

Recent phytoplankton changes in a restored mountain lake as a response to nutrients and climate

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Piburger See, a dimictic mountain lake in Tyrol (N 47°11'42'', E 10°53'18'', 915 m a.s.l.), experienced a weak cultural eutrophication in the 1950s, which has been related to fertilizer application on nearby agricultural fields, some seepage of domestic sewage and an increase in tourism (e.g. bathing activities). Restoration measures aimed at a reduction of nutrient loads started in the early 1970s, leading to a re-oligotrophication of the lake in the 1990s. Since the early 2000s, chlorophyll *a* concentration and total phytoplankton biovolume increased again up to past maximum values and pennate planktonic diatoms became dominant in the lake for the first time. The objectives of the present contribution are: *a)* to identify environmental factors responsible for the recent changes in phytoplankton abundance and taxonomical composition, and *b)* to understand possible implications of climate related factors for future lake management, with particular attention to eutrophication effects, which are not supported by major changes in nutrient concentrations. The role of nutrients and local climate variability as drivers for the abundance of phytoplankton classes and morpho-functional groups (MFG) is investigated through a multivariate statistical approach. Results are discussed in the perspective of past decennial evolution of lake trophic level and phytoplankton assemblages.