

www.jlakes.org

ISSN 1003-5427

湖 泊 科 学

JOURNAL OF LAKE SCIENCES

第33卷 第4期 2021年7月 Vol. 33 No.4 Jul. 2021



湖 泊 科 学
(Hupo Kexue)
2021 年 第 33 卷 第 4 期 7 月 6 日

目 次

学术争鸣

- 近 70 年来太湖水体磷浓度变化特征及未来控制策略 (957)
朱广伟, 秦伯强, 张运林, 李渊, 朱梦圆, 许海, 张毅博
1980 年以来太湖总磷变化特征及其驱动因子分析 (974)
吴浩云, 贾更华, 徐彬, 邵嫣婷, 赵晓晴

综 述

- 中国湖泊生态系统突变时空差异 (992)
董一凡, 郑文秀, 张晨雪, 徐敏, 王荣, 吴兴华, 李媛
内陆水体好氧甲烷氧化过程研究进展 (1004)
秦宇, 黄璜, 李哲, 鲁伦慧, 汤琼, 苏友恒, 李欣芮
淡水蓝藻胶被生物学功能及其分子调控研究进展 (1018)
程豫然, 肖艳, 吴兴华, 李哲

研究论文

- 富营养化与水华防控
- 基于 LSTM 网络的在线藻类时序数据预测研究:以三峡水库为例 (1031)
欧阳添, 闪锟, 周博天, 黄昱, 吴忠兴, 尚明生
巢湖水华蓝藻原位生长率的时空变化及其环境影响因子 (1043)
阳振, 史小丽, 陈开宁, 张民
太湖和巢湖中微囊藻(*Microcystis*)与长孢藻(*Dolichospermum*)的长时序变化及其驱动因子 (1051)
张民, 史小丽, 阳振, 陈开宁
富营养化湖泊蓝藻—芦苇碎屑堆积分解过程及其潜在的共代谢效应 (1062)
石瑞洁, 马杰, 吕成旭, 许晓光, 党馨逸, 蒋燕妮, 叶子, 吴懿婷, 王国祥
北方半干旱区典型湖泊——岱海透明度遥感反演(2013—2020 年) (1072)
刁瑞翔, 青松, 越亚螺, 郝艳玲, 包玉海

——水环境保护与修复

- 太湖水体交换周期变化(1986—2018 年)及对水质空间格局的影响 (1087)
朱伟, 程林, 薛宗璞, 冯甘雨, 王若辰, 张昱, 赵帅, 胡思远
太湖流域典型滨湖河网水动力与水质时空异质性 (1100)
夏玉宝, 王华, 何新辰, 袁伟皓, 曾一川, 闫怀宇, 张晓兰, 涂予新

