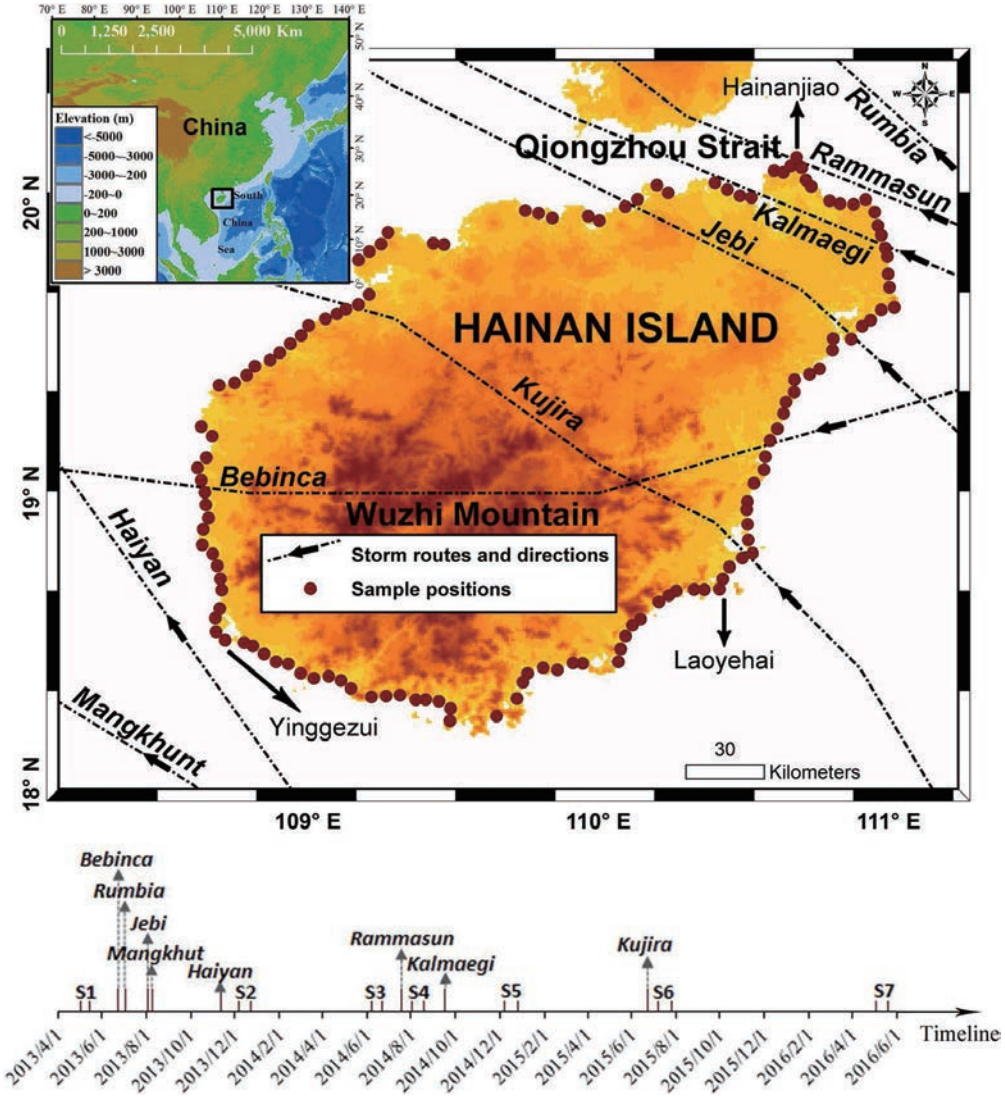


Figure 1. Map of Hainan Island, sample positions, storms during the surveys and their tracks. Topographic and bathymetric data are from GEBCO (http://www.gebco.net/), and the storm routes are the best tracks from CMA47 (http://tcdata.typhoon.gov.cn/). The maps are generated using ArcMap [10.1] (http://www.esri.com/). In the timeline, S1 to S7 refer to the seven field surveys.

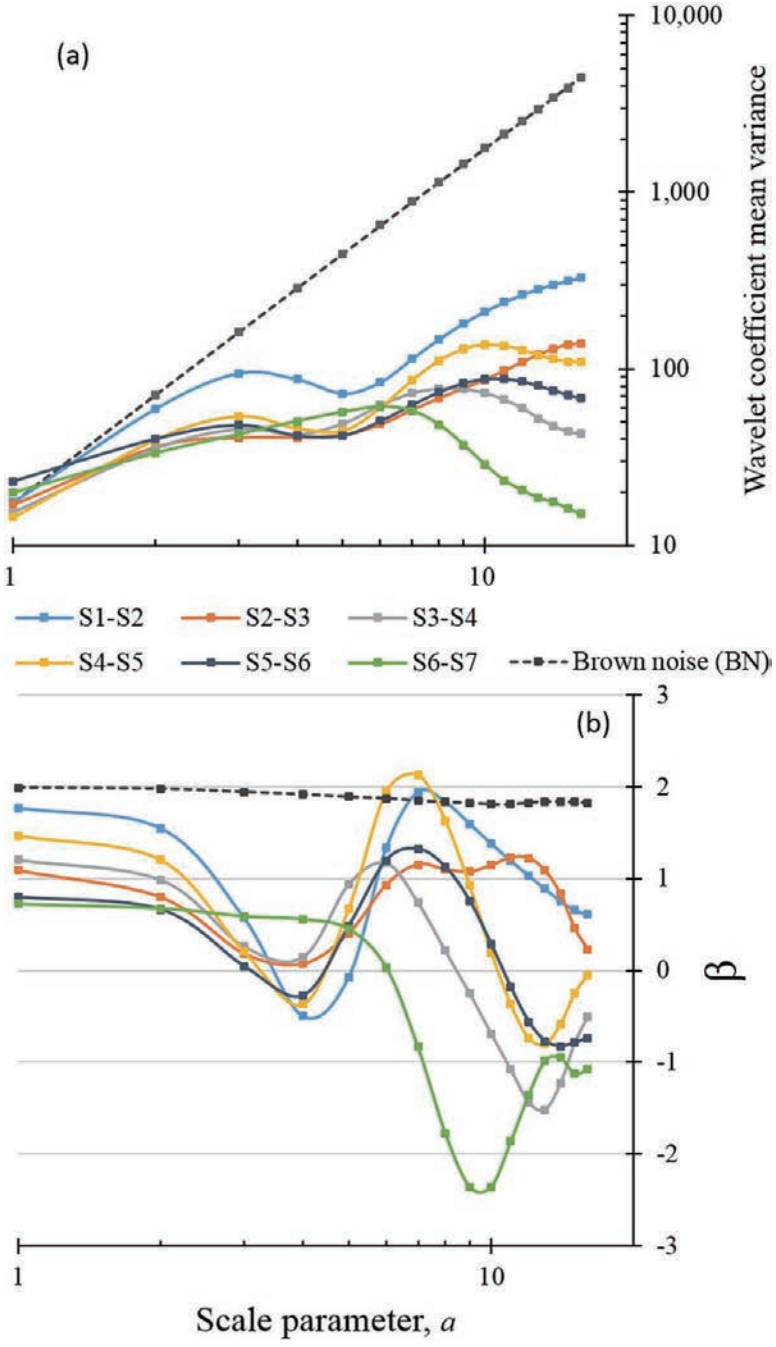


Figure 3. Wavelet transform results of the brown noise and shoreline changes on the eastern and southern coasts, from HNJ to YGZ. (a) Log-log plots of the power-spectral density and scale (~1/ frequency). (b) Powerlaw relationships between the power-spectral density and scale; β is calculated from the data points in (a).

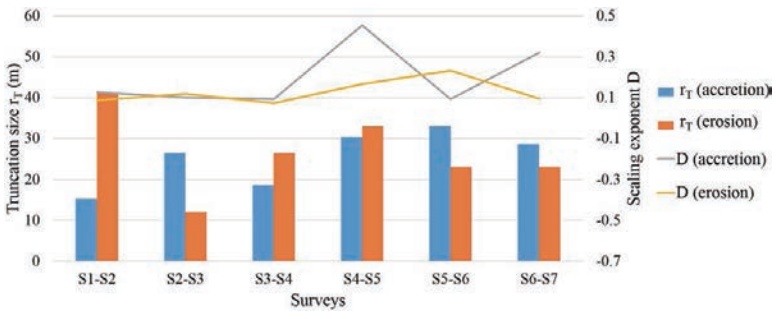


Figure 6. The parameters rT and D of the UTPLs for the cumulative distributions of the amounts of shoreline accretion and erosion during the surveys.

河口海岸生态与环境
Estuarine and Coastal Ecology and Environment

Ocean acidification without borders

Bellerby, R. G. J.*, Nature Climate Change, 2017, 7(4): 241-242.

The marine carbonate system is changing as uptake of CO_2 from the atmosphere causes ocean acidification. Now, analysis of repeat observations demonstrates that the rate and extent of Arctic Ocean acidification is enhanced through increased transport from the North Pacific.

海洋酸化无边界

海洋碳酸盐系统正在变化。由于从大气中吸收的二氧化碳增多，导致海洋酸化。现有观察结果表明，北冰洋酸化的速度和程度由于北太平洋输入的增加而变快变强。大气中的碳排放持续增加，促进二氧化碳向海洋转移。随后在海水中积累和重组的二氧化碳会导致溶解态无机碳增加，海水pH下降，碳酸钙的矿物饱和状态减少。北冰洋的冷水具有较低的缓冲二氧化碳增加的能力，因此每单位二氧化碳增加所导致的海洋酸化程度比温带和热带海洋更大。海洋酸化将影响重要的北极物种的生存，进而影响海洋生态系统的生产力、功能和多样性。必须在国际范围内协调北冰洋研究，以支持和协调海洋酸化的持续观测，开展整体性研究，实现对该区域的全方位统筹管理与可持续发展。

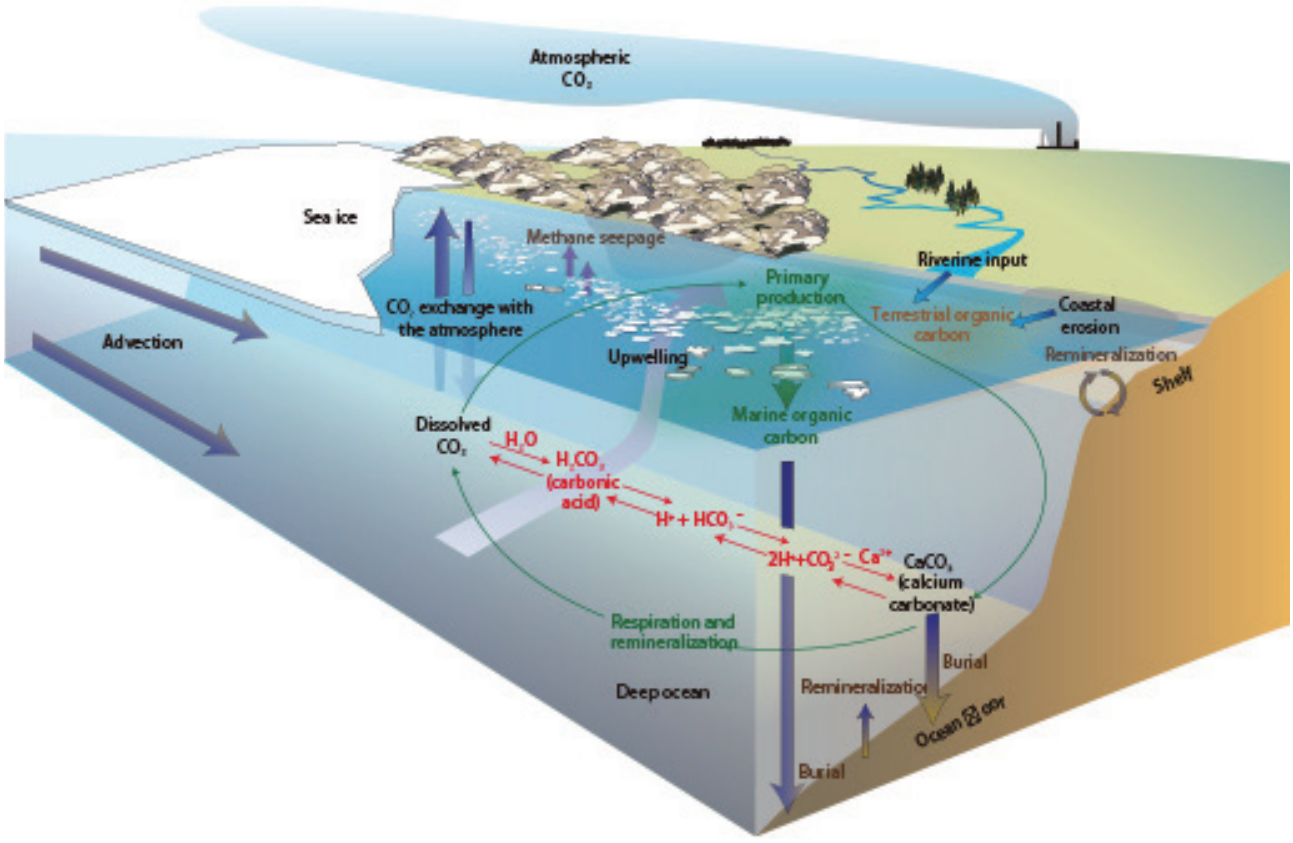


Figure 1 A conceptual view of the Arctic Ocean carbon cycle. Arctic Ocean acidification is responding to changes in the marine carbon and hydrological cycles. Increases in carbon are sourced from the atmosphere, land, and advection from other oceans. Ocean acidification can be further regulated or enhanced by internal, physical, biological, and geochemical processes. Adapted with permission from ref. 14, AMAP.

The unexpected teratogenicity of RXR antagonist UVI3003 via activation of PPARγ in Xenopus tropicalis

Zhu, J. M., Janesick, A., Wu, L. J., Hu, L. L., Tang, W. Y., Blumberg, Bruce., Shi, H. H.*, Toxicology and Applied Pharmacology, 2017, 314: 91-97.

The RXR agonist (triphenyltin, TPT) and the RXR antagonist (UVI3003) both show teratogenicity and, unexpectedly, induce similar malformations in Xenopus tropicalis embryos. In the present study, we exposed X. tropicalis embryos to UVI3003 in seven specific developmental windows and identified changes in gene expression. We further measured the ability of UVI3003 to activate Xenopus RXRα (xRXRα) and PPARγ (xPPARγ) in vitro and in vivo. We found that UVI3003 activated xPPARγ either in Cos7 cells (in vitro) or Xenopus embryos (in vivo). UVI3003 did not significantly activate human or mouse PPARγ in vitro; therefore, the activation of Xenopus PPARγ by UVI3003 is novel. The ability of UVI3003 to activate xPPARγ explainswhy UVI3003 and TPT yield similar phenotypes in Xenopus embryos. Our results indicate that activating PPARγ leads to teratogenic effects in Xenopus embryos. More generally, we infer that chemicals known to specifically modulate mammalian nuclear hormone receptors cannot be assumed to have the same activity in non-mammalian species, such as Xenopus. Rather they must be tested for activity and specificity on receptors of the species in question to avoid making inappropriate conclusions.

RXR抑制剂UVI3003通过激活PPARγ导致了热带爪蟾胚胎畸形

研究发现，三苯基锡（TPT）对热带爪蟾胚胎的致畸效应与RXR多种激动剂的截然不同，而与RXR高选择性抑制剂UVI3003的非常相似，推测UVI3003与TPT对热带爪蟾胚胎的致畸机制可能存在相似之处。根据热带爪蟾胚胎的生长发育阶段特征，在NF 10-43时期划分出7个暴露窗口，分别进行UVI3003暴露并分析了基因表达的变化。UVI3003在所有暴露窗口下都显著地下调了PPARγ基因。进一步的核受体活性检测实验发现，UVI3003与TPT在体外（Fig.5）与爪蟾胚胎体内（Fig.6）都可以有效地激活爪蟾PPARγ。

UVI3003与TPT对爪蟾PPARγ的有效激动活性证实了之前的假设，激活PPARγ是导致UVI3003与TPT在爪蟾胚胎体内引起相似畸形表型的潜在机制。UVI3003对人类PPARγ和小鼠PPARγ并没有表现出激动活性（Fig.5 b-c）。因此，被认为可以激活或抑制哺乳动物核受体的化合物不能被假定认为在非哺乳动物中（例如非洲爪蟾也具有相同或相似的活性）。研究首次提出了RXR高选择性抑制剂UVI3003同时是爪蟾特异的PPARγ核受体激动剂的观点，揭示了UVI3003对爪蟾胚胎的致畸机制。

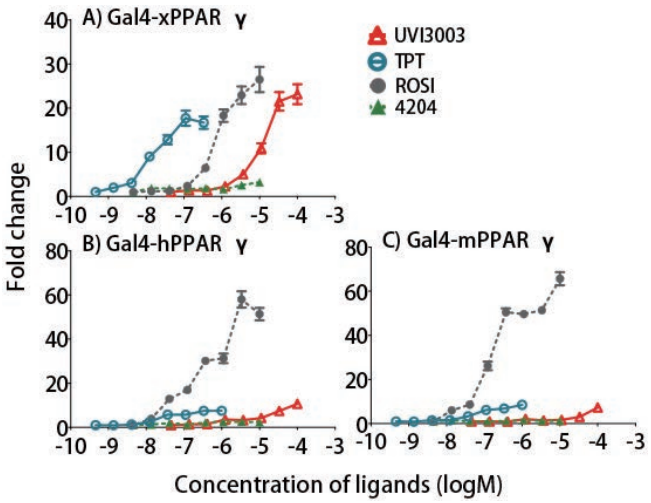


Fig. 5. Activation of xPPARγ by UVI3003 (in vitro). Rosiglitazone (ROSI) and AGN194204 are the control agonists of PPARγ and RXRα. Data represent reporter luciferase activity normalized to β-galactosidase and plotted as the average fold change ± SEM (n = 3) relative to DMSO (0.05%) controls.

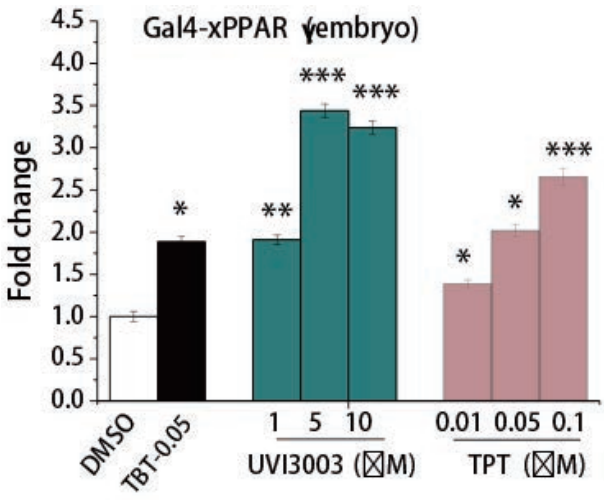


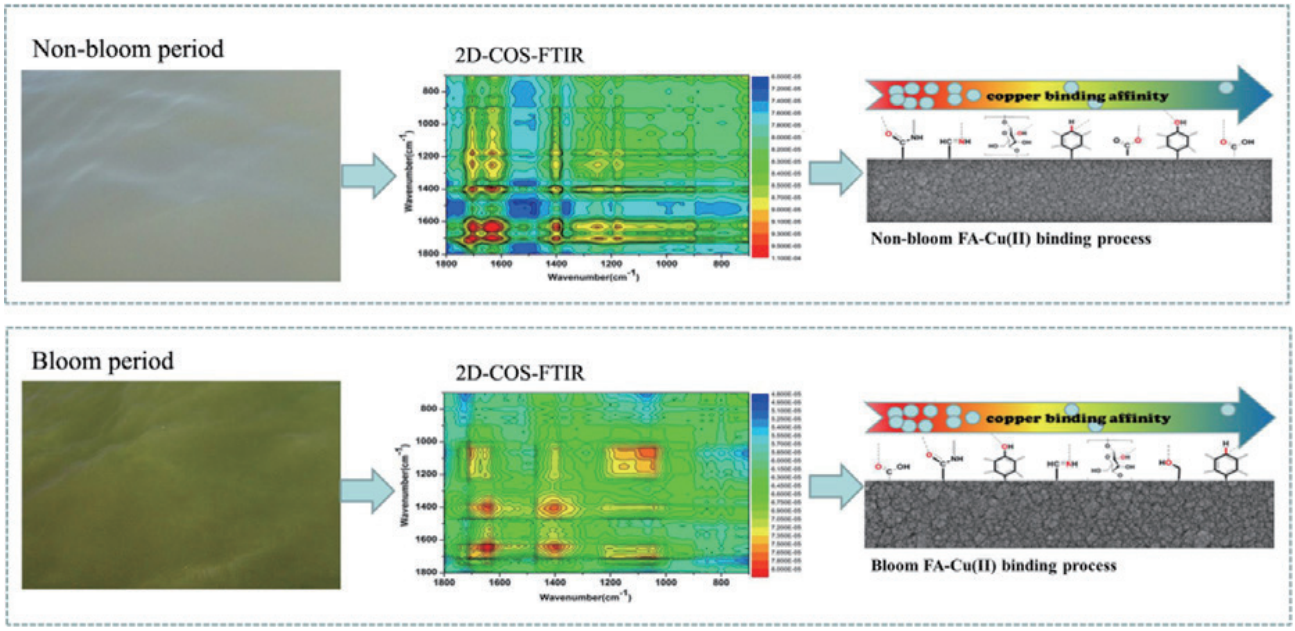
Fig. 6. Activation of xPPARγ by UVI3003 and TPT in X. laevis embryos. Embryos were injected at the 2- or 4-cell stage with 50 pg reporter DNA, and 50 pg Gal4-xPPARγ mRNA then treated at stage 8 with TPT, UVI3003, TBT (0.05 μM) or vehicle (0.1% DMSO). Each value represents the mean ± SEM of three or four replicates (n = 3, 4). Statistical analysis was conducted with one-way ANOVA (Dunnett test) and independent samples t-test. *p b 0.05, **p b 0.01 and ***p b 0.001.

Composition and copper binding properties of aquatic fulvic acids in eutrophic Taihu Lake, China
Li, W. W., Zhang, F. F.*, Ye, Q., Wu, D., Wang, L. Y., Yu, L. H., Deng, B., Du, J. Z., Chemosphere, 2017, 172: 496-504.

Fulvic acid (FA) plays a significant role in biogenic-elemental cycling in aquatic ecosystems which is highly dependent on their organic composition. In this study, the aquatic FA contents and binding properties during bloom and non-bloom periods in Taihu Lake were investigated by two-dimensional correlation spectroscopy Fourier transform infrared spectroscopy (2D-COS-FTIR), nuclear magnetic resonance (NMR) and elemental analysis. Compared with non-bloom FA, bloom FA was of lower nitrogen content and higher C/N ratio. It contained more carboxylic and aliphatic groups while less amide groups. 2D-COS-FTIR spectra evidenced the carboxyl groups in bloom FA had the fastest response to Cu(II) binding. Also, polysaccharide in bloom FA was more susceptive to Cu(II) concentrations than that in nonbloom FA. While comparing with bloom FA, the N-rich organic compounds in non-bloom FA exhibited faster binding sequence with Cu(II). A comprehensive scheme about the interaction process of FA-Cu(II) showed that both nitrogenous and oxygenic groups in FAs were active in binding to Cu(II). The alteration in binding behaviors of organic groups in FAs to Cu(II) may have been driven by algal products and microbial community variety in Taihu Lake. Our results here have the potential to contribute significantly.

太湖蓝藻爆发对溶解态有机物性能影响的研究

人类活动的加剧使世界范围内水体富营养化问题日益凸显。太湖作为典型的富营养化湖泊，水华频发，伴随着水华过程大量的有机质进入湖泊。溶解态有机物（Dissolve Organic Matter, DOM）可改变水体中重金属等的生物地球化学循环过程，在富营养化湖泊生态系统中具有重要的环境效应。
水体中富里酸（Fulvic Acids, FAs）是DOM的代表组分之一。利用核磁共振谱、元素分析及红外光谱等技术，发现蓝藻水华期和非水华期太湖水体溶解态FAs的结构组成存在差异：相比于非水华期FAs（N-FAs），水华期FAs（B-FAs）含更多的羧基及脂肪族结构，酰胺基团较少。以铜离子（Cu2+）为模式离子，进一步利用二维相关红外光谱研究了N-FA和B-FA与Cu2+ 的结合顺序：N-FA中含氮有机物在与Cu2+ 反应过程中具有更快的亲和顺序，而B-FA中的羧基对Cu2+ 浓度变化最为敏感，并给出了N-FA和B-FA与Cu2+ 反应过程中各官能团的相对亲和顺序。蓝藻爆发时藻类胞外多聚物的释放及微生物群落组成的季节性变化是溶解态FAs结构变化的主要原因，水华过程对DOM结构组成的改造是其亲和顺序改变的主要因素。这项研究加深了富营养化水域水华过程对DOM结构组成的改造及其与重金属离子生物有效性相互关系的认识，为世界范围的富营养化水域DOM生物地球化学循环研究提供参考。



Microplastics and mesoplastics in fish from coastal and fresh waters of China

Jabeen, K., Su, L., Li, J. N., Yang, D. Q., Tong, C. F., Mu, J. L., Shi, H. H.*, Environmental Pollution, 2017, 221: 141-149.

Plastic pollution is a growing global concern. In the present study, we investigated plastic pollution in 21 species of sea fish and 6 species of freshwater fish from China. All of the species were found to ingest micro- or mesoplastics. The average abundance of microplastics varied from 1.1 to 7.2 items by individual and 0.2e17.2 items by gram. The average abundance of mesoplastics varied from 0.2 to 3.0 items by individual and 0.1e3.9 items by gram. Microplastics were abundant in 26 species, accounting for 55.9 e92.3% of the total number of plastics items in each species. Thamnaconus septentrionalis contained the highest abundance of microplastics (7.2 items/individual). The average abundance of plastics in sea benthopelagic fishes was significantly higher than in freshwater benthopelagic fishes by items/individual. The plastics were dominanted by fiber in shape, transparent in color and cellophane in composition. The proportion of plastics in the stomach to the intestines showed great variation in different species, ranging from 0.5 to 1.9 by items/individual. The stomach of Harpodon nehereus and intestines of Pampus cinereus contained the highest number of plastics, (3.3) and (2.7), respectively, by items/individual. Our results suggested that plastic pollution was widespread in the investigated fish species and showed higher abundance in comparison with worldwide studies. The ingestion of plastics in fish was closely related to the habitat and gastrointestinal tract structure. We highly recommend that the entire gastrointestinal tract and digestion process be used in future investigations of plastic pollution in fish.

