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ABSTRACT BOOK



Different performances of independent sediment biological proxies in tracking ecological transitions in a small sub-alpine lake since the Little Ice Age

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A comparative study of independent geochemical and biological proxies was carried out on a 83 cm long sediment core collected in 2011 from the deepest point of the small subalpine Lake Ledro (Trentino, N-Italy). The aim of the study was to compare the capability of subfossil photosynthetic pigments, diatoms and Cladocera in tracking lake ecological transitions related to major environmental perturbations occurred during the last three centuries, i.e. after the culmination of the Little Ice Age in the Alpine region. In relation to the sparse neo-limnological and climate data available for the lake, the study aimed also at defining of the lake trophic and ecological reference conditions, at improving the reconstruction of the nutrient enrichment process during the last decades, and at evaluating the effects of restoration measures initiated in the 1990s. The analysis of the selected proxies outlined a pronounced sensitivity of Lake Ledro to hydrological variability throughout the whole time span considered, but particularly during the 18th and 19th century, and revealed two major stages in the ecological evolution of the lake, which were mainly controlled by climate-related hydrological variability and lake nutrients. The results largely agree with the hypothesis that responses of sediment biological proxies to different natural and human stressors may differ in type, timing and magnitude. Diatoms and Cladocera showed a comparable capability in tracking ecological transitions related to lake hydrology and nutrient variability, while only diatoms demonstrated a certain capability to track changes in water temperature of the lake studied. The strong response of planktonic organisms to hydrological variability confirmed that they principally respond to climate variability in an indirect way. The reconstruction of the trophic development of Lake Ledro during the last decades revealed that the lake sensitivity to hydrological variability, beside congenital for the lake, is at present masked by responses to nutrient.