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Dynamics of annual nutrinets and bloom-forming cyanobacteria, revealed by daily observation in a hyper-eutrophic lake

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Daily monitoring over a period of one year in Lake Taihu, China, included chlorophyll a (Chl-a) and nutrient measurements, determining the taxonomic composition of the phytoplankton community and various water column physicochemical parameters. Chl-a and nutrient concentrations showed strong circadian variations Chl-a rised during daylight hours, while ammonium and phosphate rised at night. Chl-a concentrations also showed strong seasonal variations, with one annual peak in spring and another from summer to autumn, dominated by Dolichospermum spp. and Microcystis spp. respectively. Temperature appeared to exert the most important effect in this species succession. A nutrientChl-a balance calculation indicated that both nitrogen and phosphorus in the water column could be limiting factors for phytoplankton growth during bloom periods. Over two thirds of particulate nutrients was attributed to phytoplankton biomass during blooms. Daily (or weekly) monitoring data provided more precise description of water quality, capturing short-term peaks in phytoplankton biomass, and reduced risks of under- or overestimating trophic levels in lakes, which always happened when using monthly monitoring data.