中国近岸和淡水鱼类体内微塑料及中塑料污染

尽管鱼类摄入微塑料已经在野外和室内模拟实验中得到证实，但目前我国近岸鱼类体内微塑料污染负荷调查鲜有报道。本研究选取了中国21种海洋近岸鱼类和6种淡水鱼类进行分析，结果表明所有鱼类种类中都可以发现微塑料（5mm以下）或者中塑料（大于5mm）的存在，微塑料平均丰度为每条鱼1.1-7.2个，中塑料的平均丰度为每条鱼0.2-3个。在总共26种鱼类中，55.9%-92.3%的个体能够被检出微塑料，并且塑料的特征以纤维形状、透明颜色以及玻璃纸组成为主。鱼类个体中肠和胃内的塑料丰度在不同种类鱼体内差异显著。中国近海及淡水鱼体内的塑料污染高于国外分析结果；鱼类对塑料的摄食可能与不同种类鱼的肠道结构以及栖息摄食习惯有关。在方法学上，建议使用全消化道分析而不是单一肠或者胃分析，以更可靠、准确的测定鱼体内微塑料污染负荷。

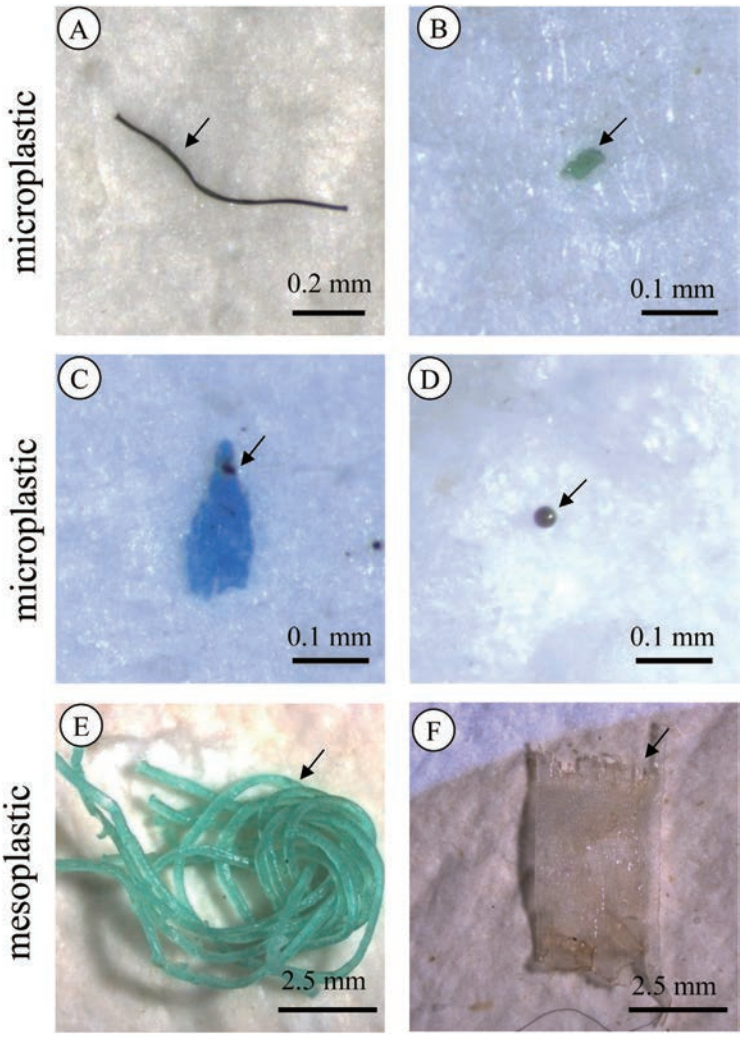


Fig. 1. Photographs of micro and mesoplastics in fish from China. The morphotypes included fiber (A), fragments (B, C), pellet (D), meso fibers (E) and meso sheet (F). Scale bar ¼ 0.2 mm (A), 0.1 mm (BeD), 2.5 mm (E, F).

Microplastics in sediments of the Changjiang Estuary, China

Peng, G. Y., Zhu, B. S., Yang, D. Q., Su, L., Shi, H. H., Li, D. J.*, Environmental Pollution, 2017, 225: 283-290.

Microplastics are plastics that measure less than 5 mm in diameter. They enter the marine environment as primary sources directly from industrial uses, as well as secondary sources resulting from the degradation of large plastic debris. To improve the knowledge of microplastic pollution in China, we investigated samples from 53 estuarine sediment locations collected with a box corer within the Changjiang Estuary. Microplastics (<5 mm) were extracted from sediments by density separation, after which they were observed under a microscope and categorized according to shape, color and size. Identification was carried out using Micro-Fourier-Transform Infrared Spectroscopy (m-FT-IR). The abundance of microplastics in the Changjiang Estuary was mapped. The mean concentration was 121 ± 9 items per kg of dry weight, varying from 20 to 340 items per kg of dry weight. It was found that the concentration of microplastics was the highest on the southeast coast of Shanghai. The distribution pattern of microplastics may be affected by the Changjiang diluted water in summer. All of the microplastics collected were categorized according to shape, color and size. Among which fiber (93%), transparent (42%) and small microplastics (<1 mm) (58%) were the most abundant types. No clear correlation between microplastics and the finer sediment fraction was found. Rayon, polyester, and acrylic were the most abundant types of microplastics identified, indicating that the main source of microplastics in the Changjiang Estuary was fromwashing clothes (the primary source). It is possible to compare microplastic abundance in this study with the results of other related studies using the same quantification method. The identification of microplastics raises the awareness of microplastic pollution from drainage systems. The prevalence of microplastic pollution calls for monitoring microplastics at a national scale on a regular basis.

长江口沉积物中微塑料分布的研究

海洋微塑料（microplastics）研究在许多国家已引起广泛关注，成为研究热点，国内相关报道近年来逐渐增多，但各海域时空分布仍需进一步研究。微塑料一般指直径小于5mm的塑料。长江口是中国第一大河流的入海口，紧邻我国人口最多的城市——上海市，大量生活污水和工业废水经由长江口排放入海。长江冲淡水的影响范围可达冲绳海槽，可能对西北太平洋的物质循环与能量输运起到关键作用。中国社会、经济的快速发展使得海岸带面临环境污染、生态破坏的威胁，特别是长江三角洲这一中国人口密度最大的地区。研究选择长江口53个站位，采集水下表层沉积物样品，以期获得长江口沉积物中微塑料全面详实的分布特征。微塑料经浮选分离处理后从沉积物转移到滤膜上，在显微镜下拍照计数，按形状、颜色、和尺寸进行分类，并用显微红外光谱仪进行鉴定，测定了15个站位的粒径分布。研究得出长江口微塑料含量分布图，分布范围为2～34个100g样品干重；观察到纤维状、碎片状、颗粒状微塑料，这些微塑料样品按颜色可分为透明、蓝色、黑色、黄色、红色、白色六类，按尺寸可分为大型微塑料（＞1mm且＜5mm）和小型微塑料（＜1mm）。微塑料样品分类中纤维状（93%）、透明类（42%）、小于1mm的小型微塑料（58%）含量最多，微塑料分布和泥沙粒径分布无明显相关性，人造丝（Rayon），聚酯纤维（Polyester）和腈纶（Acrylic）在所有鉴定的微塑料中含量最多。这是我国首次对河口及邻近海域底层沉积物微塑料开展研究，表明了微塑料在河口及邻近海域沉积物中分布广泛，密度最高区域为沿岸海域，沉积物中微塑料污染与水体污染程度密切相关，这可能对海洋底栖生物，特别是滤食性的海洋生物产生影响。同时，由于微塑料的野外采样和实验室分析等关键步骤目前仍无统一方法，微塑料的研究和监测亟待标准化。本研究提出的沉积物野外采样、室外分析鉴定方法，微塑料采集、鉴定分析发现率高，是非常实用高效的海洋沉积物微塑料研究方法，可供相关研究参考，便于今后在沉积物微塑料研究中提供更准确的数据，使各海域沉积物微塑料的时空分布数据具有更好的可对比性。

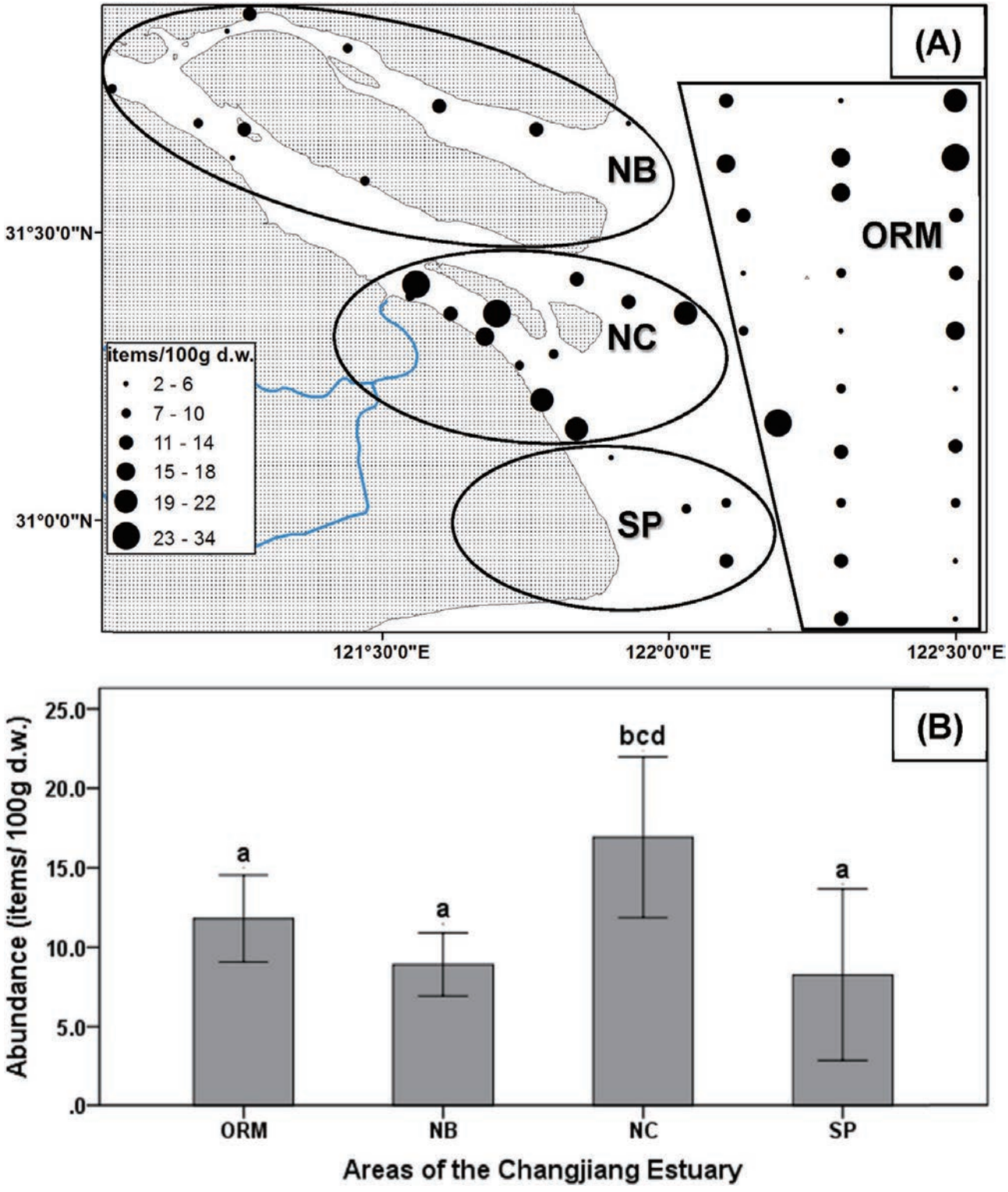


Fig. 2. (A) Microplastic abundance in sediments of the Changjiang Estuary and three areas of the Changjiang Estuary divided by geographical features. ORM: Outer River Mouth; NB: North Branch; NC: North Channel; SP: South Passage. (B) Microplastic abundance in four areas in the Changjiang Estuary. If two random groups have the same letter, they are not significantly different. Area NC had the maximum abundance and was significantly different from Area ORM, Area NB and Area SP (Mann Whitney U test, $p < 0.05$).

Persistence and risk of antibiotic residues and antibiotic resistance genes in major mariculture sites in Southeast China

Chen, C. Q., Zheng, L., Zhou, J. L.*, Zhao, H., Science of the Total Environment, 2017, 580: 1175-1184.

Antibiotics arewidely used in mariculture industry, and this study attempts to determine the extent ofwater and sediment pollution by antibiotic residues in 13 major mariculture sites in China. Through chemical and molecular biology analysis, the results showed that the total concentrations of sulfonamides and tetracyclines were in the range 62.0–373.8 ng L^{-1} and 0.2–259.1 ng L^{-1} respectively in water samples, and in the range 0.19–1.59 ng g^{-1} dry weight and 3.45–74.84 ng g^{-1} dry weight respectively, in sediments samples. The occurrence of antibiotic resistance genes (ARGs) was detected in all sites. Compared with the tetracyclines resistance genes, the absolute copy number and relative abundance of the sulfonamides resistance genes were 4.3 times and 2.3 times higher in water and sediment from the mariculture sites, with the dominant resistance genes being *sul2*. The abundance of *sul3* in thewater phasewas significantly correlated with the concentrations of sulfamerazine, while the abundance of *sul2* in the sediment phase was significantly with sulfadiazine concentrations. The abundance of tetM in the sediment phase was significantly correlated with the concentrations of oxytetracycline. The findings demonstrate the persistence of antibiotic residues and ARGs in major mariculture sites in Southeast China.

太湖蓝藻爆发对溶解态有机物性能影响的研究

人类活动的加剧使世界范围内水体富营养化问题日益凸显。太湖作为典型的富营养化湖泊，水华频发，伴随着水华过程大量的有机质进入湖泊。溶解态有机物（Dissolve Organic Matter, DOM）可改变水体中重金属等的生物地球化学循环过程，在富营养化湖泊生态系统中具有重要的环境效应。

水体中富里酸（Fulvic Acids, FAs）是DOM的代表组分之一。利用核磁共振谱、元素分析及红外光谱等技术，发现蓝藻水华期和非水华期太湖水体溶解态FAs的结构组成存在差异：相比于非水华期FAs（N-FAs），水华期FAs（B-FAs）含更多的羧基及脂肪族结构，酰胺基团较少。以铜离子（Cu^{2+}）为模式离子，进一步利用二维相关红外光谱研究了N-FA和B-FA与Cu^{2+} 的结合顺序：N-FA中含氮有机物在与Cu^{2+} 反应过程中具有更快的亲和顺序，而B-FA中的羧基对Cu^{2+} 浓度变化最为敏感，并给出了N-FA和B-FA与Cu^{2+} 反应过程中各官能团的相对亲和顺序。蓝藻爆发时藻类胞外多聚物的释放及微生物群落组成的季节性变化是溶解态FAs结构变化的主要原因，水华过程对DOM结构组成的改造是其亲和顺序改变的主要因素。这项研究加深了富营养化水域水华过程对DOM结构组成的改造及其与重金属离子生物有效性相互关系的认识，为世界范围的富营养化水域DOM生物地球化学循环研究提供参考。

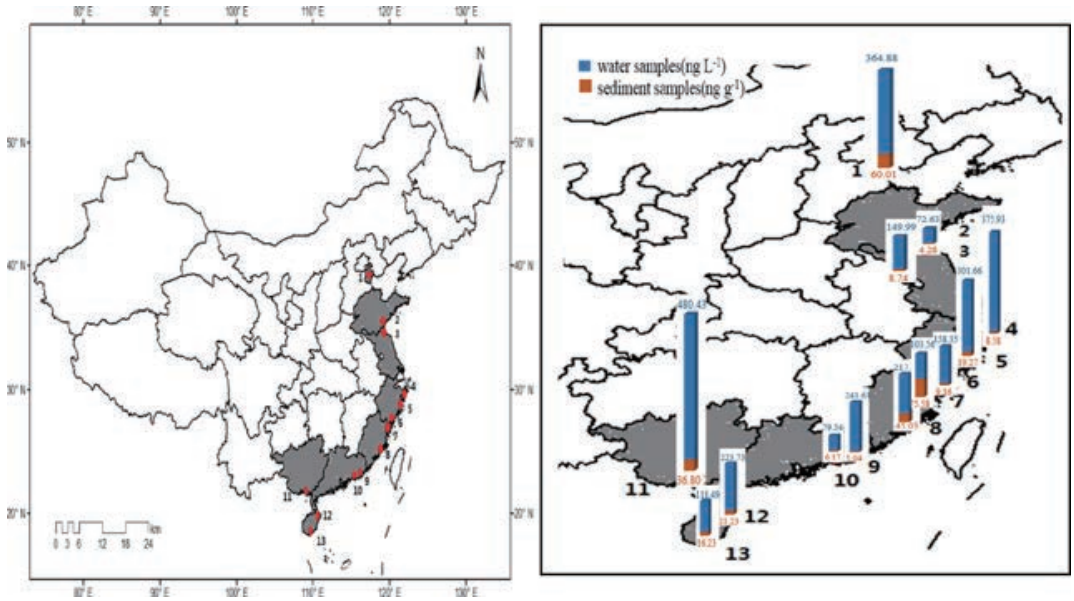


Fig. 1. (a): The sampling locations of the major mariculture sites in China. There are site 1 (Tianjin), site 2 (Qingdao), site 3 (Lianyungang), site 4 (Zhoushan), site 5 (Ninghai), site 6 (Wenzhou), site 7 (Ningde), site 8 (Quanzhou), site 9 (Shantou), site 10 (Shenzhen), site 11 (Fangchenggang), site 12 (Haikou) and site 13 (Sanya). (b): Spatial distribution of total antibiotic concentrations in water and sediment samples.

Biological responses to nine powerful typhoons in the East China Sea

Wang, T., Liu, G. P., Gao, L., Zhu, L. X., Li, D. J.*, Regional Environmental Change, 2017, 17: 465-476.

The powerful winds that occur during the typhoon period usually induce complete ocean mixing and upwelling, with deeper waters pushed to the upper ocean, which gradually alters the physical, chemical, and biological processes in the upper layer of the ocean. Using multi-satellite remote sensing and numerical model data, we investigated the biological responses to nine powerful typhoons that affected the East China Sea (ECS) between 2010 and 2013. Increases in chlorophyll-a (Chl-a) in response to the passage of several typhoons were clearly observed. However, not all typhoons induced large phytoplankton blooms in the ECS, especially in the open sea. If the difference of the ocean's precondition was not considered, the post-typhoon Chl-a concentration mainly depends on pre-typhoon Chl-a concentration and transit time. During the passage of Kompasu, wind induced currents redistributed the surface circulation and modified the current structure. With the continual intrusion of low Chl-a waters, the surface Chl-a concentrations in the bloom region decreased after the passage of Kompasu. Furthermore, the nutrients provided by the typhoon precipitation directly fueled the growth of the surface phytoplankton in the open sea, which could shorten the lag time of the Chl-a bloom after individual typhoons passed. Finally, we show evidence that typhoon-derived nutrients can trigger and sustain red tides in the ECS coastal regions. Not only do the high frequencies of typhoons increase the number of outbreaks of red tides in a specific year, but they also increase the number of red tides in the following year by enhancing the submarine groundwater discharge and terrestrial runoff.

多个强台风过境对东海表层浮游植物生长及分布的影响

台风是东海最主要的气象灾害之一。台风过境一方面加强了水体的垂直混合过程，另一方面对水体水平输运方式的改变也有一定的作用。台风期间海洋理化环境的改变将会对浮游植物的生长带来一定程度的影响。传统研究认为，台风期间垂直混合过程加强带来的营养盐促进了台风后表层浮游植物生长，往往忽略了强降雨及流场改变等因素在浮游植物生长与分布变化中的作用。

在比较了9个强台风过境前后东海表层Chla浓度的变化情况后，研究发现并不是 个台风都可使其影响海区浮游植物生物量明显 加。台风前Chla浓度及台风滞留时间是影响台风后Chla浓度高低的两个主要因素。在个别情况下，台风强降雨对台风后Chla浓度的增加也会产生积极作用。同时，台风作用下流场的变化在特定情景下可以改变海洋表层浮游植物的分布状况，台风过后低Chla浓度海水的持续入侵使部分海区的表层Chla浓度出现了降低。

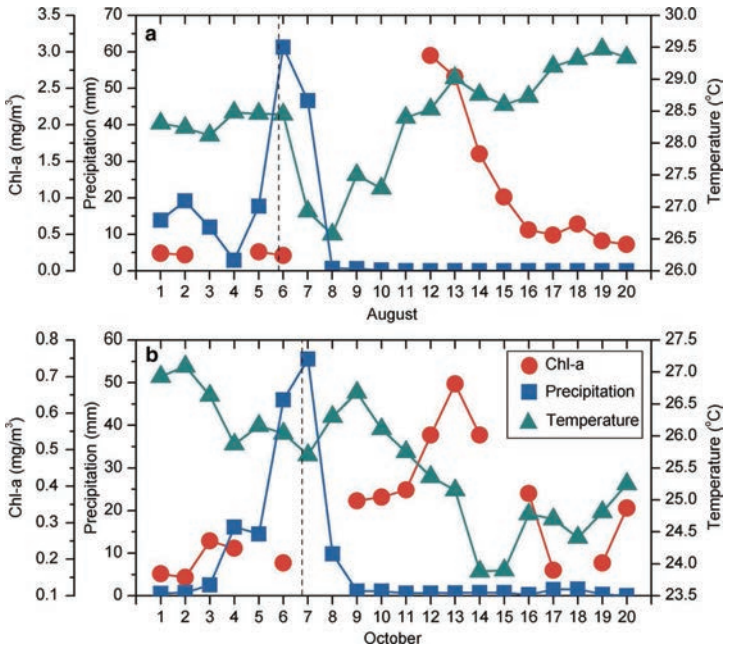


Fig. 5 Time series for the Chla concentrations, precipitation, and SST in the two open sea bloom regions (white boxes in Fig. 2, panels 3b, 9b). a Haikui, August 1–20, 2012, b Danas, October 1–20, 2013. Dashed lines start of the typhoons

Distributions and dynamics of dissolved carbohydrate species in Changjiang Estuary and the adjacent East China Sea

Song, S. Z., Gao, L., Li, D. J.*, Wang, T., Zhu, L. X., Liu Y. L., Marine Chemistry, 2017, 194: 22-32.

Water samples were collected from the Changjiang Estuary (CE) and adjacent East China Sea (ECS) during two cruises in March 2013 and July 2014 to investigate the distributions and dynamics of dissolved carbohydrate species. The concentrations of surface dissolved organic carbon (DOC) and total dissolved carbohydrates (TCHO) were higher in summer compared with those in spring. The dissolved polysaccharides (PCHO) in surface waters accounted for 65 ± 14% and 47 ± 18% of TCHO on average in spring and summer, respectively. The average TCHO/DOC ratio in summer was 17 ± 5%, compared with 11 ± 3% in spring. DOC and dissolved monosaccharides (MCHO) were significantly correlated with salinity in both seasons, indicating that physical mixing was a major controller of the DOC and MCHO distributions. By contrast, PCHO exhibited greater variations with increasing salinity, which suggest that MCHO and PCHO had different features in the study area. According to principal component analysis, PCHO were significantly correlated with the second principal component "biological factors" and they had the opposite loading with nutrients, especially NO^{2-}, which suggest that PCHO were affected greatly by nutrient-related biological processes, such as primary production and bacterial assimilation. By contrast, MCHO were affected mainly by physical factors, especially terrigenous inputs. After comparing the stations with similar salinity along the Changjiang diluted water transport pathways during summer, we observed the obvious production of PCHO and DOC, as well as the consumption of nutrients, which further demonstrated biological impacts on the PCHO concentrations. Furthermore, the increase in PCHO was only half that of DOC, demonstrating the production of other organic matter via the transformation of PCHO, or other biological processes. However, the MCHO concentrations remained constantly high in Changjiang diluted water patches in CE, and appeared to decrease with dilution, suggesting that these molecules persisted rapid microbial turnover. In general, the dynamics of MCHO and PCHO were very different in the study area. MCHO exhibited conservative behavior, whereas PCHO were highly bioactive and influenced greatly by biological factors in the CE and adjacent ECS.

