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Diatoms as an indicator for tile drainage flow in a German lowland catchment

Naicheng Wu, Claas Faber, Uta Ulrich, Britta Schmalz, and Nicola Fohrer

Department of Hydrology and Water Resources Management, Institute for Natural Resource Conservation, Kiel University, Kiel, Germany (naichengwu88@gmail.com)

The separation of flow components within a model simulation is of great importance for a successful implementation of management measures. Tracers are commonly used to identify and assess runoff-generating processes and to detect sources of stream flow components within a target catchment. Diatoms could be an ideal tracer due to their diverse preferences to different aquatic habitats (van Dam et al. 1994, Pfister et al. 2009).

As a part of a DFG (Deutsche Forschungsgemeinschaft) project, we collected diatom samples of 9 sites (4 tile drainage, and 5 river sites) weekly or biweekly from March to July 2013 in a German lowland catchment (the Kielstau catchment).

First results showed that diatom species *Achnanthes lanceolata*, *Fragilaria biceps* and *Navicula ingapirca* dominated in tile drainage flow with relative abundances of 22.2%, 21.5% and 10.9%, respectively. For river sites, the most abundant species was *Navicula cryptocephala* (20.5%), followed by *Fragilaria biceps* (12.9%), *Cyclotella meneghiniana* (9.5%) and *Achnanthes lanceolata* (9.3%). Compared with river sites, tile drainage flow had lower diatom density, biomass, species richness and percentage of Aquatic/Riparian diatoms (AqRi%). However, the proportion of Riparian diatoms (RiZo%) increased at tile drainage flow.

Indicator value method (IndVal) revealed that the two water types were characterized by different indicator species. Fifteen taxa (e.g. *Cocconeis placentula*, *Cyclotella meneghiniana*, *Navicula cryptocephala* and *Fragilaria biceps*) were significant indicators for river sites. *Achnanthes lanceolata*, *Achnanthes minutissima* and *Navicula ingapirca* were significant indicators for tile drainage flow.

These results highlight the suitability of diatoms as an indicator for tile drainage flow. Spatial and temporal variations of diatom community should be considered in future surveys.

Keywords: Diatoms, Flow components, Indicator value method, Tracer

References:

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