

## Can earthquakes change plankton communities?

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### Abstract

Zooplankton community changes have been described before, be it from sediment analysis or direct observation. These changes usually took at least a decade to become evident. In lake Krnsko jezero (1383 m a.s.l.) from Triglav National Park in Slovenia a comparatively fast zooplankton community change, with the naturally introduced *Ceriodaphnia quadrangula* supplanting *Cyclops vicinus*, was observed following a series of two earthquakes (in 1998 and 2004).

Zooplankton community structure, basic physical and chemical parameters of the lake have been studied since 1994. Before 1998 the lake was dominated by a predatory cold-water copepod *Cyclops vicinus*. After an earthquake in 1998 (EMS= 5.6) the filtrating thermophilic cladoceran *Ceriodaphnia quadrangula* appeared and soon became the dominant species. After the second earthquake in 2004 (EMS= 4.0) *C. vicinus* almost completely disappeared from the lake.

Principal component analysis showed decreasing nutrient loadings and Chl-a concentrations, while Secchi depth was increasing. Significant changes in zooplankton biomass and a slight increase in average surface water temperatures were also recorded. These results were supported by Canonical Correspondence Analysis, where the thermophilic nature of *C. quadrangula* and its colonization of the lake after the year 1998 were confirmed.

We argue that the combination of two earthquakes, increased surface water temperatures and natural introduction of a new Cladocera species induced a comparatively fast change in zooplankton community structure in lake Krnsko jezero.

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