长江口及东海邻近海域溶解性碳水化合物的分布和动力学特征

溶解性碳水化合物是海水中溶解性有机碳的重要组成部分，是异氧生物重要的能量来源，具有较高的生物活性，可以在一定程度上指示有机碳的水解状态，对于我们进一步了解有机碳的生物地球化学循环有重要的作用。但是，目前我们对于碳水化合物在近岸的动力学特征以及影响因素知之甚少。因此，我们主要研究了溶解性碳水化合物在长江口及邻近东海海域的时间和空间分布特征，同时结合盐度和营养盐数据，采用主成分分析法分析了溶解性单糖和多糖的来源和影响因素，并根据长江冲淡水在长江口斑块化移动的特点，分析了在盐度相似的站位单糖和多糖浓度的变化。在实验方法上，采用了浓硫酸水解多糖的方法检测多糖的浓度，可明显提高多糖的降解效率。研究首次报道了长江口地区溶解性单糖和多糖的不同动力学特征。单糖浓度从近岸到外海逐渐降低，主要受咸淡水混合的影响，而多糖浓度有离岸增高的趋势，物理混合对多糖浓度的变化没有明显影响。通过主成分分析，发现多糖浓度可能主要受生物因素，如浮游生物初级生产，微生物对有机物的降解等的影响。通过分析在长江冲淡水斑块化移动过程中盐度相似的站点，发现了多糖的原位生产并伴随着营养盐浓度的降低，而单糖浓度没有明显变化。因此，在长江口地区，单糖主要来源于长江冲淡水，浓度变化趋于保守，主要受物理混合的影响。而多糖具有较高的生物活性，可能主要受生物因素的影响。这与其他河口的研究发现有所不同，可能暗示了长江口独特的单糖组成，或者由其特定的生物地球化学环境导致。

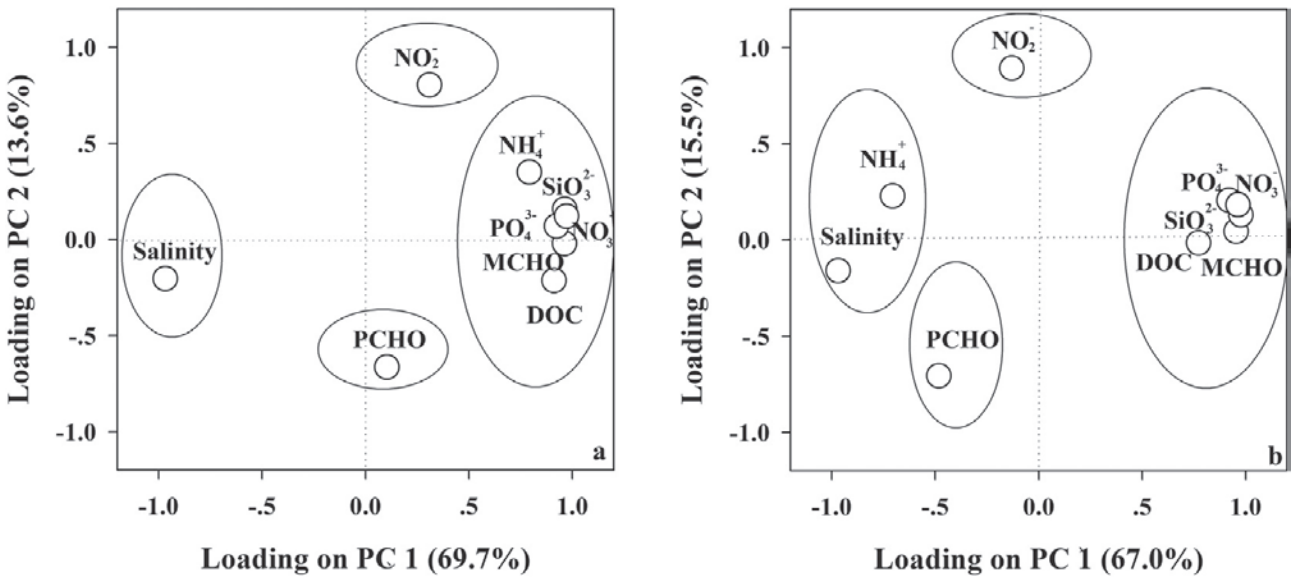


Fig. 6. The loadings of dissolved monosaccharides (MCHO), polysaccharides (PCHO), dissolved organic carbon (DOC), salinity, and nutrients on two principal components in March 2013 (a) and July 2014 (b) by principal component analysis (PCA). The first principal component (PC1) accounted for 69.7% of the total variance with the second principal components (PC2) for 13.6% in March 2013. In July 2014, PC1 and PC2 occupied 67.0% and 15.5% of the total variance, respectively.

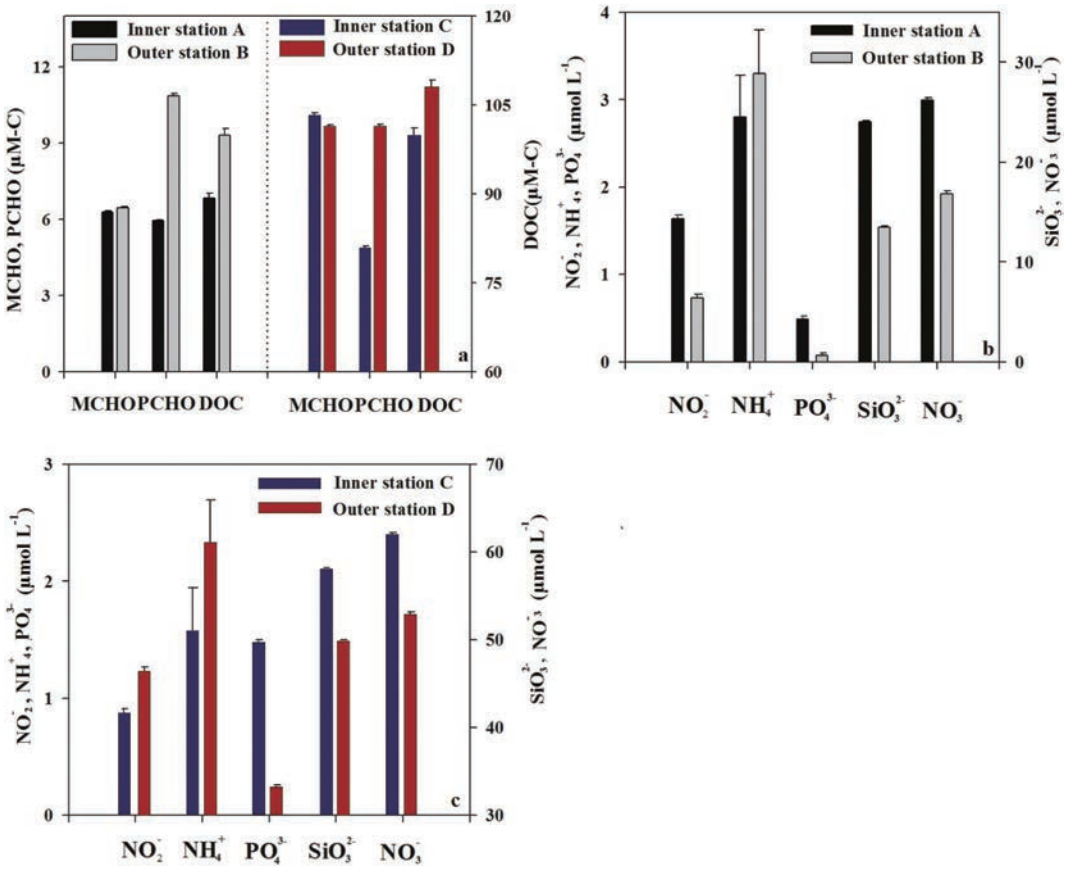


Fig. 9. Comparison of surface monosaccharides (MCHO), polysaccharides (PCHO), dissolved organic carbon (DOC, a), and nutrient concentrations (b, c) between the inner station A (salinity =25.6) and the outer station B (salinity = 25.7) and between the inner station C (salinity =17.8) and the outer station D (salinity =18.0) during the summer cruise. The location of four stations can be found in Fig. 1a.

Soil carbon and nitrogen storage in recently restored and mature native Scirpus marshes in the Yangtze Estuary, China: Implications for restoration

Chen, W., Ge, Z. M.*, Fei, B. L , Zhang, C., Liu, Q. X., Zhang, L. Q., Ecological Engineering, 2017, 104(A): 150-157.

A global study revealed that habitat degradation caused significant carbon release from coastal ecosystems to the atmosphere. As part of re-establishment of the native Scirpus mariqueter in the salt marshes of the Yangtze Estuary, the roles of revegetation mode (planting density), site characteristics (sediment texture and hydrological regime) and community age (recently restored and mature marshes) in the storage of soil organic carbon (SOC) and nitrogen (SN) were examined. In recently restored marsh characterized by muddy sediments with moderate sediment accretion, vegetation growth and SOC and SN storage increased along with the increase in planting densities and the SOC storage was 1.14–1.52 times greater than that in non-vegetated plots after two years of revegetation. The SOC storage under a high planting density equated to approximately 75% of the carbon stock in the mature marsh. However, the increase in SOC storage was much less in those sites characterized by silty sediments than that in sites with muddy sediment, even when a high planting density was applied. This is attributed to a lower rate of sediment deposition and inhibition of below-ground root growth, which was found to be strongly correlated with carbon and nitrogen stocks in the soil. These results demonstrate that successful vegetation restoration plays a key role in determining SOC and SN storage within a salt marsh. The restoration of native S. mariqueter for SOC and SN stocks is most effective when conducted in muddy sediments with good sedimentation rates and using a high planting density. In contrast, costs will be higher and recovery time longer in silty (or sandy) sediments, due to their poorer conditions for plant growth and significantly lower rates of carbon and nitrogen accumulation.

新恢复土著薦草属群落和原生群落的土壤碳氮累积：盐沼修复的启示

由于长期受到人类活动影响，我国滨海湿地生态系统服务功能急剧下降。对受损湿地进行生态功能恢复具有科学与社会意义。基于我国海岸带特有种海三棱 草的生态修复示范工程，研究了不同植被恢复模式（材料与定植强度）、沉积物特性和水文条件（泥沙淤积和水动力）下的植被恢复和土壤有机碳积累效果。结果表明，具有平缓泥沙沉积率的细沙质潮滩区域海三棱薦草恢复效果最佳，经过两年的恢复期，其土壤有机碳储量是对照组的1.14-1.52倍，且高密度植被定植区的土壤有机碳储量已相当于多年生海三棱 草群落的75%。不同密度定植区域的新生植株密度、生物量、土壤有机碳储量差异显著。然而，在水动力较强和低泥沙沉积率的粗沙质潮滩区域，即使在高密度定植方式下海三棱薦草恢复速度仍非常缓慢，土壤有机碳的增量显著低于前者细沙质潮滩。研究提出潮滩植物修复初期的成功与否对于稳定植物群落形成和土壤有机碳积累至关重要，地下生物量和土壤养分条件也对海三棱 草恢复和土壤有机碳积累发挥了一定的作用。研究在综合考虑植被恢复模式、成本效益和风险规避的基础上，提出了切实可行的潮间带原生植被种群快速恢复和功能提升（以固碳效益为例）的实践方案，为长江口滨海湿地土著种质资源库和湿地可持续管理提供了实践依据。

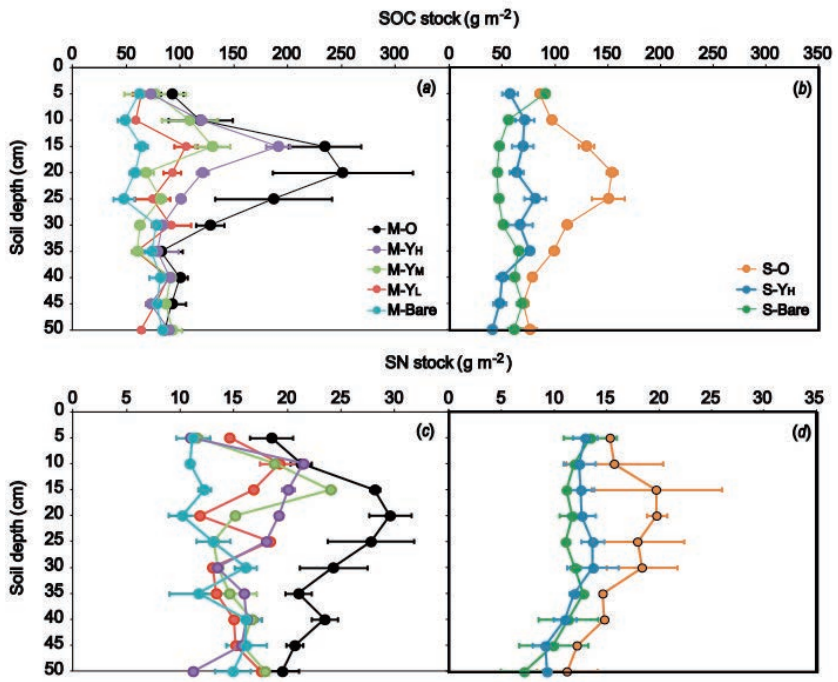


Fig. 1. Location of the study area in the Chongming Dongtan salt marsh of the Yangtze Estuary and the two sampling sites (muddy site (M) in the eastern marsh and silty site (S) in the southern marsh).

Natural radioactivity assessment of surface sediments in the Yangtze Estuary

Wang, J. L., Du, J. Z.*, Bi, Q. Q., Marine Pollution Bulletin, 2017, 114(1): 602-608.

Naturally occurring radionuclides (e.g., thorium, uranium and their daughter nuclides) are widespread in the earth surface systems, such as the lithosphere, biosphere, and pedosphere. Long-term exposure to radioactivity and inhalation of radionuclides could cause many health problems, such as acute leukopenia, anemia, leukemia, necrosis of the mouth, tooth fracture and cataracts as well as lung, pancreatic liver, hepatic, bone and kidney cancers. However, research concerning the natural radioactivity levels of estuarine sediment is limited. Sediment in the Changjiang Estuary is viewed as a potential resource for reclamations on Chongming Island and raw material for construction. The Changjiang Estuary is also the source of water for Shanghai and Jiangsu Province. Therefore, the activities of the natural radionuclides (^{238}U, ^{232}Th, ^{226}Ra and ^{40}K) of the surface sediments in the Changjiang Estuary were determined and used to evaluate radiation hazards in the study area. The of activities of ^{238}U, ^{232}Th, ^{226}Ra and ^{40}K ranges from14.1 to 62.3, 26.1 to 71.9, 13.7 to 52.3, and 392 to 898 Bq kg^{-1}, respectively, which were comparable to values of other regions in China The activities of ^{232}Th, ^{40}K and ^{226}Ra were clearly different from the global recommended values. The radium equivalent activity was less than the recommended limit of 370 Bq kg^{-1}; therefore, the sediment in this area can be safely used for reclamation. The external hazard index values were less than one. The average absorbed gamma dose rate and annual effective dose equivalent values were slightly greater than the world average value. ^{226}Ra/^{238}U and ^{232}Th/^{238}U ratios could potentially be applied for tracing sediment source.

长江口表层沉积物中的天然放射性评价

通过对2011年至2013年间采集的长江口表层沉积物分析，发现其中的天然放射性核素^{238}U，^{232}Th，^{226}Ra和^{40}K的活度分别为14.1 ~ 62.3（平均：32.8 Bq kg^{-1}），26.1 ~ 71.9（平均：40.9 Bq kg^{-1}），13.7~ 52.3（平均：24.3 Bq kg^{-1}）和392 ~ 88 Bq kg^{-1}（平均：628 Bq kg^{-1}）。这些活度与中国其他区域相应的值类似，但与全球平均值不同，如232Th和40K高于全球平均值，而226Ra低于全球平均值。所有沉积物的Ra等量活度都低于370 Bq kg^{-1}，而且Hex低于1，说明研究区域的泥沙可以安全地作为围垦的用料。另外，表层沉积物中^{226}Ra/^{238}U和^{232}Th/^{238}U比值分别是0.56-0.97（0.77）和 0.89-1.86（平均：1.38），这些特异性的核素活度比值有潜力示踪泥沙的来源。

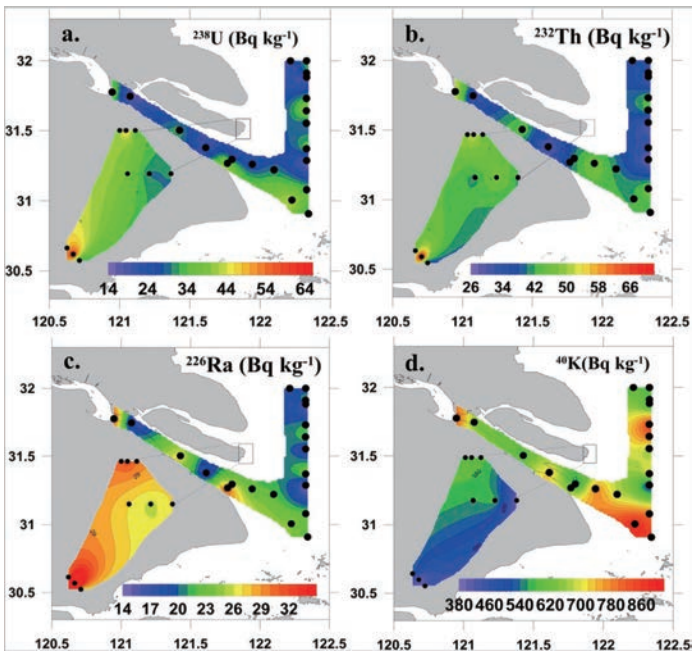


Fig. 2. Spatial distribution of the ^{238}U, ^{232}Th, ^{226}Ra and ^{40}K activities (Bq kg^{-1}) of the surface sediment from the Yangtze Estuary.

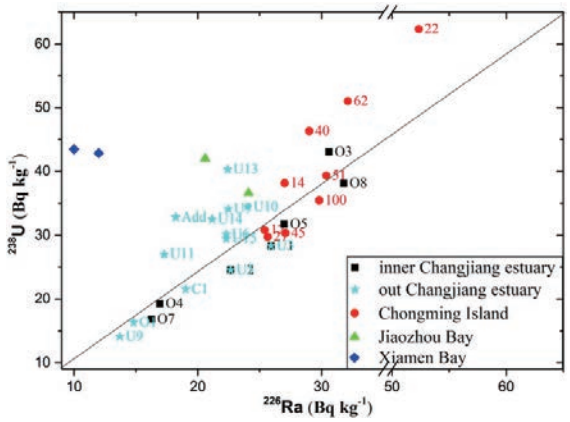
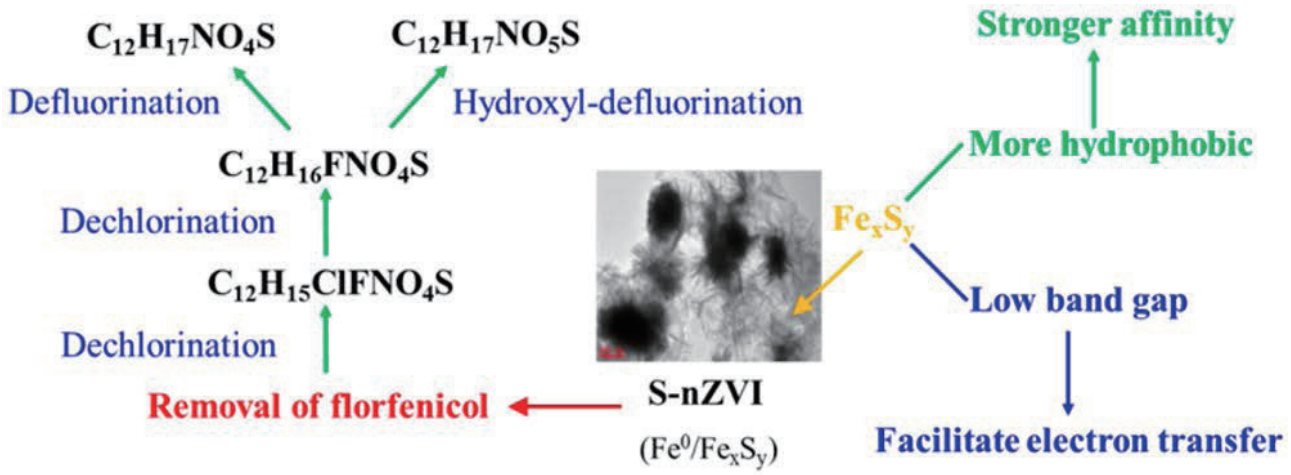


Fig. 5. ^{226}Ra compared to ^{238}U in the surface sediments of different regions, including areas from this and previous studies.

Removal of Antibiotic Florfenicol by Sulfide-Modified Nanoscale Zero-Valent Iron

Cao, Z., Liu, X., Xu, J.*, Zhang, J., Yang, Y., Zhou, J. L., Xu, X. H., Lowry, G. V., Environment Science Technology, 2017, 51: 11269 11277.

Florfenicol (FF, $C_{12}H_{14}Cl_2FNO_4S$), an emerging halogenated organic contaminant of concern was effectively degraded in water by sulfidized nanoscale zerovalent iron (S-nZVI). Sulfidized nZVI (62.5 m^2 g^{-1}) that was prepared using a one-step method resulted in small Fe0/Fesulfide particles that were more stable against aggregation than unsulfidized nZVI (10.2 m^2 g^{-1}). No obvious removal of FF was observed by unsulfidized nZVI. S-nZVI degraded FF, having a surface area normalized reaction rate constant of 3.1×10^{-4} L m^{-2} min^{-1}. The effects of the S/Fe molar ratio, initial FF concentration, initial pH, temperature, and water composition on the removal of FF by S-nZVI, and on the formation of reaction products, were systematically investigated. Both dechlorination and defluorination were observed, resulting in four degradation products ($C_{12}H_{15}ClFNO_4S$, $C_{12}H_{16}FNO_4S$, $C_{12}H_{17}NO_4S$, and $C_{12}H_{17}NO_5S$). High removal efficiencies of FF by S-nZVI were achieved in groundwater, river water, seawater, and wastewater. The reactivity of S-nZVI was relatively unaffected by the presence of both dissolved ions and organic matter in the waters tested.



Comparison of phenotypic and global gene expression changes in Xenopus tropicalis embryos induced by agonists of RAR and RXR

Zhu, J. M., Hu, L. L., Li, L. Y., H, X., Shi, H. H.*, Toxicology and Applied Pharmacology, 2017, 330: 40-47.

Retinoic acid functions through two classes of receptors, i.e., the retinoic acid receptor (RAR) and the retinoid X receptor (RXR). The difference in the role between RAR and RXR, however, are not well clarified. In the present study, we comparatively investigated the phenotypic and global gene expression changes in Xenopus tropicalis embryos induced by three different agonists, including a RAR selective ligand (all-trans retinoic acid, at-RA), a RXR selective ligand (fluorobexarotene, FBA) and their common ligand (9-*cis* retinoic acid, 9c-RA). All three agonists induced striking and similarmalformations in X. *tropicalis* embryos at the concentrations of 5–50 μg/L. Especially, the development of anterior structures and caudal region was dramatically altered. The hierarchical clustering analysis of phenotypes and gene profiles suggested that effects induced by 9c-RA separated from those by at-RA and FBA. The up-regulated genes were involved in multiple pathways while down-regulated genes were mainly related to phototransduction and tyrosine metabolism. at-RA primarily affected the retinol, glycolysis, starch and sucrose metabolisms while FBA led to disturbances in more wide-ranging pathways such as the PPAR, adipocytokine, insulin, FoxO signaling pathways, alanine, aspartate and glutamate metabolism. RXR is a heterodimeric partner for several other nuclear receptors,which opens the possibility that additional retinoid effects could be mediated by FBA, such as RXR-PPAR. Our data indicates that not only RXR-RAR but also RXR-PPAR plays important roles in the control of metabolism with retinoid treatment in X. *tropicalis* embryos.

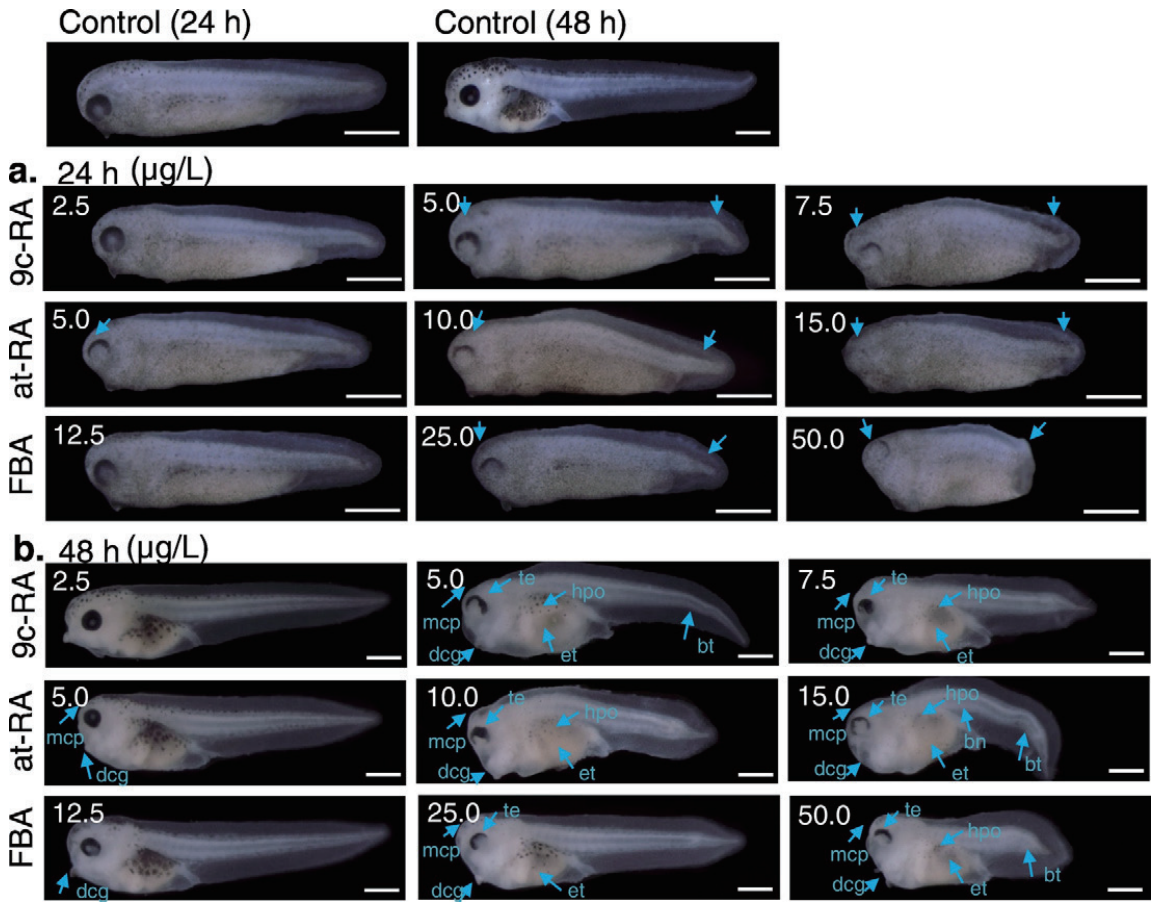


Fig. 1. Multiple malformations induced by 9c-RA, at-RA and FBA in X. *tropicalis* embryos. After three agonists treatment for 24 h from NF 10/11, 10 embryos were collected for photograph (a), another 10 embryos were rinsed with FETAX medium three times and maintained in FETAX medium24 h for morphological analysis (b). Each dish of 10 embryos was considered to be one replicate, and there were 3 dishes per group (n=3). Abbreviations: bn, bent notochord; bt, bent tail; dcg, displaced cement gland; et, enlarged trunk; hpo, hypopigmentation;mcp, microcephaly; te, turbid eyes; Scale bar = 0.5 mm.