2004 年以来长江中下游干流水体高锰酸盐指数时空变化分析	(1112)
兰 静,吴云丽,娄保锋,王瑞琳,陈 杰,卓海华	
亚热带河口区水库 DOC 和 DIC 浓度时空变化特征	(1123)
杨 平,唐 晨,陆苗慧,张林海, Yang Hong,全 川,吕 敏	
多目标优化下平原河网引调水改善水环境效果评估	(1138)
潘泓哲,李一平,唐春燕,Kumud Acharya,姚向阳,张 剑,朱 雅,程一鑫,程 月,于 珊,岳桢梧	
南方水库季节性热分层消亡对沉积物铁和磷迁移的影响——以南宁市天雹水库为例	(1153)
朱 雅,李一平,唐春燕,李荣辉,魏 尧,陈 刚,郭晋川,罗 凡,程一鑫,潘泓哲	
胶体 TiO ₂ 颗粒对不同来源溶解性有机质光降解的影响:基于分子量差异分析	(1163)
李芳芳,徐华成,江和龙	
气候变化和人类活动对鄱阳湖水龄影响的定量区分	(1175)
范宏翔,徐力刚,朱 华,鲁 照,曹宇贤,吴亚坤,姜加虎	
洞庭湖南荻(<i>Triarrhena lutarioriparia</i>)腐解对水质的影响	(1188)
赵媛媛,汤 楠,李智慧,陈跃辉,许友泽	
——水生态与生物多样性保育	
洱海四种沉水植物对弱光环境的适应性比较	(1196)
张忠海,杨 桐,王 昊,张霄林,曹 特,倪乐意,袁昌波	
抚仙湖近 60 年来沉水植物群落变化趋势分析	(1209)
高弋明,殷春雨,刘 霞,赵 钰,陈非洲,陈新芳,关保华	
环境因子对浮游甲壳动物群落功能多样性的影响	(1220)
王松波,史昭锦,耿 红,吴来燕,曹艳敏	
鳑鲏与河蚌交互作用对浮游生物和底栖生物的影响分析	(1230)
于谨磊,夏曼莉,关保华,何 虎,陈非洲,刘正文	
外来种福寿螺(<i>Pomacea canaliculata</i>)对 3 种沉水植物的牧食偏好及水体理化因子的响应	(1241)
杨 诚,康玉辉,高 健,张泽慧,苗 滕,廖明军,焦一滢,赵以军	
鄱阳湖流域蚌类环境 DNA 宏条形码引物的筛选验证	(1254)
陈金萍,周春花,欧阳珊,黄晓晨,吴小平	
——水文与水资源保护	
1990—2019 年咸海水量平衡及其影响因素分析	(1265)
昝婵娟,黄 粤,李均力,刘 铁,包安明,邢 伟,刘志斌	
——古湖沼学与全球变化	
青藏高原达则错近 1000 年来生态系统变化及可能机制	(1276)
李秀美,侯居峙,王明达,徐 磊	
勘 误	
关于“东太湖围网拆除前后水生植被群落遥感监测及变化”一文的勘误	(1253)

(本期责任编辑:梅琴;英文编辑:赵成)

Journal of Lake Sciences

(ISSN 1003-5427)

Volume 33 Issue 4; July 6, 2021

Contents

Discussion

Fluctuation of phosphorus concentration in Lake Taihu in the past 70 years and future control strategy	957
Zhu Guangwei, Qin Boqiang, Zhang Yunlin, Li Yuan, Zhu Mengyuan, Xu Hai & Zhang Yibo	
Analysis of variation and driving factors of total phosphorus in Lake Taihu, 1980–2020	974
Wu Haoyun, Jia Genghua, Xu Bin, Shao Yanting & Zhao Xiaoqing	

Review

Temporal and spatial differences of lake ecosystem regime shift in China	992
Dong Yifan, Zheng Wenxiu, Zhang Chenxue, Xu Min, Wang Rong, Wu Xinghua & Li Yuan	
Research progress of aerobic methane oxidation process in inland waters	1004
Qin Yu, Huang Huang, Li Zhe, Lu Lunhui, Tang Qiong, Su Youheng & Li Xinrui	
Advances in biological function and molecular regulation of cyanobacterial surface coats in freshwaters	1018
Cheng Yuran, Xiao Yan, Wu Xinghua & Li Zhe	

Research papers

—Eutrophication, bloom prevention and control

Research on the online forecasting of algal kinetics based on time-series data and LSTM neural network: Taking Three Gorges Reservoir as an example	1031
Ouyang Tian, Shan Kun, Zhou Botian, Huang Yu, Wu Zhongxing & Shang Mingsheng	
Spatial-temporal variations of the <i>in-situ</i> growth rate of bloom-forming cyanobacteria and their environmental factors in Lake Chaohu, China	1043
Yang Zhen, Shi Xiaoli, Chen Kaining & Zhang Min	
Characteristics and driving factors of the long-term shifts between <i>Microcystis</i> and <i>Dolichospermum</i> in Lake Taihu and Lake Chaohu	1051
Zhang Min, Shi Xiaoli, Yang Zhen & Chen Kaining	
Accumulation and decomposition of cyanobacteria and reed debris in eutrophic lakes and its potential co-metabolism effects	1062
Shi Ruijie, Ma Jie, Lv Chengxu, Xu Xiaoguang, Dang Xinyi, Jiang Yanni, Ye Zi, Wu Yiting & Wang Guoxiang	
A typical lake in the semi-arid area of northern China—The remote sensing retrieved of the transparency of the Lake Daihai (2013–2020)	1072
Diao Ruixiang, Qing Song, Yue Yalei, Hao Yanling & Bao Yuhai	

