Submitted Abstract

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Abstract

Environmental warming is the most conspicuous and relevant effect of ongoing climate change. However, the increase of a lake water temperature is not easily predictable as warming effects may co-occur with a myriad of other confounding climate factors such as changes in precipitation and droughts or changes in lake morphological features – effects that are not easy to untangle. Based on long-term time-series observations, we explore the increase in water temperature of four small high-mountain lakes in the Sierra Nevada (southern Spain) with different depth and geomorphometric features. Our hypotheses are that warming is occurring in all the lakes of this high-mountain region, summer water-column stability is increasing, duration of ice-cover period is decreasing, and that inter-lake differences are due to variation in lake depth and local geomorphology. Utilizing high-frequency in situ temperature data from years 2009 (Lake La Caldera and Laguna Larga) or 2011 (Río Seco and Aguas Verdes) to 2021, and multiple discrete measurements as far back as 1984, we will test the above hypotheses, describe the findings, and discuss their relevance to the ecology of mountain lakes in the Sierra Nevada.

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