Effects of ibuprofen, diclofenac and paracetamol on hatch and motor behavior in developing zebrafish (Danio rerio)

Xia, L., Zheng, L., Zhou, J. L.*, Chemosphere 2017, 182: 416-425.

Non-steroidal anti-inflammatory drugs (NSAIDs) which are widely used as pain relief medicines are causing increasing environmental concern due to their incomplete removal in wastewater treatment plant and potential toxicity on endocrine, kidney and reproduction in teleost fish. This study focused on the effects of widely used ibuprofen, diclofenac and paracetamol on the hatch and motor ability of earlystage zebrafish, by exposing embryos to the target chemicals at 5, 50 and 500 mg/L starting from 6 h postfertilization (hpf). A significant reduction in hatch rate at 55 hpf was caused by both ibuprofen (63%) and diclofenac (58%) at 500 mg/L. Exposure to high concentration of ibuprofen significantly decreased the spontaneous movement by 25%, and reduced the free swimming distance, duration and speed under dark condition by 41%, 29% and 30%, respectively. High concentration of diclofenac also caused 23% decrease in spontaneous movement, and reduced the swimming distance as well as active duration by 17% and 13% under light stimulation. In comparison, the exposure to paracetamol did not cause any notable effect. Among neuron related genes tested, the expression of neurog1 was downregulated from ibuprofen and diclofenac exposure by 19% and 26%, while the expression of neurod1 was up-regulated only by ibuprofen (31%). These findings indicated that ibuprofen and diclofenac significantly affected embryo locomotivity and were potentially neurotoxic, thus posing threats to zebrafish development.

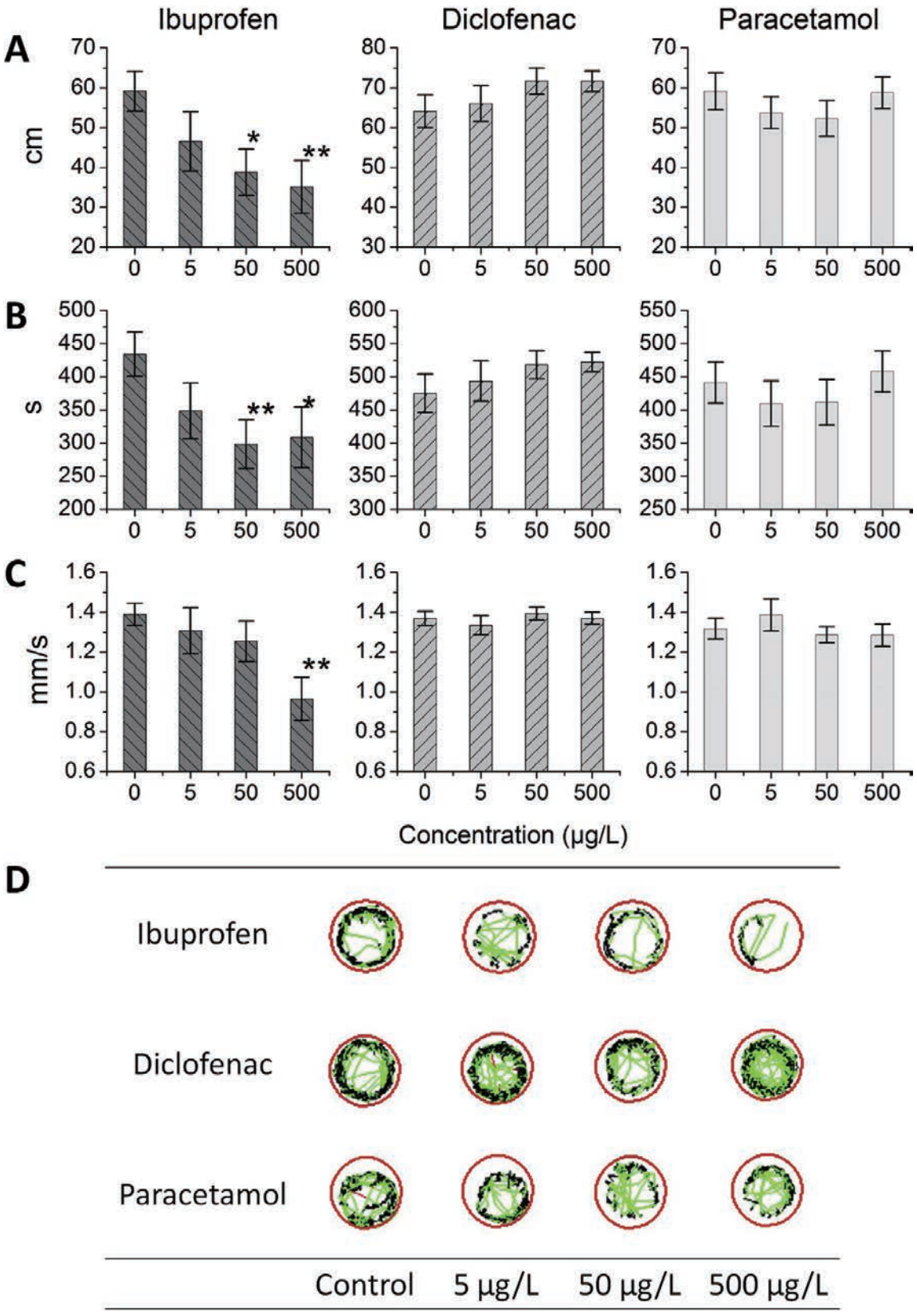


Fig. 3. Free swimming activity under dark condition at 120 hpf (*P < 0.05, **P < 0.01). (A) Distance, (B) duration, (C) velocity, (D) track of embryo movement.

Sediment and salinity effects on the bioaccumulation of sulfamethoxazole in zebrafish (Danio rerio)
Chen, Y., Zhou, J. L.*, Cheng, L., Zheng, Y. Y., Xu, J., Chemosphere, 2017, 180: 467-475.

The dynamic distribution of a widely used antibiotic sulfamethoxazole between water, sediment and aquatic organisms (zebrafish) was studied in microcosms. Sulfamethoxazole concentrations in water were gradually reduced, while in sediment and zebrafish gradually increased, suggesting active adsorption and bioaccumulation processes occurring. The presence of sediment particles and their interactions with water reduced the bioaccumulation of sulfamethoxazole in zebrafish by 13-28%. The sediment of smaller particle size with more organic carbon content and higher surface area, adsorbed sulfamethoxazole more extensively and decreased its bioaccumulation most significantly. The effect became more severe with increasing salinity in water due to the salting out of sulfamethoxazole, resulting in 24-33% reduction in bioaccumulation. At equilibrium, the distribution of sulfamethoxazole in different phases was quantified, with most sulfamethoxazole being associated with water (97.3%), followed by sedimentary phase (2.7%) and finally zebrafish (0.05%). The findings provided important data for further research into antibiotics fate and bio-uptake in aquatic organisms, and subsequent ecotoxicity.

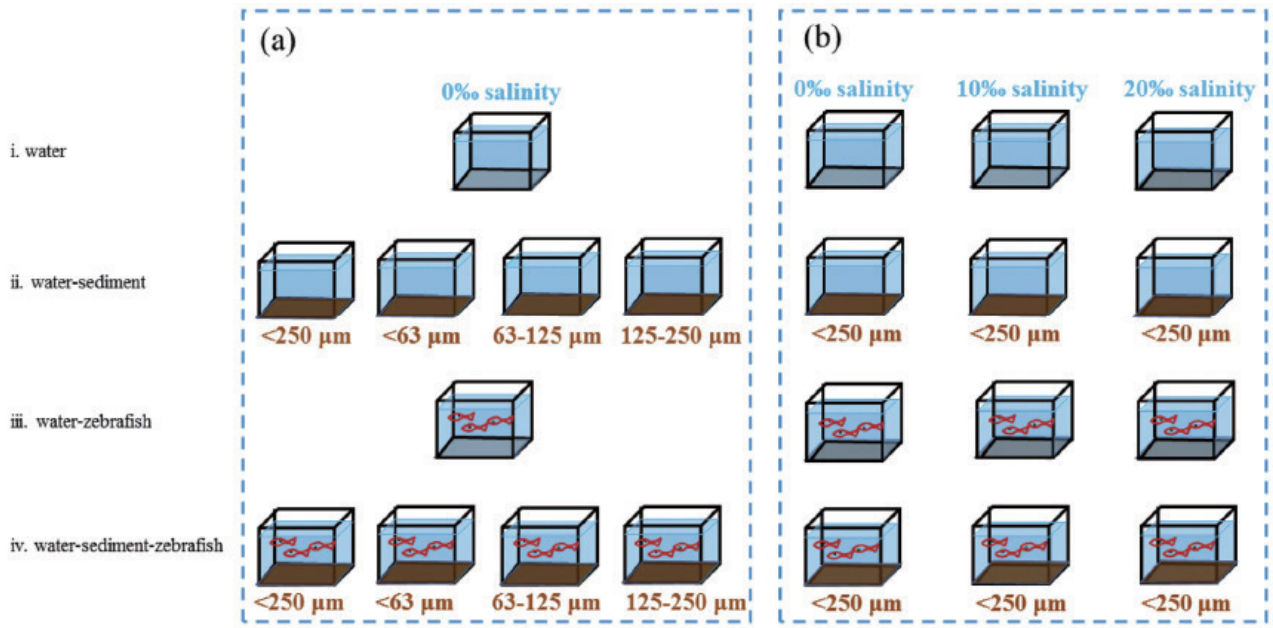


Fig. 3. KD and bioaccumulation ratio (BAR) values in water-sediment and water-sediment-zebrafish microcosms. Sediment size <250 mm.

Ra tracer-based study of submarine groundwater discharge and associated nutrient fluxes into the Bohai Sea, China: a highly human-affected marginal sea

Liu, J. A., Du, J. Z.*, Li, X. Y., Journal of Geophysical Research: Oceans, 122: 8646-8660.

The ecosystem of the Bohai Sea, which is a typical continental sea, has been greatly influenced by the anthropogenic activities in recent years. Here, we estimate the SGD and the fluxes of the associated dissolved inorganic nitrogen (DIN), phosphorus (DIP) and silicon (DSi) into the Bohai Sea based on a ^{226}Ra and ^{228}Ra mass balance model. This procedure shows that in the Bohai Sea the average radium activities (dpm 100 L-1) are 42.8 ± 6.3 (^{226}Ra) and 212 ± 41.7 (^{228}Ra) for the surface water and 43.0 ± 6.1 (^{226}Ra) and 216 ± 38.4 (^{228}Ra) for the near-bottom water. According to the $^{228}Ra/^{226}Ra$ age model, the residence time in the Bohai Sea is calculated to be 1.7 ± 0.8 yrs. The mass balance of ^{226}Ra and ^{228}Ra suggests that the yearly SGD flux into the whole Bohai Sea is (2.0 ± 1.3) × 1011 m^3 yr^{-1}, of which the percentage of submarine fresh groundwater discharge (SFGD) to the total SGD is approximately (5.1 ± 4.1) %. However, the DIN and DSi fluxes from SFGD constitute 29 % and 10 %, respectively, of the total fluxes from the SGD. Moreover, the nutrient-enriched SGD dominates the input sources in the Bohai Sea and may have an important effect on the coastal ecosystem; specifically, the high SGD-derived DIN and DIP and high DIN/DIP ratios in SFGD may potentially lead to eutrophication and thus the occurrence of red tide in the Bohai Sea.

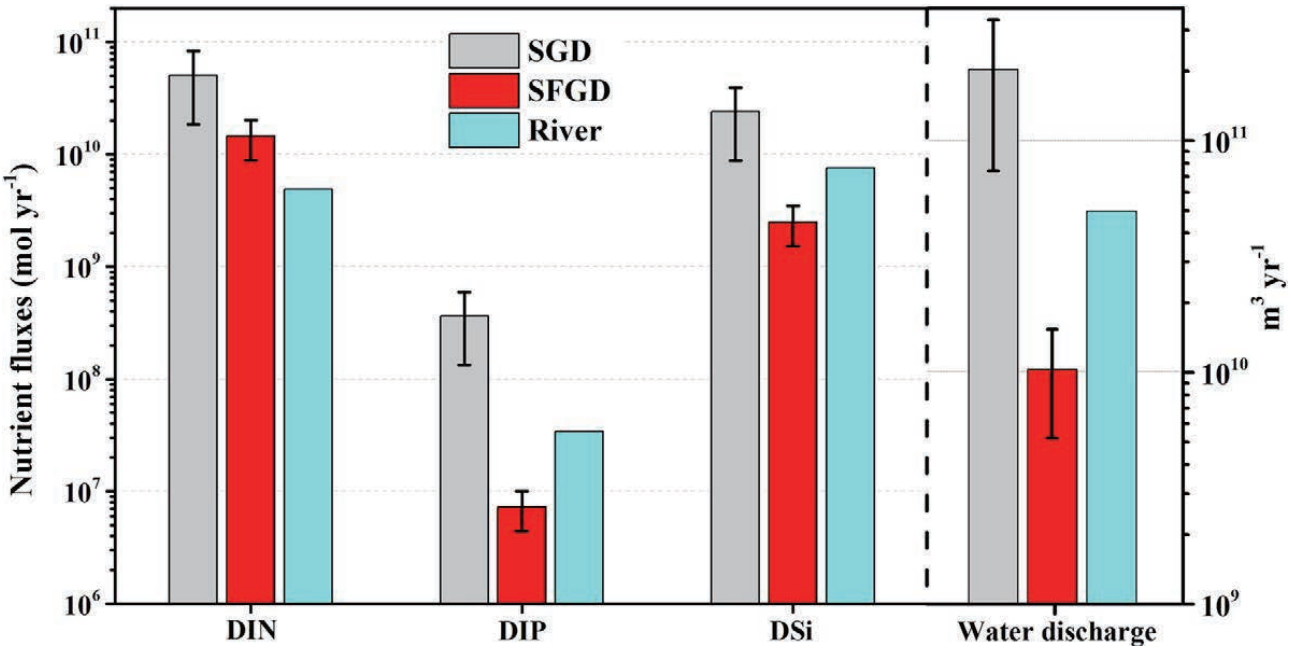


Figure 10. Comparison of nutrient inputs and river water discharge into the Bohai Sea from SGD and SFGD to riverine inputs.

Submarine groundwater discharge and associated nutrient fluxes into the Southern Yellow Sea: A case study for semi-enclosed and oligotrophic seas-implication for green tide bloom.
Liu, J. A., Su, N., Wang, X. L., Du, J. Z.*, Journal of Geophysical Research: Oceans, 2017, 122(1): 139-152.

The biogenic elements concentrations in a coastal bay/estuary are strongly influenced not only by riverine input but also by submarine groundwater discharge (SGD) which has been identified as a typical process of land/ocean interactions in coastal zones. To assess the role of SGD in nutrient fluxes in the Southern Yellow Sea (SYS), ^{228}Ra activities were measured in seawater collected in May 2015. Analyzing the sources and sinks of ^{228}Ra, the flux of excess ^{228}Ra through SGD was estimated to be (2.2 ± 1.0) × 10^{15} dpm yr^{-1}. Based on the ^{228}Ra mass balance model, we estimated the average SGD flux to be approximately (1.3 ± 0.87) × 10^{12} m^3 yr^{-1} over the entire SYS, which is at least 3.3 times the estimated annual delivery from the Changjiang River into the SYS (~1.3 × 10^{11} m^3 yr^{-1}). The SGD-derived biogenic elements loads (dissolved inorganic nitrogen [DIN], phosphorus [DIP] and silicon [DSi]) were estimated as (487 ± 384) × 10^9 mol yr^{-1}, (2.8 ± 2.2) × 10^9 mol yr^{-1}, and (313 ± 259) × 10^9 mol yr^{-1}, respectively, which are approximately 18 times, 7 times and 13 times the riverine input from both mainland China and Korea, which shows that SGD is a major source of nutrients (especially DIN and DSi), providing 66 % and 36 % of the total input, respectively. The accumulation nutrient fluxes derived by SGD may play one of the most important roles in the green tide bloom that originated from the Subei Shoal zone in the SYS. High N/P ratio input through SGD was significant in the SYS and had a significant influence on the ecosystem which may lead to the green tide bloom that originating from the Subei Shoal zone. By structuring the development of green tide formation in the SYS, SGD played an important role in the whole process, especially by providing the DIN for massive green tide bloom and nutrient recovery after its degradation in the SYS.

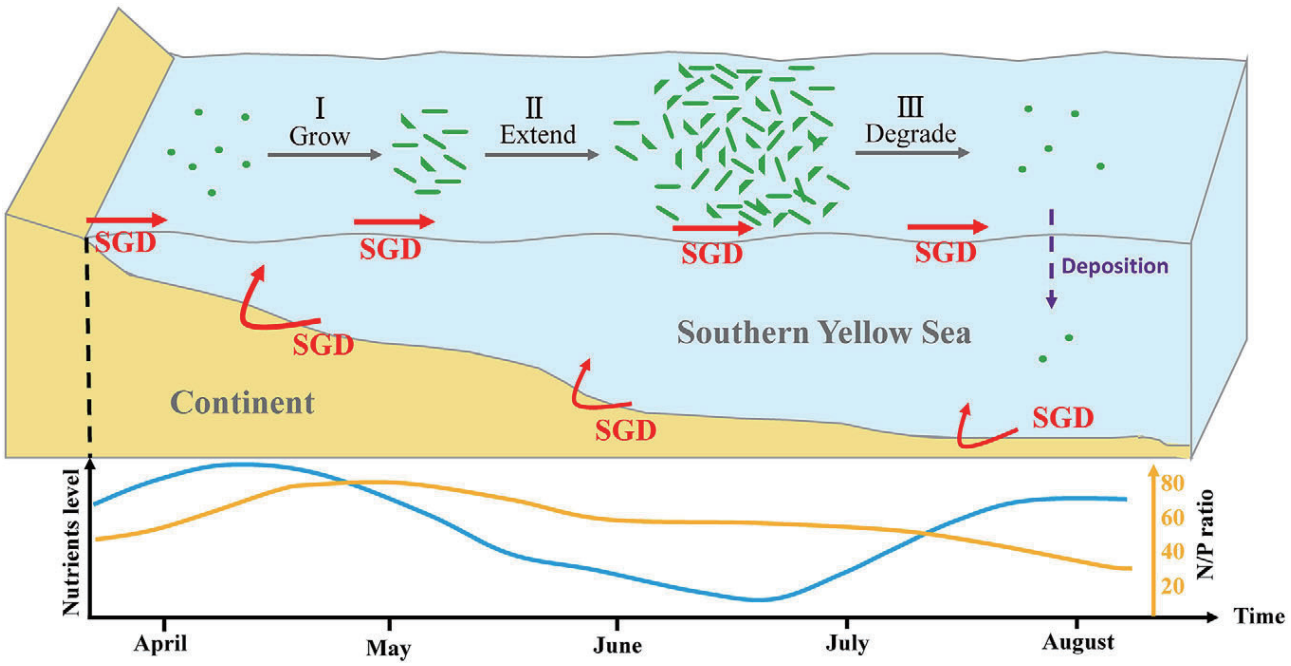


Figure 8. Conceptual model of the development of green tide formation, transport pathways and degradation in the SYS. The green symbols represent green tide occurring in the SYS. The blue line represents the DIN level, and the yellow line represents the N/P ratio in the surface water in the green tide bloom area of the SYS.

Precise Selenium Isotope Measurement in Seawater by Carbon-containing Hydride Generation-Desolvation-MC-ICP-MS after Thiol Resin Preconcentration

Chang, Y.*, Zhang, J., Qu, J. Q., Xue, Y., Chemical Geology, 2017, 471: 65-73.

Selenium is an essential trace element for normal growth and physiological functions in many organisms. Although oceans are important targets for research, direct precise isotopic analysis of Se in seawater is generally difficult owing to its low concentrations and the much higher concentrations of other elements. We developed a robust, accurate method for the precise determination of Se isotopic composition in seawater. A hydride generator combined with a desolvation device with methane addition was coupled to MC-ICP-MS to measure Se isotopes precisely. Two new thiol resins were used to preconcentrate and separate Se from the seawater matrix efficiently, and Se was quickly eluted by small amounts of concentrated HNO_3. No detectable Se isotope fractionation was observed during the preconcentration and separation procedure. The carbon-containing plasma increased Se sensitivity, suppressed the spectral interference signal, and improved precision by more than 3 times. The precisions (2sd, n = 24) of Merck Se standard solutions for $^{82/78}$Se, $^{82/77}$Se, and $^{82/76}$Se were 0.07‰, 0.10‰, and 0.16‰, respectively, and were comparable with, or better than reported values, especially for the Neptune MC-ICP-MS system. The isotopic values obtained with the method presented here for the analysis of the inter-comparison of Se standard solutions agreed well with reported values.

The method was used to obtain a depth profile for dissolved inorganic Se (DISe) isotopes in seawater from the Northwestern Pacific Ocean. This is the first study of dissolved Se isotopic composition in the ocean, and DISe isotopic composition in the seawater (0.41‰ to 1.59‰) is fractionated greatly relative to the bulk Earth values (0.04 ± 0.38‰). The $^{82/76}$DISe values were relatively constant with average values of 1.59 ± 0.06 ‰ (n = 4) from the surface to a depth of 130 m, and then decreased linearly to a depth of 800 m. Below 800 m, $^{82/76}$DISe values remained at a relatively stable value of 0.40 ± 0.05 ‰(n = 4), suggesting homogenization by strong vertical mixing. The general decrease of $^{82/76}$DISe values with water depth was mirrored by increasing DISe concentration, which was similar to trends frequently found for dissolved nitrate and silicon isotope concentration profiles. The maximum $^{82/76}$DISe was observed for surface waters with values between 1.50‰ and 1.66‰, and the heaviest $^{82/76}$DISe values were obtained in the chlorophyll a maxima layer (75 m). Heavier $^{82/76}$DISe values in the euphotic zone clearly suggest that phytoplankton preferentially accumulate the lighter Se isotopes. In addition, the change in $^{82/76}$DISe value over the depth range is probably mainly caused by the conversion of particulate organic selenide to dissolved organic selenide, with the lighter isotopes being released into the dissolved phase. Thorough investigation of Se isotopic composition in seawater is needed, and would have implications for models of global Se cycles and the interpretation of the isotope variability seen in the paleoceanographic record. The identification of dissolved Se isotope variability in seawater will provide new insight into Se biogeochemical cycling and isotope geochemistry, highlighting the value of this technique.

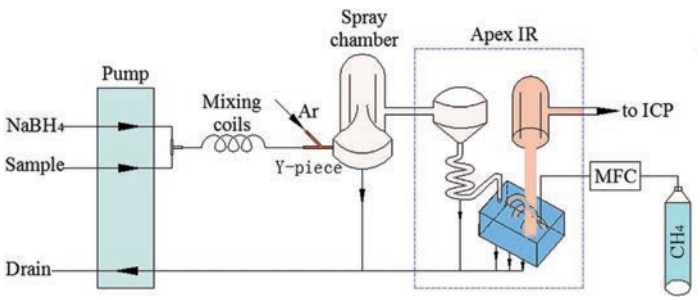


Fig. 2. Schematic diagram of the modified continuous-flow hydride generator coupling to desolvating device (Apex-IR) with methane addition.

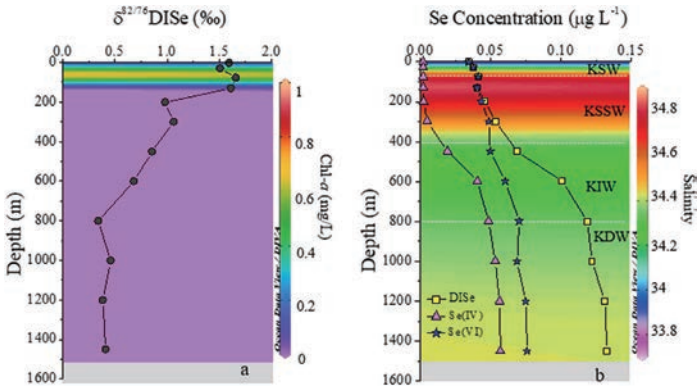


Fig. 6. Vertical distribution of Se(IV), Se(VI) and DISe concentrations and $\delta^{82/76}$DISe for the seawater depth profile collected at station C14 (127.6°N, 27.5°E) in the western margin of the Northwestern Pacific Ocean. The background colors from Ocean Data View display the chl-a concentration and the salinity of the water column during the time of sample collection. KSW: Kuroshio Surface Water; KSSW: Kuroshio Subsurface Water; KIW: Kuroshio Intermediate Water; KDW: Kuroshio Deep Water. The Se(IV) concentration were under the detection limits (< 0.0020 μg L−1) in the upper 130 m, we took them as 0.0020 μg L−1.

Effects of water chemistry and surface contact on the toxicity of silver nanoparticles to Bacillus subtilis

Yi, J., Cheng, J. P.*, Ecotoxicology, 2017, 26: 639-647.

The growing use of silver nanoparticles (AgNPs) has created concerns about its potential impacts on natural microbial communities. In this study, the physicochemical properties of AgNPs and its toxicity on natural bacteria Bacillus subtilis (B. subtilis) were investigated in aqueous conditions. The characterization data showed that AgNPs highly aggregated in aqueous conditions, and the hydrodynamic diameter of AgNPs in aqueous conditions was larger than its primary size. The studied AgNPs was less toxic to B. subtilis in estuarine water as compared to that in Milli-Q water and artificial seawater, which might be due to the observed enhanced aggregation of AgNPs in estuarine water. The toxicity of AgNPs to B. subtilis was greatly reduced when their surface contact was blocked by a dialysis membrane. Scanning electron microscope images showed that exposure contact to AgNPs resulted in damage of the microbial cell wall and enhanced formation of fibrillar structures. These results suggest that particle-cell contact is largely responsible for the observed toxicity of AgNPs in B. subtilis. This study can help to understand the potential impacts of AgNPs to natural microbes, especially in the complex aquatic environments.