—Aquatic environment protection and remediation

Changes of water exchange cycle in Lake Taihu (1986–2018) and its effect on the spatial pattern of water quality	1087
Zhu Wei, Cheng Lin, Xue Zongpu, Feng Ganyu, Wang Ruochen, Zhang Yu, Zhao Shuai & Hu Siyuan	
Spatiotemporal heterogeneity of hydrodynamic forces and water quality in typical lakeside river networks in Taihu Basin	1100
Xia Yubao, Wang Hua, He Xinchen, Yuan Weihao, Zeng Yichuan, Yan Huaiyu, Zhang Xiaolan & Tu Yuxin	

Spatiotemporal change analysis of permanganate index in the middle and lower mainstem of the Yangtze River since 2004	1112
Lan Jing, Wu Yunli, Lou Baofeng, Wang Ruilin, Chen Jie & Zhuo Haihua	
Spatiotemporal variations in water dissolved organic carbon and dissolved inorganic carbon concentrations in Wenwusha Reservoir in subtropical estuary, Southeast China	1123
Yang Ping, Tang Chen, Lu Miaoqiu, Zhang Linhai, Yang Hong, Tong Chuan & Lv Min	
Evaluation of the effect of water diversion on improving water environment in plain river network under the multi-objective optimization	1138
Pan Hongzhe, Li Yiping, Tang Chunyan, Kumud Acharya, Yao Xiangyang, Zhang Jian, Zhu Ya, Cheng Yixin, Cheng Yue, Yu Shan & Yue Zhenwu	
Effects of the disappearance of seasonal thermal stratification on the mobilization of iron and phosphorus in reservoirs, southern China—A case of Tianbao Reservoir, Nanning City	1153
Zhu Ya, Li Yiping, Tang Chunyan, Li Ronghui, Wei Yao, Chen Gang, Guo Jinchuan, Luo Fan, Cheng Yixin & Pan Hongzhe	
Effects of colloidal TiO ₂ particles on photodegradation of dissolved organic matter from different sources: Based on molecular weight difference analysis	1163
Li Fangfang, Xu Huacheng & Jiang Helong	
Distinguishing the relative impacts of climate change and anthropogenic activities on variation of water age in the Lake Poyang	1175
Fan Hongxiang, Xu Ligang, Zhu Hua, Lu Zhao, Cao Yuxian, Wu Yakun & Jiang Jiahu	
Effect of <i>Triarrhena lutarioriparia</i> residue decomposition on water quality in Lake Dongting	1188
Zhao Yuanyuan, Tang Nan, Li Zhihui, Chen Yuehui & Xu Youze	
—Freshwater ecology and biodiversity conservation	
Comparative study on the adaptability of four submerged macrophytes to low light environment in Lake Erhai	1196
Zhang Zhonghai, Yang Tong, Wang Hao, Zhang Xiaolin, Cao Te, Ni Leyi & Yuan Changbo	
Changes of submerged macrophytes community in Lake Fuxian since 1960s	1209
Gao Yiming, Yin Chunyu, Liu Xia, Zhao Yu, Chen Feizhou, Chen Xinfang & Guan Baohua	
Effects of environmental factors on the functional diversity of crustacean zooplankton community	1220
Wang Songbo, Shi Zhaojin, Geng Hong, Wu Laiyan & Cao Yanmin	
Interactive effects of bitterling fish and mussel on the community structures of plankton and benthic macro-invertebrates	1230
Yu Jinlei, Xia Manli, Guan Baohua, He Hu, Chen Feizhou & Liu Zhengwen	
Effect of <i>Pomacea canaliculata</i> grazing on three submerged macrophytes and the related physicochemical factors	1241
Yang Cheng, Kang Yuhui, Gao Jian, Zhang Zehui, Miao Teng, Liao Minjun, Jiao Yiying & Zhao Yijun	
Universal primers screening and verification for environmental DNA metabarcoding of freshwater mussels in the Lake Poyang Basin	1254
Chen Jinping, Zhou Chunhua, Ouyang Shan, Huang Xiaochen & Wu Xiaoping	
—Hydrology and water resources protection	
Analysis of water balance in Aral Sea and the influencing factors from 1990 to 2019	1265
Zan Chanjuan, Huang Yue, Li Junli, Liu Tie, Bao Anming, Xing Wei & Liu Zhibin	
—Paleolimnology and global change	
Ecosystem changes and possible mechanisms of Dagze Co in the Tibetan Plateau during the past 1000 years	1276
Li Xiumei, Hou Juzhi, Wang Mingda & Xu Lei	
Corrigendum	
Corrigendum to “Changes in aquatic vegetation communities based on satellite images before and after pen aquaculture removal in East Lake Taihu” (DOI:10.18307/2021.0228)	1253



