Geophysical Research Abstracts
Vol. 15, EGU2013-65, 2013
EGU General Assembly 2013

Identifying the factors affecting phytoplankton abundance dynamics in Shihmen Reservoir, Taiwan

Yi-Ming Kuo (1), Illy Chuang (2), Hone-Jay Chu (3), Jiunn-Tzong Wu (4), and Cheng-Shin Jang (5)

(1) Department of Design for Sustainable Environment, Ming Dao University. 369 Wen-Hua Rd., Peetow, Chang-Hua 52345, Taiwan (airkuo@ntu.edu.tw), (2) Department of Life Sciences, National Chung Hsing University, Taichung 402, Taiwan, (3) Department of Geomatics, National Cheng-Kung University, Tainan, Taiwan, (4) Institute of Earth Sciences, Academia Sinica, 128, Academia Road Section 2, Nankang, Taipei 115, Taiwan, (5) Department of Leisure and Recreation Management, Kainan University, Luzhu, Taoyuan 338, Taiwan

Investigations of multiple temporal distributions of phytoplankton dynamics through environmental variables in water bodies over extensive areas remain relatively scarce. This study focused on the determination of the key factors regulating temporal and spatial variations of phytoplankton abundance at three monitoring sites in Shihmen Reservoir within five years (2006–2010). Dynamic factor analysis (DFA), a dimension-reduction technique, was designed to identify the underlying latent effects in multiple time series and interactions between explanatory variables (i.e. environmental variables) and the response variable (phytoplankton abundance). The optimal DFA model successfully described the dynamics of phytoplankton abundance in the Shihmen Reservoir. The results demonstrated that water temperature, water level, COD, BOD, and DO considerably affected phytoplankton abundance at most of the monitoring sites. Among them, water temperature, water level, and COD significantly affected phytoplankton abundance at all three sites, indicating that these variables contributed more to the long-term dynamics of phytoplankton abundance than other variables at the surface water of Shihmen Reservoir. The influx and efflux of Reservoir altering hydrological conditions in Shihmen Reservoir may attenuate the nutrients effects on phytoplankton abundance. In this study, BOD and DO are the other crucial water quality factors that control variations of phytoplankton. The explanatory variables mainly explain the dynamics of phytoplankton abundance than common trends do. In the future, the water manager may consider these variables to propose strategies to manage water quality in Shihmen Reservoir.