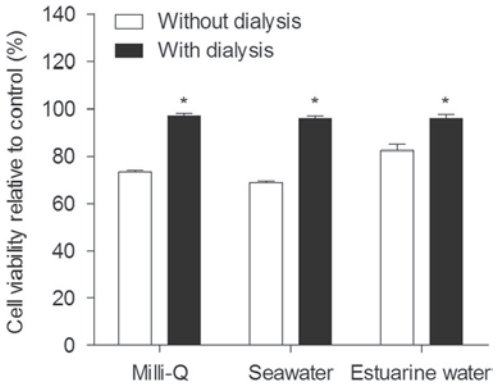


Fig. 5 Effect of contact inhibition on the toxicity of AgNPs to B. subtilis. The cell viability was determined after B. subtilis cells were exposed to 1800 μg/L of AgNPs for 3 h with direct contact or with inhibited contact with a dialysis membrane. Results are presented as means ± SE, and n = 3. Asterisks represent the significant difference in accordance with Bonferroni post-tests in two-way ANOVA (*P <0.05)

Genomics of introgression in the Chinese horseshoe bat (Rhinolophus sinicus) revealed by transcriptome sequencing

Mao XG, Tsagkogeorga G, Bailey SE, Rossiter SJ. Biological Journal of Linnean Society, 2017, 121: 698-710.

Recent genomic studies show that introgression can occur at a genome-wide scale among recently diverged lineages. However, introgression is difficult to distinguish from incomplete lineage sorting (ILS), and these processes are expected to occur together. Moreover, ncDNA introgression is less easily detected than mtDNA introgression, and as such its prevalence is less well understood. The Chinese horseshoe bat (Rhinolophus sinicus) occurs as three distinct forms on mainland China: the subspecies R. s. septentrionalis and two parapatric clades of R. s. sinicus (Central and East R. s. sinicus). Previous work suggested widespread mtDNA introgression between these subspecies, however, no ncDNA introgression was detected. In this new study we sampled the coding genomes of all three forms of R. sinicus in order to perform a more sensitive test for ncDNA introgression against an expected background of incomplete lineage sorting. We assembled 3548 nuclear protein-coding genes from these and three congeneric species, and built a high confidence species tree using Maximum Likelihood and Bayesian concordance methods. Phylogenetic analysis suggested a mosaic genome for Central R. s. sinicus derived from R. s. septentrionalis and East R. s. sinicus. Nuclear DNA introgression between Central R. s. sinicus and R. s. septentrionalis was supported by three different tests, whereas ILS could not be ruled out completely. Our findings, in line with other recent results, indicate that recently diverged taxa undergo large scale secondary introgression, and that this process likely operates alongside incomplete lineage sorting to give rise to phylogenomic discordances or even mosaic genomes.

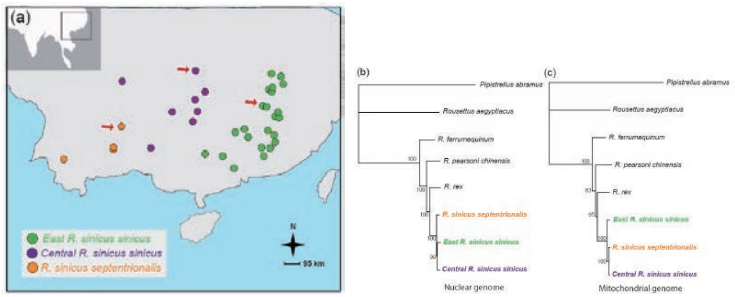


Figure 1. Sampling map and ML trees reconstructed based on nuclear and mitochondrial genomes, respectively. (a) Map showing distribution ranges of the three R. sinicus taxa, Central R. s. sinicus, East R. s. sinicus and R. s. septentrionalis. Red arrows indicate the sampling sites of bats in this study; (b) ML-tree based on a concatenated dataset of 3548 nuclear protein-coding genes; (c) ML-tree based on a concatenated dataset of 13 mitochondrial protein-coding genes

^{210}Po and ^{210}Pb disequilibrium at the PN section in the East China Sea

Su, K. J., Du, J. Z.*, Baskaran, M., Zhang, J., Journal of Environmental Radioactivity, 2017, 174: 54-65.

Lead-210 and ^{210}Po have been widely used as tracers for quantifying particulate scavenging in the upper layer of the oceanic water column. In this study, we investigated the ^{210}Po/^{210}Pb disequilibrium in the water column of the PN section in the East China Sea (ECS) during autumn 2013. In most of the water column, a deficiency of 210Po was observed with respect to its parent nuclide ^{210}Pb (i.e., a ^{210}Po/^{210}Pb activity ratio < 1.0). The (^{210}Po/^{210}Pb)dissolved, (^{210}Po/^{210}Pb) particulate and (^{210}Po/^{210}Pb)total activity ratios ranged from 0.29 to 0.71 (average: 0.53 ± 0.13, n ¼ 27), 0.31 to 1.42 (average: 0.70 ± 0.27, n ¼ 27) and 0.22 to 0.62 (average: 0.50 ± 0.12, n ¼ 27), respectively. The distribution coefficients (Kd) of ^{210}Po and ^{210}Pb were 12.1×10^{4} ml g^{-1} and 8.8 104 ml g1, with an average (210Po/210Pb) total activity ratio of (0.50 ± 0.12, n ¼ 27). However, over the continental shelf, planktonic detritus and fecal pellets appear to be the main carriers for ^{210}Po, which preferentially scavenges ^{210}Po and produces a lower (^{210}Po/^{210}Pb) total activity ratio (0.49 ± 0.12, n ¼ 22) with a Kd for ^{210}Po of 13.8×10^{4} ml g^{-1} in the water column. The variations in the fractionation factor (1.48 ± 0.66) of ^{210}Po/^{210}Pb reveal distinct differences between the distribution and scavenging of ^{210}Po and ^{210}Pb by particulate matter in different marine environments: in the estuarine zone (a high turbidity area), terrigenous suspended particulate matter scavenges ^{210}Pb from the water column, while in areas dominated by biogenic particular matter, ^{210}Po is preferentially scavenged from the water column. Using the ^{210}Po/^{210}Pb disequilibrium in the water column, we estimated the removal fluxes of POC from the upper waters downward to be 25.0 mg C m^{-2} d^{-1}, comparable to those in other marginal seas. Moreover, a decreasing trend of POC removal fluxes was observed with increasing distance offshore.

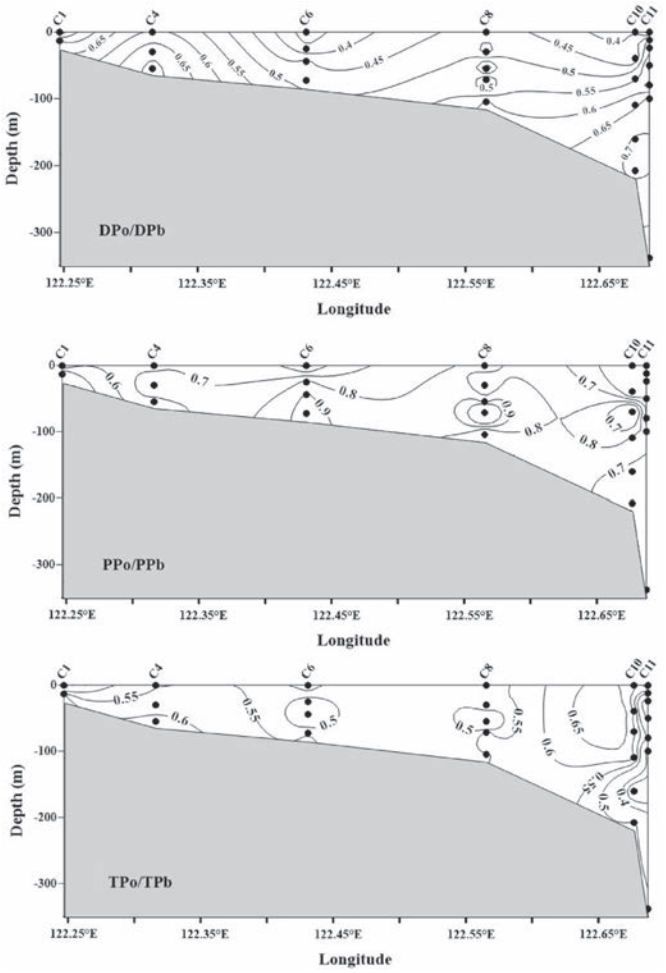


Fig. 8. Distribution of ^{210}Po/^{210}Pb AR in different phases at the PN section of the ECS.

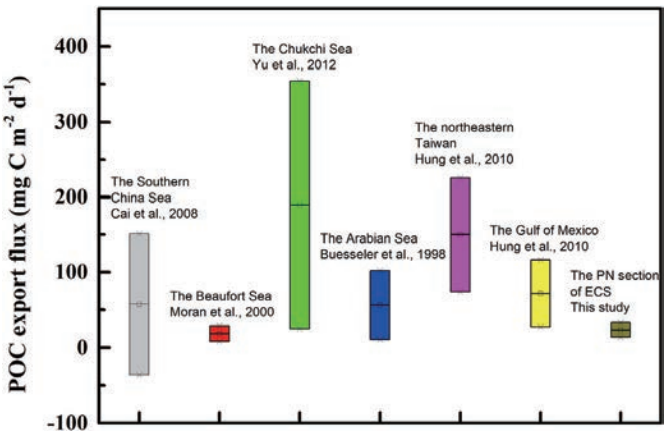


Fig. 9. POC export fluxes in the sea(s) of other regions.

Regional climatic response to global warming: Trends in temperature and precipitation in the Yellow, Yangtze and Pearl River basins since the 1950s

Tian, Q., Yang, S. L.*, Quaternary International, 2017, 440:1-11.

As the effects of global warming on climate have a wide spatial variability, regional studies of temporal climate trends are critical. This study investigates the effect of global warming on temperature and precipitation trends in the Yellow, Yangtze and Pearl River basins (the Three Basins) of China over the past 58 years (1956-2013). Over this time period, the mean warming rate in the Three Basins (0.22 C/10 yr) was close to that for the global land surface (0.21 C/10 yr). However, the warming rate showed high spatial variability across the study region, ranging from 0.05 C/10 yr to 0.49 C/10 yr. These rates tend to increase with latitude and elevation and toward very large cities (e.g., Shanghai). The warming rate in the Three Basins varied by season, it was lower in summer (0.14 C/10 yr) and higher in winter (0.29 C/10 yr). In spite of the warming trend, no statistically significant increase or decrease in precipitation was found for the Three Basins over the past 58 years.

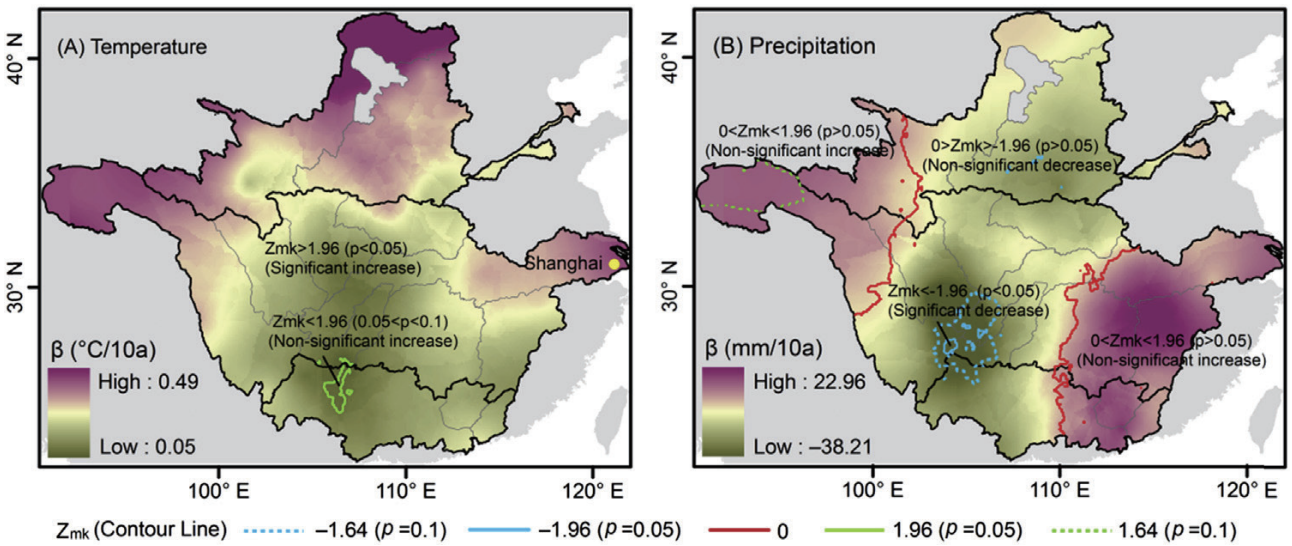


Fig. 4. Spatial distribution of the rate and significance level for trends in annual temperature (A) and annual precipitation (B) based on the MK test (1956e2013).

Bioaccumulation of sulfadiazine and subsequent enzymatic activities in Chinese mitten crab (Eriocheir sinensis)

Cheng, L., Chen, Y., Zheng, Y. Y., Zhan, Y., Zhao, H., Zhou, J. L.*, Marine Pollution Bulletin, 2017, 121:176-182.

The bioaccumulation of sulfadiazine and subsequent enzymatic activities in Chinese mitten crab (Eriocheir sinensis) were studied in microcosms, by exposing to 50, 100, 500 and 1000 ng/L of sulfadiazine for 44 days. An effective method for extracting sulfadiazine in crab tissues was established by modifying the cleanup method after ultrasound extraction, with improved recoveries of 61.8%, 93.7% and 100.5% in gill, muscle and liver samples. The results showed that sulfadiazine residues were all< 3 ng/g dry weight in different tissues, and that sulfadiazine bioaccumulation in crab was not dose-dependent. A significantly negative correlation was observed between acetylcholinesterase activity and the residue concentration of sulfadiazine during exposure to 50 ng/L and 1000 ng/L, and between alkaline phosphatase and sulfadiazine residues in the 100 ng/L exposure group in the gill, suggesting that the two enzymes played an important role in the metabolism of sulfadiazine in crab.

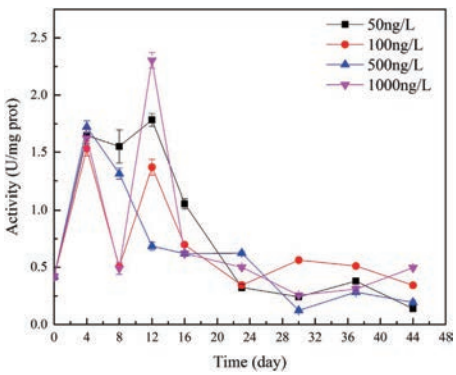


Fig. 5. The activity of acetylcholinesterase in crab gill during sulfadiazine exposure. Each data point represents average ± SD (n= 4).

Seasonal variation, flux estimation, and source analysis of dissolved emerging organic contaminants in the Yangtze Estuary, China

Zhao, H., Cao, Z., Liu, X., Zhan, Y., Zhang, J., Xiao, X., Yang, Y., Zhou, J. L., Xu, J.*, Marine Pollution Bulletin, 2017, 125 : 208–215.

The occurrence and seasonal variation of 24 dissolved emerging organic contaminants in the Yangtze Estuary were studied, including 12 non-antibiotic pharmaceuticals, seven sulfonamides, two macrolides and three chloramphenicols. Sulfadiazine, erythromycin, thiamphenicol and paracetamol were the primary contaminants in sulfonamides, macrolides, chloramphenicols and non-antibiotic pharmaceutical groups, respectively. Compared to the concentrations at Datong, chloramphenicols at Xuliujing were significantly higher in autumn and winter, while macrolides were lower in spring. Based on the flux estimation, approximately 37.1 tons of sulfonamides, 17.4 tons of macrolides, 79.2 tons of chloramphenicols and 14.1 tons of non-antibiotic pharmaceuticals were discharged into the Yangtze Estuary from June 2013 to May 2014. However, the total flux from the Huangpu River only represented 5% of the total. The pharmaceutical sources were speculated on by analyzing the seasonal variations in pharmaceutical concentrations and fluxes at various sites. Both environmental and social factors might affect the fluxes.

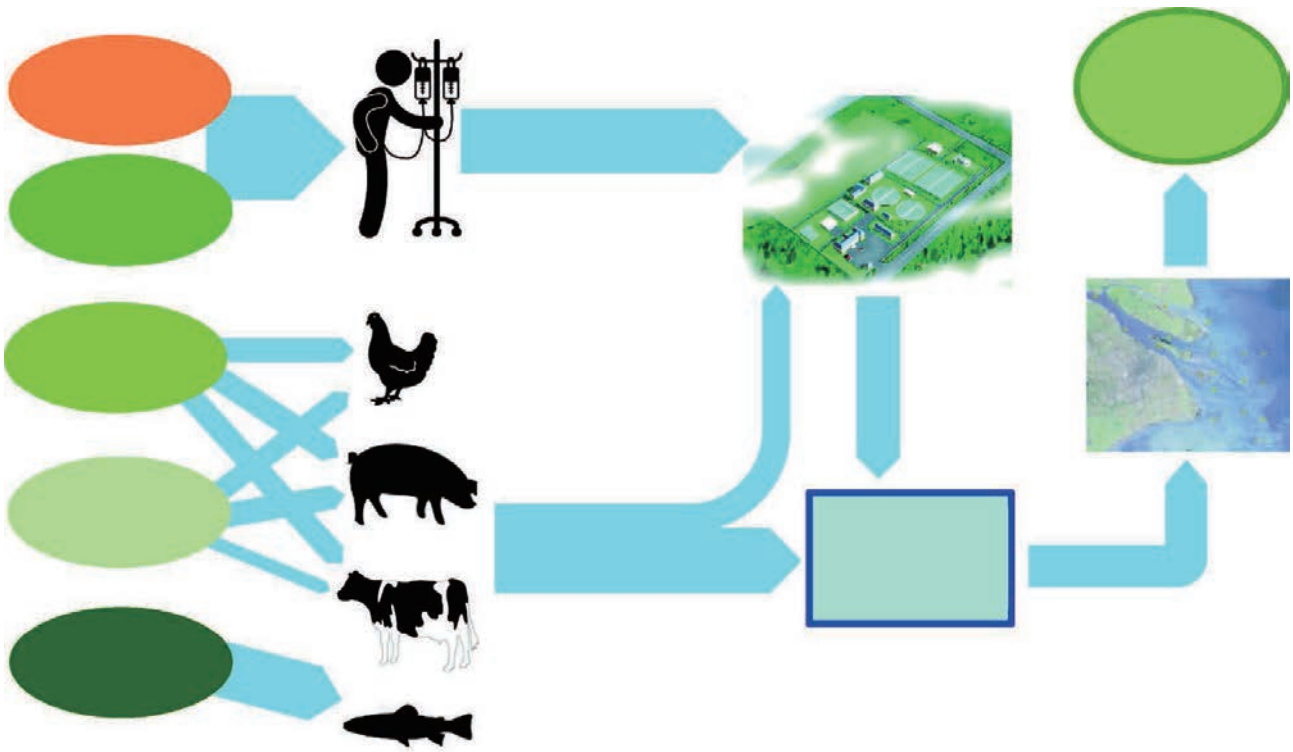


Fig. 4. Pharmaceutical contaminant migration process in the Yangtze Estuary.

Hypoxia off the Changjiang (Yangtze River) Estuary and in the adjacent East China Sea: quantitative approaches to estimating the tidal impact and nutrient regeneration.

Zhu, Z.Y., Wu, H., Liu, S. M., Wu, Y., Huang, D. J., Zhang, j., Zhang, G. S., Marine Pollution Bulletin, 2017. 125: 103-114.

Given the ongoing rise in eutrophication, estuarine and coastal hypoxia is expected to continue to increase for the foreseeable future. The Changjiang Estuary and ECS is a region under a direct and strong terrestrial influence, and large areas of hypoxia have developed repeatedly over recent decades. In 2013, we observed another hypoxic event, with an area of up to 11,150 km^2 and an estimated bulk oxygen depletion of 5.1 million tons. The minimum DO concentration decreased over the three large hypoxic events from 30.1 μM (1999) to 29.3 μM (2006) and 22.7 μM (2013).

The bottom DO concentrations in the study area showed regular and periodic variations that followed the tidal cycles (period: ~12 h). The hypoxic events would affect larger areas when they occur in the northern region because the tidal excursion is longer there (15 km) than in the south (5 km). We completed a simple, but conservative, nutrient regeneration estimate to quantitatively estimate the nutrient levels regenerated in hypoxic events, relative to ambient non-hypoxic waters. In the three hypoxic events in 1999, 2006, and 2013, the amount of regenerated nitrogen (as nitrate) and phosphorus (as DIP) was conservatively estimated to be 19,000–30,000 tons and 900–4100 tons, respectively, which account for 3%–5% and 5%–23%, respectively, of the annual nitrate and DIP loads carried by the Changjiang River. The absolute regenerated nutrients would be much larger in amount. When compared with other significant hypoxic regions, such as in the Gulf of Mexico and the Baltic Sea, recurrent and unstable hypoxia in the ECS would enhance more nutrient regeneration due to its repeated occurrence.

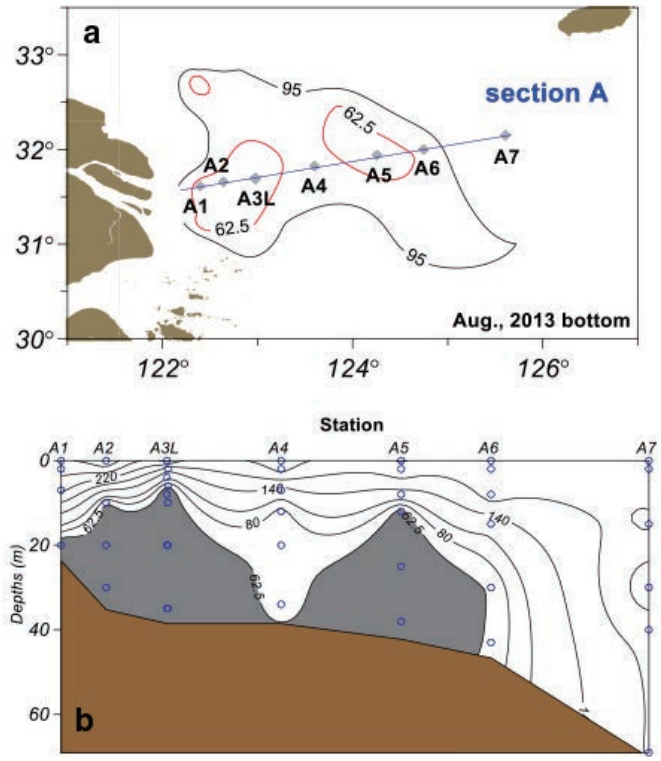


Fig. 3. Section A is used as a cross section to observe the horizontal as well as vertical distribution of dissolved oxygen concentrations in the two defined hypoxic regions in Aug., 2013. (a) Location of the section A/hypoxic regions together with station names, (b) Dissolved oxygen distribution in section A (shaded area: hypoxic water with dissolved oxygen <62.5 μM).

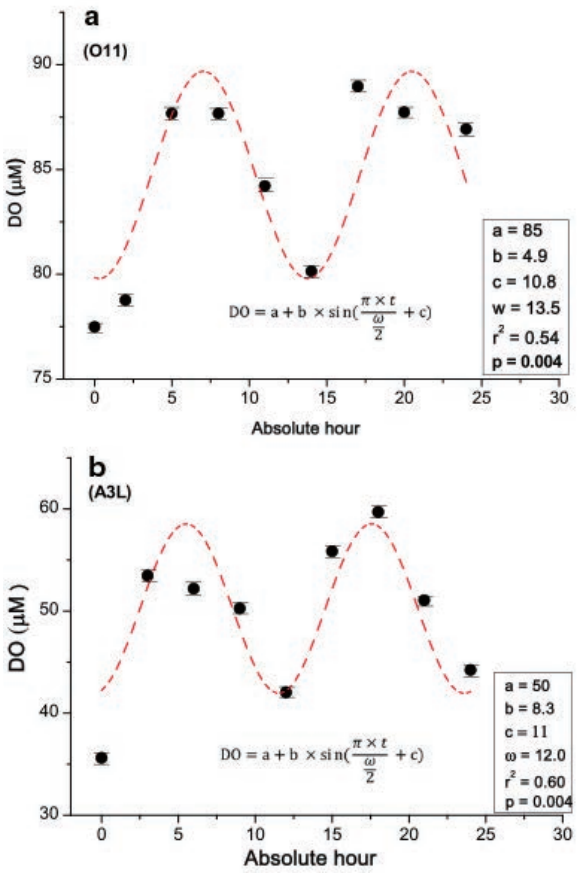


Fig. 8. Observed (dots) bottom dissolved oxygen concentrations at stations a) O11 and b) A3L and the sinusoidal model fitting (dashed line). The model equation and coefficients are also shown.

How to Change the Chemical Composition of Sea Spray Aerosol via Marine Bloom

Zhang, F. F., Du, J. Z.*, Chem, 2017, 2: 610-620.

Sea spray aerosol (SSA) is the most important medium for material and energy exchange between the ocean and the atmosphere and it plays a crucial role in global climate change. In this issue of Chem, integrating single-particle Raman spectroscopy with bulk particle aerosols quantitative analysis, Grassian and colleagues depict the detailed chemical composition and the measured hygroscopicity variation of individual nascent SSA particles with changes in ocean biological processes. During the first phytoplankton bloom, the submicron SSA decreased its hygroscopicity relative to increasing long chain fatty acid (aliphatic-rich) fractions. However, after the second heterotrophic bacterial bloom, the submicron SSA increased its hygroscopicity by decreasing the fraction of long chain fatty acids and increasing the more hygroscopic polysaccharides. In contrast, the supermicron SSA increased its hygroscopicity by decreasing the polysaccharide fraction and increasing the oxygen-rich (short chain fatty acids, free saccharides) fractions. They highlighted that the average hygroscopicity of individual particles changed with the chemical composition of the particle types. The results presented in the current issue can link the changing specific major classes of OM within SSA particles to ocean biological processes (Figure 1).