《湖泊科学》已经被下列国内外数据库和文摘期刊收录
Journal of Lake Sciences has been abstracted and/or indexed by

《中文核心期刊要目总览》核心期刊(北京大学)
中国科学引文数据库核心期刊(CSCD)
中国科技论文与引文数据库(CSTPCD)
中国学术期刊(光盘版)(中国知网)
万方数据
中文科技期刊数据库(维普资讯)
RCCSE中国核心学术期刊
中国科技期刊引证报告(核心版)
中国科技论文统计与分析
中国学术期刊综合评价数据库
中国期刊全文数据库
中国科技期刊精品数据库
中国核心期刊(遴选)数据库
中国生命科学文献数据库
中国地理与资源文摘
中国生物学文摘
古生物学文摘
水文水资源文摘
中国学术期刊文摘

Bibliography and Index of Geology
BIOSIS Previews
Cambridge Scientific Abstracts
Chemical Abstracts
Current Bibliography on Science and Technology
Current Geographical Publications
EI Compendex
Environmental Engineering Abstracts
Environmental Knowledgebase
Georef
Meteorological and Geoastrophysical Abstracts
Ocean Abstracts
Pollution Abstracts
ProQuest
Scopus
Sustainability Science Abstracts
VINITI Database
Water Resources Abstracts
Zoological Records

湖泊科学 *HUPO KEXUE*
(双月刊, 1989 年创刊)
第 33 卷第 4 期 2021 年 7 月 6 日出版

Journal of Lake Sciences
(Bimonthly, started in 1989)
Volume 33, Number 4; Jul. 2021

编 辑 《湖泊科学》编辑委员会
(210008 南京市北京东路 73 号)
(E-mail: jlakes@niglas.ac.cn)

主 编 秦伯强
主 管 中国科学院
主 办 中国科学院南京地理与湖泊研究所
中国海洋湖沼学会

出 版 科 学 出 版 社
(100717 北京市东黄城根北街 16 号)

印 刷 装 订 江苏省地质测绘院

总 发 行 处 江苏省邮政局

订 购 处 全国各地邮局

国 外 发 行 中国国际图书贸易总公司
(100044 北京市 399 信箱)

Edited by Editorial Board of *Journal of Lake Sciences*
(73 East Beijing Road, Nanjing 210008, P.R.China)
(E-mail: jlakes@niglas.ac.cn)

Editor-in-chief Qin Boqiang

Sponsored by Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences;
Chinese Society for Oceanology and Limnology

Published by Science Press
(16 Donghuangchenggen North Street, Beijing
100717, P.R.China)

Distributed by China International Book Trading Cooperation (P.O.Box 399, Beijing 100044, P.R.China)

国内邮发代号: 28-201 国内统一刊号: CN32-1331/P 国内外公开发行 Code Number: BM4051 定价: 68.00 元

