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Expansion of cyanobacteria outbreaks in the Alpine region: first report of an intense *Microcystis* bloom in Lake Serrai

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ABSTRACT

Lake Serrai is a small eutrophic dimictic lake located in the town of Baselga di Pinè, in the Province of Trento. The lake has an average depth of 7 m and a maximum depth of 18 m and is mainly used for recreational activities. During the last decade, summer blooms of non-toxic populations of *Dolichospermum* spp. were documented over the entire lake. Conversely, at the end of August 2023, an intense toxic bloom of *Microcystis aeruginosa* developed over several weeks, resulting in a bathing ban by the local authorities. Besides the usual monitoring for the control of bathing waters, a few opportunistic samples were collected for microscopical examinations, toxins analyses using LC-MS techniques, and strain isolation and cultivation. In the areas where the surface scums developed, the MC-LR and MC-RR congeners of microcystins showed concentrations of 200 $\mu\text{g L}^{-1}$ and 42 $\mu\text{g L}^{-1}$, respectively. The bloom episodes documented in Lake Serrai are part of a more general increasing trend of cyanobacterial outbreaks actively documented in the southern Alpine region. Besides persisting high trophic status, as in Lake Serrai, the causes were also connected to the general increasing temperature trends at the global and local levels.