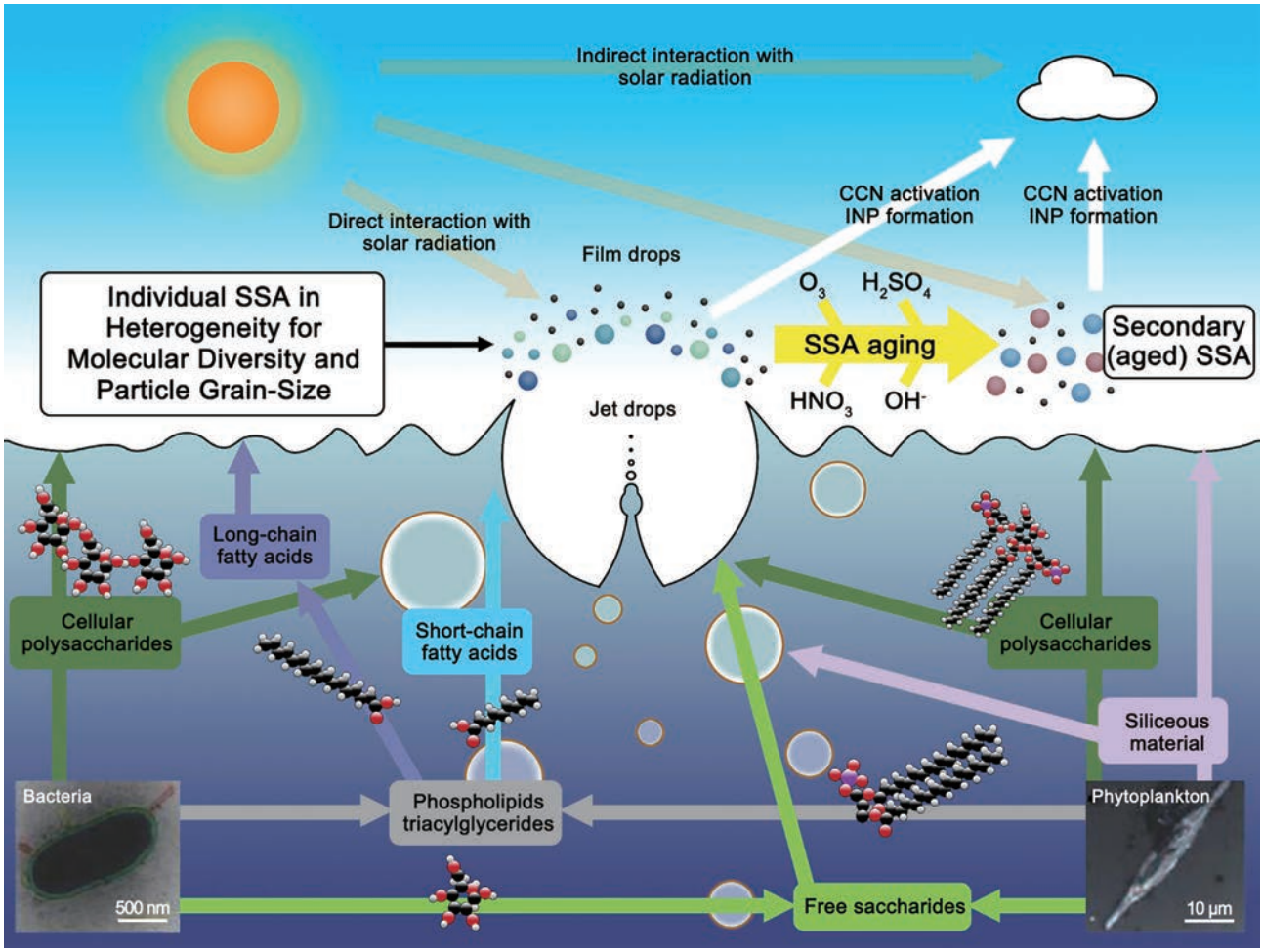


Figure 1. Diagram of the Pathways for Individual SSA Particles and Their Linkage with Climate-Relevant Properties via Biological Processes in Seawater

交流与合作
Academic Communications & Cooperations

实验室积极开展国际交流与合作，目前承担了政府间国际科技创新合作重点专项项目“水环境的高光谱及多源高分辨率光学遥感研究”、国家自然科学基金-重点国际（地区）合作研究项目 “高浊度河口航道回淤及滩槽系统响应研究”、“早-中全新世长江与尼罗河三角洲环境演变异同及早期农业文明对比研究”及“长江河口最大浑浊带的动力沉积过程对大型工程的自适应机理研究”等国际合作项目5项。
SKLEC is actively involved in international communications and cooperation. SKLEC is currently in charge of 5 internationally cooperation projects, including the intergovernmental international scientific and technological innovation cooperation special program “Hyperspectral and multi-mission high resolution optical remote sensing of aquatic environments” and NSFC international (regional) cooperation and communication program: “Navigation to a resilient estuary – morphological interactions between navigation channel and estuary”, “A comparative study between the Yangtze and Nile delta: the similarity and discrepancy of the early-middle Holocene environmental evolution and early agricultural civilization” and “Natural versus anthropogenically driven behavior of hydrodynamics and sediment dynamics in estuarine delta networks, application to the Yangtze Estuary Delta” and so on.

2017年实验室接待国内外学者、专家来室合作研究与学术交流70多人次。55人次参加国际学术会议并进行学术交流，其中邀请报告（含大会报告）8次。主/承办6次国际会议及3次国内学术研讨会。2017年实验室共举办学术报告近70场次。
More than 70 scholars visited SKLEC in 2017. SKLEC researchers attended international conferences for 55 person-times, including 8 plenary lectures. In 2017, SKLEC hosted six international conferences and three national conferences. Nearly 70 lectures were given in SKLEC in total.

新增国际合作项目介绍
Brief Introduction of New International Cooperation Projects

国家自然科学基金委员会重点国际(地区)合作与交流项目：早-中全新世长江与尼罗河三角洲环境演变异同及早期农业文明对比研究(2017.01-2021.12)
NSFC Key Project of International Cooperation and Communications: A comparative study between the Yangtze and Nile delta: the similarity and discrepancy of the early-middle Holocene environmental evolution and early agricultural civilization ((2017.01-2021.12).

本国际合作项目由华东师范大学主持，埃及Kafrelsheihk和法国Axis-Marseille大学参加并共同承担。项目选取长江三角洲和尼罗河三角洲为典型研究区域，主要开展下列方面的对比研究：1)流域气候水文波动对三角洲成因的作用；2）三角洲环境演变对海洋动力的响应；3）早期农业文明对三角洲环境的适应性特征；4）两地全新世三角洲演变在跨区域、乃至全球变化的意义；成果旨在为应对未来三角洲环境挑战提供科学依据。
This is an international collaborative project, which is hosted by East China Normal University, and jointed by Kafrelsheihk (Egypt) and Axis-Marseille (France). The China’s Yangtze delta and Egypt’s Nile delta are selected as the comparative research area. Key contents includes: 1) The role of climate-hydrological fluctuations of drainage basin to the Holocene delta formation; 2) Holocene delta evolution in response to the role of marine dynamics; 3) the adaptation of early agricultural development to delta environmental change, and 4) the significance of above 3 at cross-region and global scale. The final result will shed light on the management of delta change in future.

国家自然科学基金委员会与荷兰科学研究组织、英国研究理事会合作研究项目：长江河口最大浑浊带的动力沉积过程对大型工程的自适应机理研究(2017.06-2021.12)
Trilateral Cooperation Project of NSFC, Netherlands Organization for Scientific Research (NWO), and

Research Councils UK (RCUK): Natural versus anthropogenically driven behavior of hydrodynamics and sediment dynamics in estuarine delta networks, application to the Yangtze Estuary Delta (2017.06-2021.12)

该项目为国家自然科学基金委员会（NSFC）与荷兰科学研究组织（NWO）、英国研究理事会（RCUK）在“三角洲可持续性研究”（Sustainable Deltas）领域共同资助中、荷、英三边合作研究项目，中方为华东师范大学，外方为荷兰乌特勒支大学和英国邓迪大学。该项目拟采用现场观测、数值模型和解析模型的联合研究方法，重点分析长江口在正常和极端外部自然条件下以及流域、河口区人类活动影响下，河槽纵、横剖面水动力过程和沉积物捕集模式响应的物理机制，研究高强度持续性大型工程影响下可能发生潜在的河口三角洲系统内动力沉积过程稳态转换问题；为研发长江河口三角洲系统内航道减淤、防洪优化和供水管理的改进提供有效方案，推进流域—河口—海洋连续物质输运系统中自然过程与人类活动相互作用机理的理解和陆源入海物质的生态环境效应研究。
We propose to investigate a major problem occurring in the high turbidity zones of the Yangtze Estuarine Delta (YED), viz. the amplification of tides, seaward migration of mouth bars, coarsening of bed sediment, increased siltation in navigation channels and a potential regime shift towards a hyperturbid system resulting from engineering works. An innovative, integrated research approach will be adopted of analysing field data, simulation with 3D models and developing and analysing new process-based (semi-) analytical models for multi-channel estuarine networks. Three research teams will closely work together. Results from each team will be combined to examine the effect of anthropogenic measures on both along-channel and across-channel patterns of hydrodynamics and sediment entrapment in the Yangtze Estuary under varying external conditions.

在研国际合作项目进展
Progress of International Cooperation Projrcts

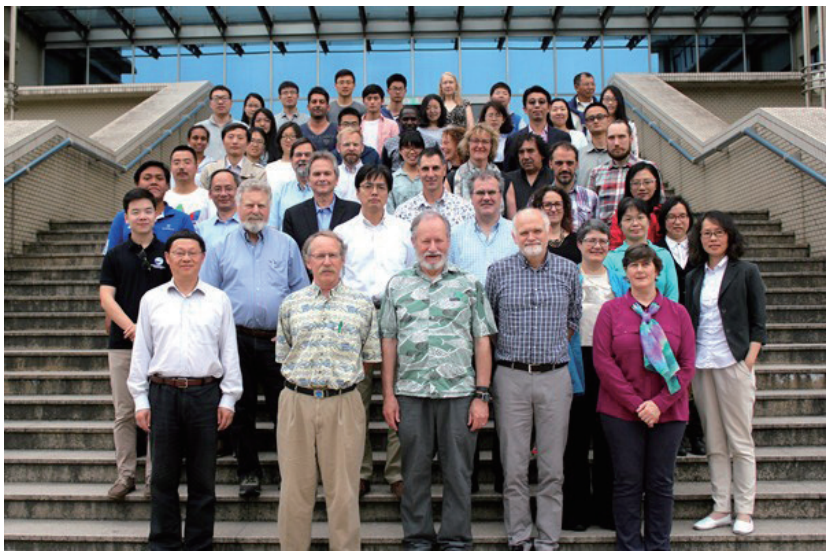
科技部国家重点研发计划政府间国际科技创新合作重点专项：水环境的高光普及多源高分辨率光学遥感研究（2016.12-2019.09）
The National Key Research and Development Program of the Ministry of Science and Technology: Hyperspectral and multi-mission high resolution optical remote sensing of aquatic environments (2016.12-2019.09)

本项目与比利时皇家自然科学院合作，围绕国产/国外先进的高空间分辨率多源卫星观测数据，交叉对比验证了高空间分辨率Landsat-8/OLI、Sentinel-2/MSI、GF-1/WFV卫星数据和水色产品反演的精度，定量评估了面向陆地目标设计的高空间分辨率传感器信噪比、分辨率两个技术指标对水环境参数（如悬浮物浓度）遥感反演的影响。探索了高观测频率低空间分辨率（GOCI）与低观测频率高空间分辨率（Landsat/OLI）卫星数据的融合技术，在不额外增加传感器时空分辨率的前提下，实现了既能反映河口悬浮物含量空间分布的细节，又能观测其含量的动态变化，这为河口工程尺度下泥沙时空变化研究提供了新的机会
The project, in cooperation with the Belgian Royal institute of natural sciences, focuses on studies of multiple domestic / foreign advanced high spatial resolution satellite missions. To explore whether high spatial resolution sensors initially designed for land applications are adequate for ocean color observation in estuarine and coastal waters, cross-comparison of high spatial resolution Landsat-8/OLI, Sentinel-2/MSI, GF-1/WFV satellite data/products against ocean color GOCI data/products, and validation of satellite-derived suspended particulate matter (SPM) concentration using in situ OBS SPM data from autonomous measurement stations, are conducted. Meanwhile, effects of signal-to-noise ratio and spatial resolution of high spatial resolution sensors on water environment parameters are quantitatively assessed. Moreover, satellite data fusion technology, for data of the high frequency observation with low spatial resolution (GOCI) and data of low frequency observation with high spatial resolution (Landsat/OLI), is explored. It can realize the wishes of observing SPM details in small scale and observing dynamic change at the same time, which may provide a new opportunity for the study of spatial-temporal dynamic variation of sediment transport in estuarine engineering scale.

学术会议
Workshop & Conference

海洋生物圈整合研究项目会议
Integrated Marine Biosphere Research (IMBeR) Conference

2017年4月23至25日，海洋生物圈整合研究项目（Integrated Marine Biosphere Research, IMBeR）科学指导委员会会议在我校河口海岸学国家重点实验室召开。会议由IMBeR项目区域办公室（IMBeR RPO）、IMBeR项目国际办公室、华东师范大学河口海岸学国家重点实验室共同举办。来自中国、美国、英国、澳大利亚、德国、法国、日本等20多位IMBeR科学指导委员会委员， 海洋研究科学委员会(Scientific Committee in Oceanic Research, SCOR) 执行主任Dr. Edward R. Urban，未来地球项目（Future Earth）代表，以及河口海岸学国家重点实验室的研究人员出席了此次会议。会议最后一天为IMBeR-SKLEC学术研讨会，会议以学术报告的形式在物理海洋、海洋化学、海洋生物、海岸带管理等相关领域进行了积极交流。



The Integrated Marine Biosphere Research (IMBeR) scientific steering committee meeting was held from 23-25 April, 2017 at East China Normal University (ECNU) in Shanghai, China. The meeting was sponsored by IMBeR RPO, IMBeR IPO, and the State Key Laboratory of Estuarine and Coastal Research (SKLEC). More than 20 IMBeR Scientific Steering Committee (SSC) members from China, the United States, Britain, Australia, Germany, France, Japan, as well as Dr. Edward R. Urban from Scientific Committee in Oceanic Research (SCOR), and researchers at SKLEC attended the meeting. IMBeR's working group and regional project leaders reported the results of recent years. The IMBeR SSC Chair summarized the achievements of IMBeR and initiated the planning of next, especially highlighted the importance of promoting IMBeR in the Asia-Pacific region.

In order to link-up closely between IMBeR and SKLEC, a scientific symposium was held between IMBeR and SKLEC scientists. The meeting actively communicated in the fields of physical, chemical, biology oceanography, and coastal zone management.

2017年华东师范大学海外青年科学家论坛-海洋科学分论坛
2017 International Forum for Outstanding Overseas Young Scholars in marine science

6月29-30日， 2017年华东师范大学海外青年科学家论坛——海洋科学分论坛在校理科大楼顺利举行。美国伍兹霍尔海洋研究所、路易斯安那州立大学、马里兰大学、迈阿密大学，德国亥姆霍兹研究中心海岸带研究所、马克思普朗克气象研究所及化学研究所，荷兰皇家海洋研究所，加拿

大海洋渔业部贝德福德海洋研究所，英国利物浦大学，比利时荷语天主教鲁汶大学，以及香港科技大学等单位的12位海外青年科学家应邀出席。我校副校长梅兵、人事处处长施国跃、实验室主任高抒、党委书记俞世恩，以及实验室师生参加了本次论坛。论坛开幕式由高抒主任主持。
The 2017 International Forum for Outstanding Overseas Young Scholars in marine science was held from 29-30, June in ECNU. 12 oversea young scholars joined this forum and gave talks on physical oceanography, oceanographically remote sensing, marine ecosystem, marine geology and ocean chemistry. The forum provided a platform to enhance exchange between the young scholars' SKLEC and overseas institutes.

国际河口海岸学会2017年大会
Estuarine and Coastal Science Association (ECSA) 2017

由国际河口海岸学会（Estuarine and Coastal Science Association, ECSA）冠名，华东师范大学河口海岸学国家重点实验室主办的河口海岸学2017年大会：脆弱的海陆界面（ECSA2017, Where Land Meets Ocean: The Vulnerable Interface—），于2017年10月16-20日在上海建国宾馆召开。来自26个国家和地区的180余名代表参加了大会。
本次大会的主要议题包括：水动力学和海岸动动态；泥沙输运和动力地貌；环境变化下的河口和三角洲转型；港口和航道工程；河口海岸过程和陆架海洋过程的相互作用；河口海岸带的污染物迁移转化；生物地球化学过程；有害藻类暴发的控制机制；多重压力下的蓝碳；围垦与外来物种入侵；生态修复；基于生态系统的海岸带管理；海岸带城市的能源和环境安全。会议安排了8个大会特邀报告，100多个分会场报告，30多个展板。河口海岸科学领域的专家学者围绕上述主题进行了充分的交流，其中不乏精彩的报告。

The Estuarine Coastal Sciences Association (ECSA) and the State Key Laboratory of Estuarine and Coastal Research (SKLEC) Jointly organized the ECSA 2017 conference during Oct. 16-20, 2017, in Shanghai, China. In conjunction with the 60th anniversary of the Institute of Estuarine and Coastal Research, East China Normal University, we organized this conference and invite more than 180 world-wide leading scientists from 26 countries to Shanghai to discuss cutting edge research questions and potential solutions for the vulnerable interface between land and ocean.

There were 8 excellent keynote presentations, 100 oral presentations and 30 posters in the conference.

香山科学会议第598次学术研讨会
The 598th Xiangshan Science Conference

2017年6月14-15日，由我室张经教授等申请的香山科学会议第598次学术研讨会在北京香山饭店召开。大会主题为“北极海洋在全球变化中的作用及其对中国的影响”。中科院寒区旱区环境与工程研究所秦大河院士、复旦大学穆穆院士和张经院士担任执行主席。来自高等院校、科研院所、业务机构以及项目和科技管理部门的近50名代表参与研讨。

During June 14-15th, the 598th Xiangshan Science Conference originated by Prof. Zhang Jing was held in Beijing. The theme is Arctic Sea on the Role of Global Climate Change and its Impact on China. Prof. Qing Dahe,

academician, from Northwest Institute of Eco-Environment and Resources, CAS and Prof. Mu Mu, academician, from Fudan University and Prof. Zhang Jing from SKLEC acted as co-chair. More than 50 participants from high-education institutes, research institutes and science and technology management officials joined the conference.

中国海洋湖沼学会、中国海洋学会海岸河口分会理事会换届暨河口海岸学术研讨会
The New Term Election Meeting of Estuarine and Coastal branch of Chinese Society for Oceanology and Limnology (CSOL) and Chinese Society for Oceanography (CSO)

2017年11月23日，由中国海洋湖沼学会主办、华东师范大学承办的中国海洋湖沼学会、中国海洋学会海岸河口分会理事会换届大会暨河口海岸学术研讨会在青岛召开。 华东师范大学高抒教授当选为分会理事长，新任理事长聘任华东师范大学贾建军研究员为分会秘书长。

河口海岸学术研讨会由新任秘书长贾建军研究员主持。本次会议共邀请五位专家作主题报告。报告期间，与会专家、学者就河口海岸学科前沿问题展开了充分、热烈的交流与研讨。

On November 23th, the New Term Election Meeting of Estuarine and Coastal branch of Chinese Society for Oceanology and Limnology (CSOL) and Chinese Society for Oceanography (CSO) was held in Qingdao. Prof. Gao Shu was elected as Director General and appointed Dr. Jia Jianjun as Secretary-General.

A Forum of Estuarine and Coastal has been held after the New Term Election Meeting. The new Secretary-General Dr. Jia Jianjun hosted the forum. There were five invited speakers gave keynote talks during the forum and have deep discussion with participants.

邀请报告
Invited Presentations at International Conferences & Workshops

2017年实验室有55人次参加国际学术会议并进行学术交流，其中大会报告6次，邀请报告2次。

Members of SKLEC attended international conferences for more than 50 person-times, including 6 plenary speakers and 2 invited talks.

Plenary Speakers

Li Daoji, Methodological limitations for microplastic quantification in the ocean: recommendations for overcoming the defects-***WESTPAC Training Workshop on Distribution, Source, Fate and Impacts of Marine Microplastics in Asia and the Pacific,*** September 20-22, Thailand.

Shi Huahong, Microplastic pollution in marine organisms -***WESTPAC Training Workshop on Distribution, Source, Fate and Impacts of Marine Microplastics in Asia and the Pacific,*** September 20-22, Thailand.

Li Daoji, Microplastic in the marine environments, China-***ECSA2017***, October 16-20, Shanghai, China.

Wang Yaping, Coastal zone delivers more waters while trapping more sediment than expected-***ECSA2017***, October 16-20, Shanghai, China.

Ge Zhengming, Multiple-factors regulated vegetation pattern and carbon processes in the coastal salt marshes: Implications on sea-level rise impacts'-***ECSA2017***, October 16-20, Shanghai, China.

Jiang Shan, Understanding the influence of human activities on tropical watersheds from coast study-***Fifth China-Southeast Asian Countries Marine Cooperation Forum***, December 12-16, Malaysia.

Invited talks

Li Daoji, Microplastic in the marine environments, China-***2017 Annual Meeting of North Pacific Marine Science Organization (PICES)***, September 25-30, Russia.

Li Daoji, Progress of marine microplastic research in China-***ASEAN Conference on Reducing Marine Debris in ASEAN Region***, November 22-23, Thailand.

专家学者来访
Visiting Scholars

2017年实验室接待国内外专家、学者来室合作研究与学术交流70多人次。
In 2017, more than 70 scholars visited SKLEC.

List of Visiting Scholars

专家 Visiting Scholar	单位 Affiliation	备注 Remark
Patricia M. Glibert	The University of Maryland, USA	
John Keesing	The Commonwealth Scientific and Industrial Research Organization, Australia	
Craft Christopher B	Indiana University, USA	
Tim Eglinton	ETH Zürich, Switzerland	
John Keesing	The Commonwealth Scientific and Industrial Research Organization, Australia	
Ian Thomas	Geography and Resources Management, Melbourne, Australia	
Patricia M. Glibert	University of Maryland Center for Environmental Science	
Jian Shen	The Virginia Institute of Marine Science, USA	
Mark Baskaran	Wayne State University, USA	
Salud Deudero	CIESM Marine Ecosystems and Living Resources Committee, Spain	
Willard Moore	University of South Carolina, USA	
Gerardo Perillo	Argentinian Institute of Oceanography, Argentina	
Suzanne Hulscher	Twtente University, the Netherland	
Aazani Mujahid	University Malaysia Sarawak, Malaysia	
Alfonse Dubi	University of Dar es Salaam, Tanzania	
Bruce Glavovic	Massey University, New Zealand	
Gerhard Kattner	Alfred Wegener Institute Helmholtz Center for Polar and Marine Research , Germany	
Mike Elliott	The University of Hull, UK	
Moritz Müller	University Malaysia Sarawak, Malaysia	

专家 Visiting Scholar	单位 Affiliation	备注 Remark
Thamasak Yeemin	Ramkhamhaeng University, Thailand	
Vasantha Pahalawat-taarachchi	National Aquatic Resources Research and Development Agency, Sri Lanka	
Alice Newton	University of Algarve , Portugal	
Pavel Tishchenko	V.I.Il'ichev Pacific oceanological institute, Russa	
Sheikh Aftab Uddin	Institute of Marine Sciences and Fisheries University of Chittagong, Bangladesh	
Zhengbing Wang	Technische Universiteit Delft , the Netherland	
Alaa Salem	Kafrelsheikh University, Egypt	
Kevin Ruddick	Royal Belgian Institute of Natural Sciences, Belgium	
Tjeerd Bouma	University of Groningen, the Netherland	
Brian Finlayson	The University of Melbourne, Australia	
Jaap Kwadijk	Technische Universiteit Delft , the Netherland	
Paulus Wieringa	Technische Universiteit Delft , the Netherland	
Stefen Aarninkhof	Technische Universiteit Delft , the Netherland	
Zhengbing Wang	Technische Universiteit Delft , the Netherland	
Changsheng Chen	University of Massachusetts	
Aazani Mujahid	University Malaysia Sarawak, Malaysia	IOC/WESTPAC-CorReCAP
Moritz Müller	Swinburne University of Technology Sarawak Campus (SUTS), Malaysia	IOC/WESTPAC-CorReCAP
Ian Townend	University of Southampton, UK	海外高端专家 High-end Foreign Expers
Jianguo Liu	Imperial College London, UK	
Knut Erik Tollefsen	Norwegian Institute for Water Research (NIVA), Norway	
Michael Meadows	International Geographical Union, South Africa	
Catherine Krull	University of Victoria, Canada	
Robert Lipson	University of Victoria, Canada	
Meng Zhou	University of Massachusetts Lowell, USA	

专家 Visiting Scholar	单位 Affiliation	备注 Remark
Chunyan Li	Louisiana State University, USA	
Ilia Ostrovsky	Israel Oceanographic and Limnological Research, Israel	
Jolanda Maria Hubertus Verspagen	Universiteit van Amsterdam, the Netherland	
Xing Ji	Universiteit van Amsterdam, the Netherland	
Xiaohui Xie	University of Maryland, USA	
Yanhong Xi	Helmholtz-Centre for Environmental Research, Germany	
Peigen Lin	Woods Hole Oceanographic Institution, USA	
Peigen Lin	Woods Hole Oceanographic Institution, USA	
Shiliang Shan	Bedford Institute of Oceanography, Canada	
Peng Wang	University of Miami, USA	
Zhengchang Zhu	Royal Netherlands Institute for Sea Research, the Netherland	
Feifei Liu	Max-Planck-Institut für Eisenforschung GmbH, Germany	
Xiaoteng Shen	University of Leuven, Belgium	
Xiaorong Li	University of Liverpool, UK	
Ning Zhao	Max-Planck-Institut für Eisenforschung GmbH, Germany	
Qiang Yao	Louisiana State University, USA	
Zhongya Cai	The Hong Kong University of Science and Technology, Hong Kong	
Xu Kehui	Louisiana State University, USA	
Yanxia Ma	Louisiana State University, USA	
Zhang Wenyan	Helmholtz-Zentrum Geesthacht, Germany	
Bulat Mavlyudov	Institute of Geography, Russian Academy of Sciences, Russia	
Larsen Thomas	Leibniz-Laboratory for Radiometric and Isotope Research ,Germany	
Yiming Wang	Leibniz-Laboratory for Radiometric and Isotope Research ,Germany	
Andrew Yau	American Geophysical Union, USA	
Brooks Hanson	American Geophysical Union, USA	
Christine McEntee	American Geophysical Union, USA	
Michael Liemohn	American Geophysical Union, USA	

专家 Visiting Scholar	单位 Affiliation	备注 Remark
Minghua Zhang	American Geophysical Union, USA	
Gert J. de Lange	University of Utrecht, the Netherland	
Alexander Horn-er-Devine	University of Southampton, UK	
Hongbing Liu	The Hong Kong University of Science and Technology, Hong Kong	
John Keesing	The Commonwealth Scientific and Industrial Research Organization, Australia	
Yanick Ricard	Ecole Normale Supérieure de Lyon, France	
Sebastian Rodri-guez Rivera	Santo Tomás - Universidad	

开放基金
SKLEC Research Fund

2017年，实验室在研开放基金课题26项，共282.8万元，新增开放基金课题13项，共148.8万元。
There were 26 on-going projects that were funded by SKLEC with a total of 2.83 million RMB in 2017. Thirteen new projects were approved in 2017 with a funding total of 1.49 million RMB.

