



“Gheorghe Asachi” Technical University of Iasi, Romania



EFFECTS OF ENVIRONMENTAL FACTORS ON THE BIOMASS OF BENTHIC DIATOM IN RIVERS

**Baichuan Zhang¹, Pengxiao Zhao¹, Yong Li^{1*}, Ruifeng Liang¹,
Hongwei Wang², Yuanming Wang¹**

¹*State Key Laboratory of Hydraulics and Mountain River Engineering, Sichuan University, Chengdu 610065, China*

²*Sichuan Zipingpu Development Co., Ltd.; Chengdu 610065, China*

Abstract

This paper aims to disclose the quantitative relationship between benthic diatom biomass in natural rivers and environmental factors. For this purpose, the author selected seven natural rivers in the basin of Minjiang River as the objects. First, the samples of benthic diatoms and the environmental factors were collected from 14 different sampling sites of five rivers and the diatom density and Chlorophyll a (Chl a) content were selected to characterize the diatom biomass. Then, the number of diatom cells of the collected samples was counted and the Chl a content was measured in the lab. After that, the correlations between diatom biomass (diatom density and Chl a content) and environmental factors were analysed in details, revealing that turbidity, water depth, chemical oxygen demand (COD) and flow velocity are primary influencing factors of diatom biomass. On this basis, two mathematical models were established through multivariate linear regression analysis to calculate the correlations between diatom density and Chl a content, respectively, with the primary influencing factors. The models were validated through a case study on the remaining two rivers. The results show that the calculated diatom density and Chl a content of most sampling site could mirror the actual impacts of COD, turbidity, water depth and flow velocity on diatom biomass in the study area. The research findings provide an indirect way to estimate the biomass of benthic diatoms and shed new light on the evaluation of the health of rivers.

Key words: diatom density, Chlorophyll a (Chl a) content, environmental factors, correlation analysis, empirical prediction models

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* Author to whom all correspondence should be addressed: e-mail: li_yong@scu.edu.cn; Phone: 139-8181-6976