Submitted Abstract

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Abstract

Mediterranean mountain freshwater ecosystems are among the most sensitive ecosystems to global change due to the increased summer drought in the region. Long-term paleolimnological studies of bioindicators in sediment records from these ecosystems are used for climate reconstruction and may be useful for studying lake diversity over time as they are a cumulative record of the communities across the lake. A better understanding of Mediterranean mountain lake ecosystem responses to global change can strengthen our ability to forecast and mitigate its deleterious effects allowing the conservation of such fragile ecosystems. Hence, the main aim of this study is to study the diatoms and cladocera biodiversity dynamics in sediment from Sierra Nevada lakes (Granada, Spain).

Sierra Nevada Mountains contain around 50 alpine lakes of glacial origin at an elevation of 2800-3100 m a.s.l. They are shallow (maximum depth <10 m), small (surface area <1 ha), low primary production and well-mixed lakes. During the summer, the water level in most of them is reduced and some of them become completely dry.

Several samples were taken: a) sediment cores were retrieved from six lakes of Sierra Nevada, covering the last 150 years; b) one long core from Río Seco Lake covering 6000 years and c) superficial sediment samples from 17 lakes. The lakes were selected to better characterise the regional variation in lake and valley types. Samples were processed and were analysed for diatoms and cladocera. For each sample, a minimum of 300 valves were counted for diatoms and a minimum of 200 remains were counted for cladocera. Biodiversity was measured using different biodiversity indexes such as the Hill numbers. Biodiversity dynamics for each bioindicator was analysed in terms of differences in structure, composition and turnover rate over time (from the deep cores) and space (from the surface samples).

Previous published studies show that changes in diatoms and cladocera assemblages in Sierra Nevada lakes reveal a regional-scale response to climate change especially during the 20th century consistent with a warmer and drier climate in the region. However, this new approach may allow us to analyse its effect on biodiversity metrics.

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