2017年河口海岸学国家重点实验室设立开放基金课题
Research Fund Projects in 2017

姓名 Name	课题名称 Title	单位 Affiliation
王爱华 WANG Aihua	长江口沉积物中环境敏感元素的沉积环境信息提取方法研究 Extraction of sedimentary environment information of environmental sensitive elements in the sediments of the Changjiang Estuary	中国地质调查局南京地质调查中心 Nanjing Survey Center, China Geological Survey
肖德荣 XIAO Derong	长江中上游与河口海岸沉积物的同源性研究 Sources Study of particulate organic carbon from Upstream and Estuary area of the Yangtze River	西南林业大学 Southwest Forestry University
郑建 ZHENG Jian	海水中放射性同位素的质谱分析方法——以镭、钚同位素为例 Determination of radionuclides concentrations in seawater using ICP-MS: A case study from Pu and Ra isotopes	National Institute of Radiological Sciences, Japan
韩秋影 HAN Qiuying	黄河三角洲典型潮间带植物分布特征及其环境影响因素 Plant distribution characteristics and environmental variables in typical intertidal zones of Yellow River Delta	海南热带海洋学院 Hainan Tropical Ocean University
吴捷 WU Jie	中国海岸招潮蟹（Uca spp.）优势物种种群遗传结构及生物地理演化历史研究 Population genetic structure and biogeographical history of several dominant species of fiddler crabs (Uca spp.) along the Chinese coasts	中国科学院上海生命科学研究院 Shanghai Institutes for Biological Sciences, CAS

王有基 WANG Youji	微塑料对厚壳贻贝早期发育的生态生理效应: 海水酸化的潜在交互作用? Ecophysiological effects of microplastics on the thick shell mussel Mytilus coruscus: potential interaction with ocean acidification?	上海海洋大学 Shanghai Ocean University
郑崇伟 ZHENG hongwei	海上风能助力“21世纪海上丝绸之路”建设 Offshore wind energy to support the construction of the 21st century Maritime Silk Road	中国人民解放军海军大连舰艇学院 PLA Dalian Naval Academy
沙龙滨 SHA Longbin	跨湖桥地区全新世气候－海平面波动与新石器文化的兴衰 An integrated study of Holocene climate – sea level fluctuations and evolution of Kua-Hu-Qiao Neolithic culture	宁波大学 Ningbo University
Penjai ompongchaiyakul	The influence of terrestrial input to eutrophication and hypoxia phenomena in the upper Gulf of Thailand	Chulalongkorn University, Thailand
吕建树 LV Jianshu	海洋沉积物重金属空间变异的多尺度定量模拟 The Multi-scale Simulation of Spatial Variability of Heavy Metals in Marine Sediments	山东师范大学 Shandong Normal University
许春阳 XU Chunyang	混合沙絮凝特性及其对沉降速度的影响 Influence of flocculation on the settling velocity of mixed sediment	河海大学 Hohai University
杜金秋 DU Jinqiu	辽河口湿地沉积有机碳来源与累积特征研究 Source and accumulation characteristics of sedimentary organic carbon in Liaohe estuary wetland	国家海洋局国家海洋环境监测中心 National Marine Environmental Monitoring Center, SOA
布乃顺 BU Naishun	滨海湿地温室气体排放及碳收支随潮滩演替的纵向演变规律研究 Spatio-temporal variations of greenhouse gas emissions and carbon buget and their mechanisms along tidal succession from low to high tidal zones of coastal wetlands	辽宁大学 Liaoning University

论文专著
List of Peer Reviewed Publications

2017年，实验室在国内外重要刊物上发表学术论文170多篇，其中国际刊物131篇，国内重要刊物42篇；参与编写出版英文专著1部。
In 2017, more than 170 peer-reviewed papers were published, among which 131 were published in international journals, 42 in national journals. One SKLEC member published 1 book.

国外刊物发表论文列表
List of International Peer Reviewed Publications

[1] Ahmed, M. B., Zhou, J. L.*, Ngo, H. H., Guo, W. S., Thomaidis, N. S., Xu, J., Progress in the biological and chemical treatment technologies for emerging contaminant removal from wastewater: A critical review. ***Journal of Hazardous Materials,*** 2017, 323(A): 274-298.

[2] Bellerby, R. G. J.*, Ocean acidification without borders. ***Nature Climate Change,*** 2017, 7(4): 241-242.

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国内刊物发表论文列表
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专著、章节
Books

[1] Liu, D. Y., Zhou, M. J., Green tides of the Yellow Sea: massive free-floating blooms of Ulva prolifera, ***Global Ecology and Oceanography of Harmful Algal Blooms. Springer,*** 2017.

获奖与专利
Awards & Patents

China Geological Science Achievement Award

中国地理学会授予沈焕庭教授“中国地理科学成就奖”。
Prof. SHEN Huanting was awarded a China Geological Science Achievement Award from the Geographical Society of China.

Innovation prize in marine science technology

2017年，由我室汪亚平教授领衔完成的科研成果“河口海岸沉积动力学及其环境效应”荣获海洋科学技术二等奖。
Research on “Sedimentary dynamics and environmental effects in estuarine and coast” was awarded second prize by the Marine Science and Technology Award.

实用新型专利
National Utility Model Patent

2017年度，实验室获批2项实用新型专利。
In 2017, SKLEC was authorized 2 National Utility Model Patents.

专利名称 Patent Name	发明人 Inventor	专利号 Patent Number
海底多参数观测集成平台	顾靖华；丁平兴；葛建忠；宗海波；韦桃源	ZL 2016 2 1098005.3
近底边界层的观测架	顾靖华；何青；薛元忠	ZL 2016 2 1100512.6

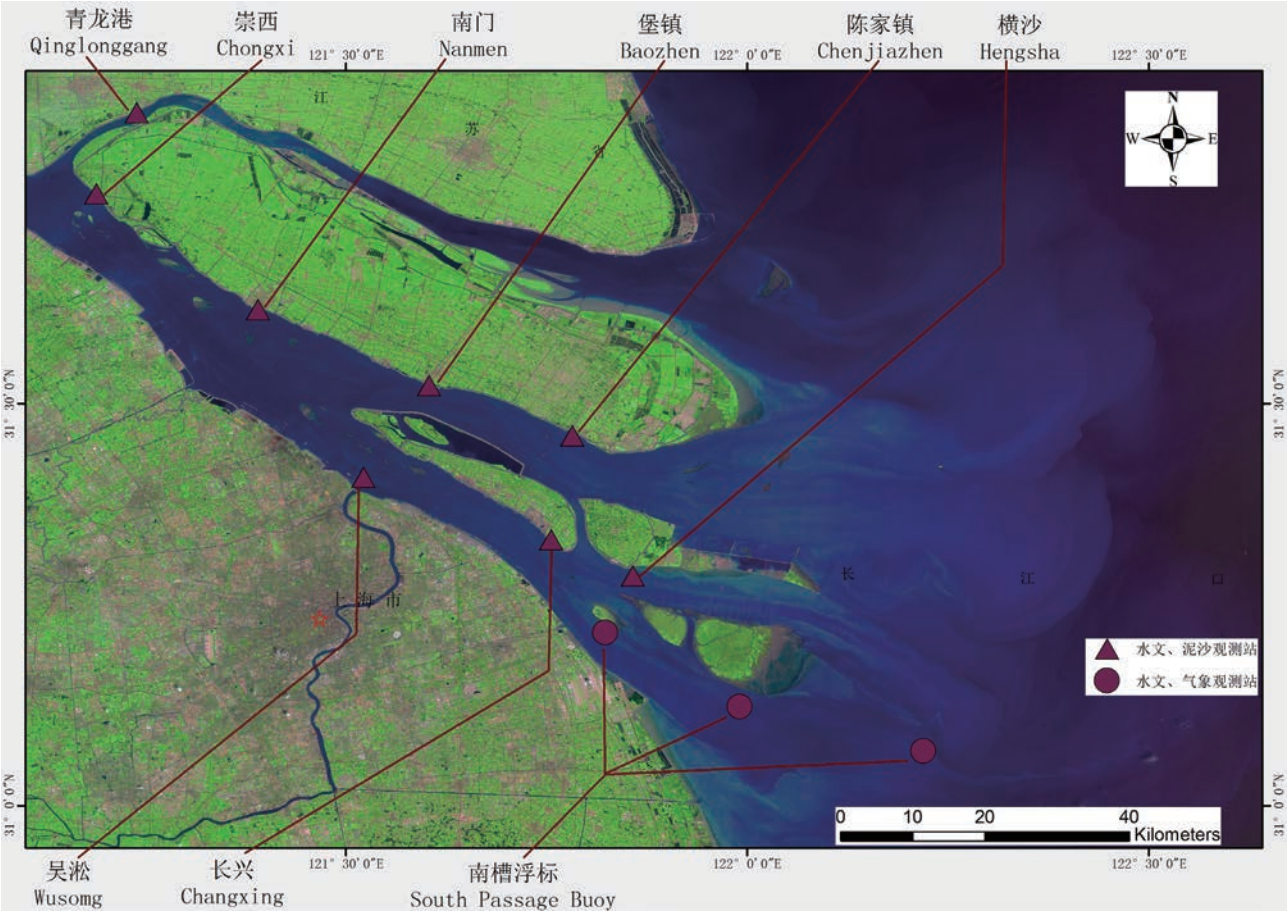
平台设施与野外观测
Facilities & Field Observations

平台与设施
Facilities

实验室现有野外台站横沙、长兴、堡镇、南门、崇西以及大通测站工作正常、数据有效。在大通站每两个月实施一次定期采样，观测有序进行。

The hydrological observation stations, including Hengsha, Changxing, Baozhen, Nanmen, Chongxi, and Datong, working properly. Regular sampling and surveying was carried out at the Datong Station, which is the most downstream national hydrological station on the Yangtze River, every two months.

长江河口及东海野外观测站分布图
Observation Stations in the Yangtze River Estuary and East China Sea



新增野外大型仪器设备（20万元以上）
New Instruments for Field Survey

设备名称 Equipment	型号 Type	管理人员 Manager
pH传感器 pH Sensor	SAMI-pH	Richard Bellerby
滨海湿地生态物联网定位观测系统 Coastal Wetland Ecological Internet Location Observation System	FECO2-5	田波 TIAN Bo
干湿法粒径粒型分析仪 Dry-Wet Partical Size and Shape Analyzer	Camsizer XT	胡进 HU Jin
多参数水质分析仪 Multi-parameter controller	AquaTROLL 600 (no pressure)	杜金洲 DU Jinzhou
声学多普勒流速剖面仪 ADCP/ Acoustic Doppler Current Profilers	300KHz	张文祥 ZHANG Wenxiang
膜去溶雾化进样系统 Film Desolvation Nebulization Sampling System	Aridus II / ApexIR-HF-Spiro	杜金洲 DU Jinzhou
高性能计算机 HPC/ High-Performance Computer	中科I620-G20	袁庆 YUAN Qing

长江口南槽水文监测浮标配布工程
Hydrological monitoring buoy platform of South Passage of Yangtze River estuary

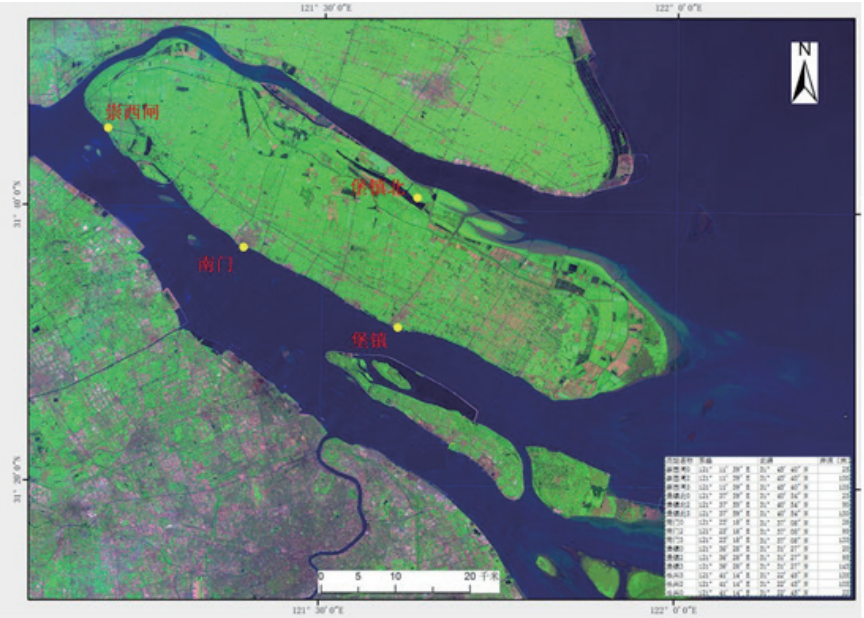
长江口水文监测浮标野外观测平台建设工作自2016年开始，经过3次内部选址论证，于2017年11月15日完成测试，正式在长江口南槽完成布增。此次增布的3个浮标，分别编号华师水文1（31° 04′ 05.0″ N，122° 13′ 08.0″ E），华师水文2（31° 07′ 23.7″ N，121° 59′ 25.0″ E），华师水文3（31° 12′ 55.3″ N，121° 49′ 21.4″ E），能够提供连续的海洋环境监测数据，主要用于流速、流向、浊度、温度、盐度等指标的实时监测。

On November 15th , 2017, the hydrological monitoring buoy platform of Yangtze River estuary was completed. There were three buoys named Huashi Hydrology No.1, Huashi Hydrology No.2 and Huashi Hydrology No.3 respectively being put into use this time. It can provide the continuous marine environmental monitoring data and be used for the real-time monitoring of velocity, flow direction, turbidity, temperature, salinity and other indicators.

崇明地下水观测井建设
Chongming Underwater Observation Wells

2017年，实验室与崇明水文站合作新增崇西闸、南门、堡镇和堡镇北的地下水观测井，主要用于对井内不同深度水文参数（温度，盐度，水位，Ph/ORP,溶解氧）实时监测，及对生物地球化学参数（营养盐，微生物，DOC/DIC，微量金属，Ra，U，Rn等放射性同位素，H，O等稳定同位素）进行定期观测。

In 2017, the SKLEC cooperated with Chongming hydrometric station to add four groundwater observation wells including Chongxizha, Manmen, Baozhen and North of Baozhen. They were mainly used to real-time monitor the different hydrological parameters (temperature, salinity, water level, Ph/ORP, dissolved oxygen) in different depth of the wells and regularly observe the biogeochemical parameters (nutrient, microorganism, DOC/DIC, trace metals, radioactive isotopes such as Ra, U, Rn, stable isotope such as H, O and so on).



崇明地下水观测井分布图
Groundwater observation wells in the Chongming Island

九段沙涡度相关通量观测系统
Jiuduansha eddy covariance observation systems

2017年，实验室在九段沙湿地国家级自然保护区建成两座自有产权涡度相关通量观测塔站。
In 2007, SKLEC established two eddy covariance observation systems in Jiuduansha Wetland Nature Reserve of China.

LI-7500A开路式CO_2/H_2O涡度相关测量系统主要用于近地气层的瞬时三维风速脉动、温度脉动、H_2O脉动和CO_2脉动及CO_2通量、H_2O通量、显热通量、空气动量通量等地表与大气之间的物质与能量交换通量及磨擦风速等微气象特征量。

LI-7500A Open Path CO_2/H_2O Analyzer is a high speed, high precision, non-dispersive infrared gas analyzer that accurately measures densities of carbon dioxide and water vapor in turbulent air structures. With the eddy covariance technique, these data are used in conjunction with sonic anemometer air turbulence data to determine the fluxes of CO_2 and H_2O.

Biomet101能量平衡系统（生物气象辅助传感器系统）主要用于净辐射四分量、光合有效辐射、降雨量、空气温度、空气相对湿度、土壤温度、土壤湿度、土壤热通量。
Biomet101 system (biological and meteorological measurements) is mainly used to measure shortwave (upward and downward) and longwave (upward and downward) radiation, photosynthetically active radiation, precipitation, air temperature, relative humidity, soil temperature, soil moisture, and soil heat flux.

崇明东滩Argus视频观测系统
Argus video observation system

为了实现海岸线变化、沙滩宽度、潮沟、植被类型的定量监测，2017年，实验室着手在崇明东滩鸟类国家级自然保护区建设一座Argus视频观测系统，搭载6台高清摄像头，可实现2-6公里海岸，180°视角的实时观测。观测塔高30米，塔上25米和15米处留有扩展平台，可用于后续设备接入。Argus观测系统预计2018年4月投入使用。
In 2017, the Argus video observation system was set up to quantitative monitor the shoreline change, beach width, tidal creek and vegetation form in the bird national nature reserve of Chongming Dongtan. The system with six high-definition cameras can realize real-time observation of 180° angel view of 2-6 kilometers shore. The observation tower is 30 meters high and there are two extended platforms in the 15m and 25m from the ground which can be used to access the follow-up equipment. The Argus video observation system will be put into use in 2018.

Argus系统设计图

野外调查
Field Observations

中国南极科学考察
Field survey in Antarctica

2017年4月11日，有我室朱卓毅副教授和博士生张晓慧参加的中国第33次南极科考队克服了冰情复杂、气候多变等困难，圆满完成考察任务，顺利返回上海。他们此行的目的是围绕“全球变暖背景下冰川融水对海洋有机质及痕量元素的影响”的科学问题开展样品的采集和数据分析，并着重在冰川融水、毗邻海湾进行了现场考察和采样，获取了大量第一手的观测资料和科学样品。
On 11th, April, 2017, Assoc. Prof. Zhuoyi Zhu and PhD student Xiaohui Zhang came back to SKLEC after a field campaign in Antarctica (33rd Chinese Antarctica research team members). They completed the field survey under terrible weather conditions. Their research's aim was “the influence of glacier melt runoff on organic matter and trace metal in adjacent ocean under climate change conditions”. Accordingly, a large quantity of melt water and seawater samples were gathered.

基金委长江口共享航次项目“长江口科学考察实验研究”2017年度野外调查
NSFC Public Cruise Fund “Scientific Observation on the Yangtze River Estuary” Observation in 2017

2月15日至3月1日、5月3至5月20日，国家自然科学基金委海洋科学共享航次“长江口科学考察实验研究”（航次编号：NORC2017-03）分别圆满完成枯季航段和洪季航段的连续两次野外作业内容。
Three cruises of NSFC Public Cruise Fund “Scientific Observation on the Yangtze River Estuary” in winter and summer were successfully completed.

本次调查由国家海洋调查船队成员船“润江1号”执行，华东师范大学葛建忠副研究员和吴辉副研究员、杨阳博士分别担任现场首席科学家。国内涉海高校和海洋机构的54名科考队员参加了航次。
The cruises were carried out by the National Marine Survey Ship-‘Runjiang No.1’. Associate professor GE Jianzhong, associate professor WU Hui and Dr. YANG Yang were the chief scientists in the field. 54 scientific staff attended the cruises.

此次考察项目包括物理海洋、海洋地质、海洋化学、海洋生物等内容。在科考队员的精心计划和船方的积极配合下，本航次安全、高效地完成任务书中断面和站位的观测与采样，同时还增做了5个杭州湾站点以及1个断面、10个站点的采样工作。
The observation of physical oceanology, marine geology, marine chemistry, and marine biology was covered. Along with the stations and sections in the project specification, one cross section and ten stations in the Yangtze River Estuary and five stations in the Hangzhou Bay were carried.

实验室中挪中心VOCO项目“长江口附近海域春季赤潮过程”调查任务

2017年5月11-25日，由我室中挪中心主任Richard Bellerby教授任首席的“Vulnerabilities and Opportunities of the Coastal Ocean(VOCO)”项目自主航次，顺利完成“长江口附近海域春季赤潮过程”的调查工作。本次调查项目包括物理海洋、海洋化学、海洋浮游生物、海洋遥感、微塑料调查、赤潮浮游植物甲板培养实验等内容，完成了81个站位的18个生物化学参数，共约3600份样品的采集，为春季长江口附近海域的生物地球化学研究，提供了丰富的数据资料。
The cruise of Vulnerabilities and Opportunities of the Coastal Ocean “Scientific Observation of spring red tide process on the offshore near Yangtze River estuary” was successfully completed. The director of the SKLEC Sig-Am center, Prof. Richard Bellerby, was the chief scientist. The observation of physical oceanology, marine chemistry, marine plankton, ocean remote sensing, microplastics, and cultivate experiments of algal phytoplankton on the deck was covered. There were 18 biochemical parameters of 81 stations have been obtained and 3600 samples were collected. This cruise provided abundant data for the study of biogeochemical on the offshore near Yangtze River estuary in Spring.

北极科学考察
Field survey in Arctic

2017年9月，我室杜金洲教授、朱卓毅副教授顺利完成北极黄河站“度夏”科考任务。此次考察区域包括冰川融水、近海毗邻峡湾等地，开展了海洋有机地球化学调查、气体稳定同位素地球化学调研等内容，成功完成了峡湾中柱状沉积物的采样。此外，朱卓毅副教授还在新奥尔松国际科学社区为各国在站科学家，作了题为“Organic matter and its implications: snapshot from polar and other estuaries”的公开学术报告。

In September, 2017, Prof. Jinzhou Du and associate professor Zhu Zhuoyi completed a summer survey in Arctic. The research sites included surface rivers and coastal fjords. They conducted research on marine chemistry and atmospheric isotope. They also collected sediment corers from fjords. In addition, associate professor Zhu Zhuoyi delivered a scientific speech, titled with “Organic matter and its implications: snapshot from polar and other estuaries”, in the New Orleans intentional science community.

人才培养
Student Programs

2017年实验室在读研究生294人，其中博士研究生130人，硕士研究生164人。
There are 294 postgraduate students in SKLEC, including 130 Ph.D. students and 164 M.Sc. students.

学位授予
Degrees Offered

硕士学位：自然地理学；物理海洋学；海洋化学；海洋生物学；海洋地质；生态学；环境科学；港口、海岸及近海工程
M.Sc. Programs: Physical Geography; Physical Oceanography; Marine Chemistry; Marine Biology; Marine Geology; Ecology; Environmental Science; Port Coastal and Offshore Engineering

博士学位：自然地理学；河口海岸学；物理海洋学；海洋化学；海洋生物学；海洋地质；生态学；环境科学
Ph.D. Programs: Physical Geography; Estuarine and Coastal Science; Physical Oceanography; Marine Chemistry; Marine Biology; Marine Geology; Ecology; Environmental Science

入学新生与毕业学生
The Freshmen and Graduates

2017年实验室共招收研究生92人，其中博士生33人（含留学生3人），硕士生59人；招收的博士生中直博生13人、硕博连读2人。2017年共毕业60人，其中博士生20人（含留学生1人），硕士生40人，罗章、李惠、杨天、盛皓、姚俊被评为2017年上海市优秀毕业生。
92 students were enrolled in 2017, including 33 Ph.D. and 59 M.Sc. students. 60 students graduated in 2017, including 20 Ph.D. and 40 M.Sc. students. Luo Zhang, Li Hui, Yang Tian, Sheng Hao, Yao Jun were honored as Outstanding Graduate Student of Shanghai.

