



From eutrophic lake to river: phytoplankton composition changes in river-lake system (Tanglangchuan River, China)

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Due to the fact that the Dianchi Lake is a hypereutrophic lake, we assume it is a potential source of cyanobacteria seed contributing to harmful algal blooms in the upper reach of the Tanglangchuan River (China). However, cyanobacteria, unlikely to survive in the short-retention-time river, are possibly replaced by other fast-growing algae along the river. To determine longitudinal changes of phytoplankton structures from Dianchi Lake to downstream Tanglangchuan River, samplings were carried out in June and September 2013 at 7 different stations. Among these stations, two of them are located in the mouth of Dianchi Lake (D1~D2) while the remaining five are along the main stream of the Tanglangchuan River (T1~T5). Then phytoplankton species were defined. We found that in June cyanobacteria dominated with more than 95% of the total cells in D1 and D2. The cyanobacteria sustained a long distance from T1 to T4 with a clear dominance of the total cells from 85.6% to 90.4%. However, in the last station (T5) which is located about 100km downstream the mouth of the Dianchi Lake, chlorophytes and bacillariophytes took the place of cyanobacteria and dominated (56.3% of the cells were chlorophytes and 27.1% were bacillariophytes). In autumn, the cyanobacteria dominated from D1 to T5 but the percentage and biomass of the cyanobacteria decreased along the river. The dominance of the cyanobacteria in the upper reach of the river indicates that the Dianchi Lake provides the cyanobacteria seed to the downstream river. Additionally, the transition of the algae dominance in the lower reach suggests that longitudinal changes in phytoplankton composition do exist. In view of the high concentration of total nitrogen and total phosphorus, changes of flow velocity and residence time should be key factors causing spatial succession.