Geophysical Research Abstracts
Vol. 14, EGU2012-8390, 2012
EGU General Assembly 2012

Development and testing of a phytoplankton index of biotic integrity (P-IBI) for a German lowland river

N. Wu, B. Schmalz, and N. Fohrer
Kiel University, Dep. Hydrology and Water Resources Management, Kiel, Germany (nwu@hydrology.uni-kiel.de)

We developed a phytoplankton index of biotic integrity (P-IBI) for a German lowland river (the Kielstau catchment) to assess effects of human disturbances on the biotic condition of riverine phytoplankton community. Six metrics (out of 36 original metrics) were selected from a training data set, based on Cumulative_R^2 and correlation index (CoI) between biotic metrics and environmental variables. The final P-IBI scores were calculated by averaging metrics for a site after transforming them to a discrete 1 (bad), 2 (low), 3 (moderate), 4 (good), 5 (high) scale according to the requirements of the European Water Framework Directive (WFD). We then tested the robustness of P-IBI. The P-IBI and its six metrics were indicative of ecological integrity and water quality as indicated by canonical correspondence analysis and comparisons with other single metrics, although Cumulative_R^2 and CoI values declined in the testing data set. By implementing the developed P-IBI in the study area, we found that the ecological status varied seasonally. The general ecological status of the study region was 'Moderate' regardless of seasonal variations, which was lower than the requirement ('Good' status) of WFD by 2015. The relative lower ecological status was probably caused by point sources, diffuse sources emissions and artificial drainage systems of the study area. Our study was an important trial for the development of IBI in a catchment without reference sites and the constructed P-IBI could be a useful tool to measure the long-term status of streams and the effectiveness of various watershed managements. Besides, further river basin managements are suggested to address point sources, diffuse sources as well as artificial drainage systems in order to gain a better water quality in the study region.