博士毕业生
List of Ph.D. Graduates

自然地理学/Physical Geography

姓名 Name	导师 Supervisor	毕业论文题目 Thesis	就业单位 Employment
朱琴 Zhu Qin	杨世伦 Yang Shilun	基于现场观测和数值模拟的淤泥质潮滩沉积动力过程研究 Sediment dynamics on intertidal mudflats: A study based on in situ measurements and numerical modelling	荷兰皇家海洋研究所 Royal Netherlands Institute for Sea Research
傅强 Fu Qiang	李道季 Li Daoji	鲶鱼鱼鳔的比较转录组研究及趋化因子的表达分析初探其耐低氧机制 Comparative tranome analysis of swimbladder and expression of chemokinome superfamily in catfish (Ictalurus spp.) provide insights to the hypoxia tolerance	青岛农业大学 Qingdao Agricultural University

姓名 Name	导师 Supervisor	毕业论文题目 Thesis	就业单位 Employment
姚弘毅 Yao Hongyi	李九发 Li Jiufa	近期长江河口典型河道悬沙输运及其与底沙交换过程 Recent exchange between suspended sediment and bedload and sediment transport in the Yangtze Estuary	
于鹏 Yu Peng	周云轩 Zhou Yunxuan	浅海水下地形雷达成像理论研究及应用 Theory and application of radar imaging of shallow water bathymetry	厦门大学 Xiamen University
刘现彬 Liu Xianbin	陈中原 Chen Zhongyuan	长江三角洲南北翼晚新生代沉积物磁学特征—源汇关联及对长江贯通入海指示意义 Magnetic properties of late Cenozoic sediments in south and north flanks of Yangtze delta—relations of source and sink and implications for Yangtze River’s connection to the sea	
潘大东 Pan Dadong	王张华 Wang Zhanghua	全新世长江口沉积记录中的陆海相互作用界面 河口锋的位置迁移及机制分析 Migration of land-ocean interaction interface-estuarine front in Holocene sedimentary record of the Yangtze River mouth and its mechanism	闽南师范大学 Minnan Normal University
吴帅虎 Wu Shuaihu	程和琴 Cheng Heqin	河口河槽演变对人类活动的响应 Morphological Change of Estuarine Channel in Response to Human Activities	安阳师范学院 Anyang Normal University
黎树式 Li Shushi	戴志军 Dai Zhijun	南亚热带独流入海河流水沙变化过程研究——以南流江为例 Variations in water and sediment process of unbranched river of the southern subtropical China: a case study of Nanliu River	钦州学院 Qinzhou University
陈艇 Chen Ting	王张华 Wang Zhanghua	中晚全新世太湖平原南部水文环境变化及其对新石器文明发展的影响 Mid- to late Holocene hydrology changes in the south Taihu area of the Yangtze delta plain, China, and its relationship to the development of Neolithic cultures	南方科技大学 Southern University of Science and Technology
KAPUTE MAUREEN MZUZA	张卫国 Zhang Weiguo	马拉维Shire河中游土地利用土地覆盖变化与沉积物物源追踪 Land use land cover change and sediment tracing in the middle Shire River catchment, Malawi	马拉维姆祖祖大学 Mzuzu University, Malawi

河口海岸学/Estuarine and Coastal Science

姓名 Name	导师 Surpervisor	毕业论文题目 Thesis	就业单位 Employment
郭文云 Guo Wenyun	丁平兴 Ding Pingxing	潮汐不对称性的时间变化特征及其对工程的响应 The time-varying characteristics of tidal duration asymmetry and its response to project	上海海事大学 Shanghai Maritime University
栾华龙 Luan Hualong	丁平兴 Ding Pingxing	长江河口年代际冲淤演变预测模型的建立及应用 Prediction model of decadal morphological evolution of the Yangtze Estuary and its applications	长江水利委员会长江科学院 Changjiang River Scientific Research Institute of Changjiang Water Resources Commission
周婧 Zhou Jing	杜金洲 Du Jinzhou	河口海岸带铀的地球化学行为探讨 以长江口和海南老爷海为例 Geochemical behaviors of uranium in estuarine and coastal zone: In case of the Changjiang Estuary and Laoye Lagoon in Hainan	海洋出版社 China Ocean Press
钟小菁 Zhong Xiaojing	陈沈良 Chen Shenliang	海南岛海滩地貌动态：常态过程，极端事件和人工岛建设的影响 Morphodynamics of the beaches around Hainan Island: The normal processes, the influences of extreme events and artificial island construction	集美大学 Jimei University
王希龙 Wang Xilong	杜金洲 DU Jinzhou	我国近海典型区域的海底地下水排放（SGD）及其营养盐通量研究 Study on submarine groundwater discharge (SGD) and its driven nutrient fluxes from typical area in coastal sea of China	华东师范大学 East China Normal University
赵世烨 Zhao Shiye	李道季 Li Daoji	我国部分河口多种环境介质中微塑料的赋存特征及海洋雪中微塑料分析方法研究 Microplastic contamination of some key estuaries in China and the approach for analyzing microplastic in marine snow	华东师范大学 East China Normal University

生态学/Ecology

姓名 Name	导师 Surpervisor	毕业论文题目 Thesis	就业单位 Employment
董珑丽 Dong Longli	李小平 LI Xiaoping	铜锌镍对海三棱 草的急性毒性预测模型 生物配体模型研究 Acute Rhizotoxicity of a Salt Marsh Plant (Scirpus Mariqueter) to Copper, Zinc and Nickel Using a Biotic Ligand Model (BLM)	上海望恒机械设备有限公司 Shanghai Wangheng Machinery Equipment Co. LTD
黄星 Huang Xing	李秀珍 Li Xiuzhen	红树林土壤有机碳、重金属特征对红树林景观格局变化的响应——以海南东寨港和广西钦州湾为例 Responses of Mangrove Soil Organic Carbon and Heavy Metals to the Change of Mangrove Landscape —— A Case Study in Dongzhai Harbor, Hainan Island and Qinzhou Bay, Guangxi	钦州学院 Qinzhou University

姓名 Name	导师 Surpervisor	毕业论文题目 Thesis	就业单位 Employment
薛莲 Xue Lian	李秀珍 Li Xiuzhen	盐度和淹水变化对长江口盐沼湿地有机碳累积的影响 Effects of salinity and flooding gradients on carbon storage capacity of tidal salt marshes in the Yangtze River Estuary, China	上海市农业学校 Shanghai College of Agriculture

环境科学/Environmental Science

姓名 Name	导师 Surpervisor	毕业论文题目 Thesis	就业单位 Employment
朱静敏 Zhu Jingmin	施华宏 Shi Huahong	三苯基锡与维甲酸X受体抑制剂UVI3003对爪蟾胚胎的致畸机制 The teratogenic mechanisms of triphenyltin and RXR antagonist UVI3003 in Xenopus embryos	钦州学院 Qinzhou University

硕士毕业生 List of M.Sc. Graduates

自然地理学/Physical Geography

姓名/Name	导师/Supervisor	姓名/Name	导师/Supervisor
陈瑞瑞/Chen Ruirui	蒋雪中/Jiang Xuezhong	李懿淼/Li Yimiao	李茂田/Li Maotian
马骏强/Ma Junqiang	陈静/Chen Jing	戚纤云/Qi Xianyun	周云轩/Zhou Yunxuan
舒敏彦/Shu Minyan	周云轩/Zhou Yunxuan	王诗妮/Wang Shini	蒋雪中/Jiang Xuezhong
肖锐/Xiao Rui	蒋雪中/Jiang Xuezhong	杨天/Yang Tian	杨世伦/Yang Shilun
张钊/Zhang Zhao	李占海/Li Zhanhai	徐立辰/Xu Lichen	孙千里/Sun Qianli
高近娟/Gao Jinjuan	戴志军/Dai Zhijun		

物理海洋学/Physical Oceanography

姓名/Name	导师/Supervisor
鲍道阳/Bao Daoyang	朱建荣/Zhu Jianrong

海洋化学/Marine Chemistry

姓名/Name	导师/Supervisor	姓名/Name	导师/Supervisor
王洪波/Wang Hongbo	邓兵/Deng Bing	王晓彤/Wang Xiaotong	邓兵/Deng Bing
曹梦莉/Cao Mengli	吴莹/Wu Ying	李明/Li Ming	吴莹/Wu Ying

海洋地质/ Marine Geology

姓名/Name	导师/Supervisor	姓名/Name	导师/Supervisor
崔猛/Cui Meng	王张华/Wang Zhanghua		

生态学/Ecology

姓名/Name	导师/Supervisor	姓名/Name	导师/Supervisor
胡忠健/Hu Zhongjian	葛振鸣/Ge Zhenming	李蕙/Li Hui	袁琳/Yuan Lin
刘雅丽/Liu Yali	高磊/Gao Lei	张骞/Zhang Jian	李秀珍/Li Xiuzhen
张运清/Zhang Yunqing	李秀珍/Li Xiuzhen	鲍振宇/Bao Zhenyu	董东/Dong dong
花永杰/Hua Yongjie	毛秀光/Mao Xiuguang	施达/Shi Da	董东/Dong dong

环境科学/Environmental Science

姓名/Name	导师/Supervisor	姓名/Name	导师/Supervisor
陈超琼/Chen Chaoqiong	周俊良/Zhou Junliang	陈悦/Chen Yue	周俊良/Zhou Junliang
姜晓芬/Jiang Xiaofen	侯立军/Hou Lijun	李巍巍/Li Weiwei	张芬芬/Zhang Fenfen
杨东琪/Yang Dongqi	施华宏/Shi Huahong	郑 瑶/Zheng Yueyao	周俊良/Zhou Junliang

港口、海岸及近海工程/Port, Coastal and Offshore Engineering

姓名/Name	导师/Supervisor	姓名/Name	导师/Supervisor
程武风/Cheng Wufeng	陈沈良/Chen Shenliang	道付海/Dao Fuhai	丁平兴/Ding Pingxing
龚昊/Gong Hao	李占海/Li Zhanhai	罗章/Luo Zhang	张国安/Zhang Guoan
盛皓/Sheng Hao	戴志军/Dai Zhijun	石盛玉/Shi Shengyu	程和琴/Chen Heqin
胥为/Xu wei	沈芳/Shen Fang	杨万伦/Yang Wanlun	丁平兴/Ding Pingxing
姚俊/Yao Jun	张国安/Zhang Guoan		

公派留学
Oversea Study Supported by China Scholarship Council

2017年，实验室共有10位学生获公派留学资格，赴美国、英国、澳大利亚、荷兰攻读学位或接受联合培养。
Ten students supported by China Scholarship Council scholarships to study abroad (USA, UK, Australia and the Netherlands) for Ph.D. degrees to be offered either fully by oversea institutes or jointly with SKLEC.

博士研究生/Ph.D. Degree to be Offered by Oversea Institute

姓名 Name	申报国别/地区 Country/Region	留学单位 Oversea institute
高近娟/Gao Jinjuan	澳大利亚/Australia	墨尔本大学/ University of Melbourne

联合培养/Ph.D. Degree to be Offered Jointly with SKLEC

姓名 Name	国内导师 Supervisor	申报国别/地区 Country/Region	留学单位 Oversea institute
陈晴/Chen Qing	陈沈良/Chen Shenliang	英国/UK	卡迪夫大学 Cardiff University
陈语/Chen Yu	何青/He Qing	美国/USA	威廉玛丽学院 The College of William and Mary
胡玲玲/Hu Lingling	施华宏/Shi Huahong	美国/USA	杜克大学 Duke University
李林江/Li Linjiang	朱建荣/Zhu Jianrong	美国/USA	罗格斯大学 Rutgers University
林建良/Lin Jianliang	何青/He Qing	荷兰/The Netherlands	代尔夫特理工大学 Delft University of Technology
刘建安/Liu Jianan	杜金洲/Du Jinzhou	美国/USA	卡罗来纳海岸大学 Coastal Carolina Univesity
苏磊/Su Lei	施华宏/Shi Huahong	澳大利亚/Australia	墨尔本大学 University of Melbourne
王峰/Wang Feng	张卫国/Zhang Weiguo	澳大利亚/Australia	澳大利亚国立大学 The Australian National University
王福强/Wang Fuqiang	吴莹/Wu Ying	美国/USA	德州农工大学 Texas A&M University

海外研修
Oversea Visiting

2017年，实验室有5位同学赴美国、英国、荷兰、克罗地亚进行交流访学。
Four students went abroad (USA, UK and Croatia) as visiting students.

姓名/Name	访学单位/Visiting institute	起止时间/Date
陈小刚 /Chen Xiaogang	克罗地亚鲁杰尔•博什科维奇研究所/ Rudjer Boskovic Institute, Croatia	2016.08-2017.01
田原原 /Tian Yuanyuan	美国俄勒冈州立大学/ University of Oregon, USA	2017.03-2017.08
朱琴 /Zhu Qin	荷兰代尔夫特理工大学/ Delft University of Technology, The Netherlands	2017.01-2017.04
陈建忠 /Chen Jianzhong	英国普利茅斯海洋实验室/ Plymouth Marine Laboratory, UK	2017.09-2017.12
高娟 /Gao Juan	美国莱特州立大学/ Wright State University, USA	2017.11-2018.01

研究生科研成果
Research Outputs Contributed by Graduate Students

2017年研究生发表第一作者论文80篇，占实验室第一作者论文总数的80%，其中SCI/SCIE论文49篇（I区文章3篇，II区文章19篇），占实验室第一作者SCI/SCIE论文的74%。实验室学生中有18人次参加国际学术会议，其中13人做口头报告。
The graduate students published 80 papers as first authors, among which 49 papers were published in SCI/SCIE journals. Eighteen (18) students attended international conferences with 13 oral presentations.

公众服务
Outreach

为促进优秀大学生之间的思想交流，扩大河口海岸学国家重点实验室在国内相关院校中的影响力，提高实验室研究生生源质量，由我校研究生院主办、河口海岸学国家重点实验室承办的“2017年河口海岸学优秀大学生夏令营”于2017年7月10日至13日在我校举行。通过高校推荐和河口海岸学国家重点实验室的选拔，共有来自国内二十多所高校的36名大学生参加本次夏令营。
Under the guidance of East China Normal University, SKLEC hosted Excellent Students’ Summer School of Estuarine and Coastal Science during July 10-13, 2017. According to recommendation from universities and SKLEC’s selection, finally, 36 excellent students participated in the programme.

2017年1月21日，实验室与上海自然博物馆签署科研成果科普转化战略合作协议。签约仪式后，实验室陈静副教授主持上海市自然博物馆“绿萝讲堂”，陈中原教授、张利权教授、郭磊城博士作主题为“足不出户，也能拯救三角洲”的科普沙龙。
On January 21, 2017, the SKLEC signed the MOU with Shanghai Museum of Natural History. Meanwhile, associate Prof. Chen Jing hosted the Bunting Lecture and Prof. Chen Zhongyuan, Prof. Zhang Liquan and Dr. Guo Leicheng gave a popular science salon titled “Not out of doors, but also can save the delta”.

2017年5月27日，实验室开展了主题为“探索河口，巡游海岸”的公众开放日活动，活动吸引了100多为社会各界人士积极参与，包括在校大学生，研究生，退休教师，公司白领等。
On May 27, 2017, the SKLEC Public Open Day attracted more than 100 visitors including university teachers, students and workers.

2017年7月10日，全国青少年高校科学营华东师范大学分营来自全国各省市以及港澳台的100多名优秀高中生参观了河口海岸学国家重点实验室。童春富副研究员和钱伟伟老师向营员们讲解了我室的发展历史及对国家和地方做出的贡献，介绍了相关的学科知识。
Members of the National Youth Science Camp, consisting of more than 110 high school students, teachers, and volunteers visited SKLEC on 10th July, 2017. Associate Professor Tong Chunfu and Qian Weiwei introduced some information about SKLEC.

2017年11月4-5日，实验室应邀参加了上海自然博物馆的“科学家面对面”活动，实验室汪亚平教授、王宪业老师以及李秀珍教授团队的老师、同学代表实验室参加了该项活动。
In November, 2017, the SKLEC attended the “Talk to Scientists” event hosted by the Shanghai Museum of Natural History. Prof. Wang Yaping, Lecturer Wang Xianye, Prof. Li Xiuzhen and some students attended the event.

学位评定分委员会

主　任：高抒
副主任：何青、张卫国
委　员：丁平兴、戴志军、杜金洲、高磊、沈芳、袁琳

SKLEC Committee for Academic Degree Assessment

Chair: GAO Shu
Deputy Chair: HE Qing, ZHANG Weiguo
Members: Ding Pingxing, Dai Zhijun, Du Jinzhou, Gao Lei, Shen Fang, Yuan Lin

研究队伍
Research Staff

2017年，重点实验室引进研究人员2人，现有固定人员56人（其中研究人员47人，技术人员7人，管理人员2人）。
Two research members joined SKLEC in 2017. There are 56 fulltime members, including 47 academic research members, 7 technical members and 2 administrative members.

侯立军教授获得国家杰出青年科学基金资助;
Prof. Hou Lijun was supported by the National Science Fund for Distinguished Young Scholars.
引进国家杰出青年科学基金获得者汪亚平教授;
Prof. Wang Yaping who was supported by the Excellent Scientist Foundation of NSFC joined the SKLEC.
引进国家“外专千人计划”入选者Bernd Wünnemann （中文名乌尼曼）教授;
Prof. Bernd Wünnemann who was supported by the Recruitment Program of Foreign Experts (also named Thousand Talents Program for High-level Foreign Experts) joined the SKLEC.

固定人员
Faculty and Staff

教授 Professors

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陈中原 Mr. CHEN Zhongyuan	河流-三角洲沉积地貌过程；水文地貌过程；环境考古 River-Delta Sedimentological and Geomorphological Processes; Geoarchaeology	z.chen@sklec.ecnu.edu.cn
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葛振鸣 Mr. GE Zhenming	气候变化与生态系统碳过程；生态模型；湿地生态学 Climate Change & Ecosystem Carbon-process; Ecological Model; Wetland Ecology	zmge@sklec.ecnu.edu.cn
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李秀珍 Ms. LI Xiuzhen	景观生态学；湿地生态学；遥感与地理信息系统应用 Landscape Ecology; Wetland Ecology; Application of Remote Sensing and GIS	xzli@sklec.ecnu.edu.cn
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施华宏 Mr. SHI Huahong	生态毒理学；生物监测；环境与健康 Ecotoxicology; Biomonitoring; Environment and Health	hhshi@des.ecnu.edu.cn
汪亚平 Mr. WANG Yaping	海洋沉积动力过程与数值模拟；河口海岸物质循环与输运 Ocean Sediments Dynamic Process and Numerical Simulation; Substances Transports and Circulation in Estuarine and Coastal Areas	ypwang@ sklec.ecnu.edu.cn
王张华 Ms. WANG Zhanghua	河口-三角洲沉积地貌环境演变 Sedimentary and Morphological Evolution of Estuary and Delta	zhwang@geo.ecnu.edu.cn
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杨世伦 Mr. YANG Shilun	海岸湿地沉积动力过程；河口对流域变化的响应 Sediment Dynamic Processes in Coastal Wetlands; Estuarine Response to Impacts from River Basin;	slyang@sklec.ecnu.edu.cn

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周俊良 Mr. ZHOU Junliang	污染物河口地球化学；新型污染物分析；污染物毒理学 Estuarine Pollutant Geochemistry; Emerging Contaminant Analysis; Environmental Toxicity	jlzhou@sklec.ecnu.edu.cn
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朱建荣 Mr. ZHU Jiangrong	河口海岸海洋动力学；河口海岸海洋数值模式 Estuarine, Coastal and Ocean Dynamics; Estuarine, Coastal and Ocean Model;	jrzhu@sklec.ecnu.edu.cn
Mr. Bernd Wünnemann	气候与环境变化的湖泊地层记录 Lake Sedimentary Records for the Environmental and Climate Change	wuenne@zedat.fu-berlin.de

副教授 Associate Professors

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葛建忠 Mr. GE Jianzhong	水动力及泥沙运动数值模拟；可视化系统及高性能计算 Numerical Modeling of Hydrodynamics and Sediment Transport; Visualization System and High-Performance Computing	jzge@sklec.ecnu.edu.cn
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技术人员Technical Staff

姓名 Title	技术领域 Position	姓名 Title	技术领域 Position
瞿建国　副教授 Mr. QU Jianguo, Associate Professor	无机分析 Inorganic Elements Analysis	崔莹　工程师 Ms. CUI Ying, Engineer	有机及无机分析 Organic and Inorganic Elements Analysis
顾靖华　工程师 Mr. GU Jinghua, Engineer	野外仪器设备管理 Field Surveying Instrument	张国森　工程师 Mr. ZHANG Guosen, Engineer	有机及无机分析 Organic and Inorganic Elements Analysis
张文祥　高级工程师 Mr. ZHANG Wenxiang, Senior Engineer	野外仪器设备管理 Field Surveying Instrument	薛云　工程师 Ms. XUE Yun, Engineer	无机分析 Inorganic Elements Analysis
张婧　助理工程师 Ms. ZHANG Jing, Assistant Engineer	有机分析 Organic Elements Analysis		

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客座人员
Guest Scientists

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固定人员在国际期刊和国际组织任职情况
Serving in International Academic Organizations and Journals

Name	International Organizations/Journals	Position	During
陈中原 CHEN Zhongyuan	Environmental Management of Enclosed Coastal Seas	SPC Member	2004-
	IAG-Large Rivers Working Group	Member	2001-
	Geomorphology	Editors-in-Chief	2017.7-2019.12
	Earth Surface Processes and Landforms	Editorial advisory board	2008-
	Estuarine Coastal and Shelf Science	Associate Editor	2013.1-
程和琴 CHENG Heqin	Journal of Geology, Geophysics and Geosystems	Editorial board member	2009-
丁平兴 DING Pingxing	Acta Oceanologica Sinica	Editorial board member	2003-
	China Ocean Engineering	Editorial board member	1999-
戴志军 DAI Zhijun	Scientific Reports	Editorial board member	2016.12-2018.12
高抒 GAO Shu	Anthropocene Coasts	Founding Co-Editor	2017.1-
	Marine Geology	Editors-in-Chief	2018.1-
	Continental Shelf Research	Associate Editors	
	Acta Oceanologica Sinica	Associate Editors-in-Chief	
	Chinese Journal of Oceanology and Limnology	Editorial board member	
	China Ocean Engineering	Editorial board member	
	Ocean Science Journal	Editorial board member	
何利军 HE Lijun	Marine Life Sciences	Editorial board member	2013.4-
	Biological Segment	Technical editor	2014-
何青 HE Qin	INTERCOH	SSC Member	2003-
侯立军 HOU Lijun	Estuaries and Coasts	Associate Editors	2017.1-2020.12
	Journal of Marine Science: Research and Development	Editorial board member	2012.6-
	American Journal of Environmental Monitoring	Editorial board member	2014.8-
	Earth Sciences	Editorial board member	2014.9-
	Scientific Reports	Editorial board member	2015.12-
李道季 LI Daoji	UNESCO IOC/WESTPAC, Marine Microplastic Project	PI	2017-

Name	International Organizations/Journals	Position	During
李秀珍 LI Xiuzhen	International Association for Landscape Ecology	Council Chair	2011.1-2019.12
	Ocean and Coastal Management	Associate Editor	2014.10-
	Journal of Conservation Planning	Editorial board member	2001-2017.12
	Ecological Engineering	Editorial board member	2008.8-
	Chinese Geographical Science	Editorial board member	2009.6-
Richard Bellerby	SCAR Action Group on Ocean Acidification	Leader	2010-
	AMAP Working Group on Ocean Acidification	Leader	2010-
	SCOR/SCAR Expert Group in Oceanography	Member	2006-
	SCAR SOOS Implementation Group	Member	2007-
	SCAR Integrated Climate and Ecosystem Dynamics (ICED)	SSC Member	2009-
汪亚平	Anthropocence Coasts	Associate Editor	2017.1-
杨世伦 YANG Shilun	Scientific Reports	Editorial board member	
张经 ZHANG Jing	IOC/WESTPAC-CorReCAP	Project Leader	2008-
	IGBP/IMBER -Capacity Building Working Group	Chair	2009-
	SCOR-Committee on Capacity Building	Member	2009-
	Water, Air and Soil Pollution	Editorial board member	1994-
	Water, Air and Soil Pollution: Focus	Editorial board member	1999-
	Journal of Marine Systems	Editorial board member	2008-
	Acta Oceanologica Sinica	Editorial board member	2003-
张卫国 ZHANG Weiguo	Future Earth Coasts	SSC Member	2016.1-2018.12
	Current Pollution Reports	Editorial board member	2014-
	Estuarine Coastal and Shelf Science	Editorial board member	2013-
	Geomagnetism and Paleomagnetism, Frontiers in Earth Science	Review Editor	2015.11-2018.11
周俊良 ZHOU Junliang	Scientific World Journal	Editorial board member	2009-
	ISRN Oceanography	Editorial board member	2011-

新聘人员
New Appointees

汪亚平　教授

主要经历：
中国科学院海洋研究所 博士 (2000.7)
韩国国立海洋研究院 博士后 (2001)
美国弗吉尼亚海洋研究所 访问学者 (2003-2004)
南京大学副教授、教授 (2004-2017.8)
华东师范大学 教授 (2017.9-)
2016年获得国家自然科学基金杰出青年基金资助
研究专长：
海洋沉积动力过程与数值模拟;
河口海岸物质循环与输运

Prof. Dr. Wang Yaping

Education and Major Experience:
Ph.D., Institute fo Oceanology, Chinese Academy of Sciences (2000.7)
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Visiting Scholar, Virginia Institute of Marine Science, USA (2003-2004)
Associate Professor, Professor, Nanjing University (2004-2017.8)
Professor, ECNU (2017.9-)
Be supported by the National Science Fund for Distinguished Young Scholars in 2016
Research Interests:
Ocean Sediments Dynamic Process and Numerical Simulation;
Substances Transports and Circulation in Estuarine and Coastal Areas

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德国柏林自由大学 博士 (1990)
德国柏林自由大学 讲师和研究人员 (1990-2000)
德国柏林自由大学 教授 (2002-)
南京大学副教授、教授 (2008-2017.8)
华东师范大学 教授 (2017.9-)
2014年入选国家“外专千人计划”长期项目
研究专长：
气候与环境变化的湖泊地层记录

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Ph.D., Freie Universität Berlin, Germany (1990)
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Professor, Freie Universität Berlin, Germany (2002-)
Professor, Nanjing University (2008-2017.8)
Professor, ECNU (2017.9-)
Be supported by the Thousand Talents Program for High-level Foreign Experts of China in 2014
Research Interests:
Lake Sedimentary Records for the Environmental and Climate Change

郭磊城　副教授

主要经历：
荷兰代尔夫特理工大学和UNESCO-IHE 博士 (2014)
华东师范大学 博士后 (2015.1-2017.2)
华东师范大学 副教授 (2017.3-)
研究专长：
河口海岸动力地貌及模拟研究

Dr. Guo Leicheng, Associate Professor

Education and Major Experience:
Ph.D, Delft University of Technology /UNESCO-IHE (2014)
Post-Doctor Researcher, ECNU (2015.1- 2017.2)
Associate Professor, ECNU (2017.3-)
Research Interests:
Estuarine and deltaic morphodynamics