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Meiofaunal ecology in harsh environments, a case study in a deglaciating Alpine area

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Biography:

I am an aquatic ecologist with a particular interest in animal biodiversity and ecosystem processes. I have been investigating for more than 30 years groundwater and surface water ecosystems in Italy and abroad, focussing my activity on the ecology, zoology and biogeography of invertebrate communities from different habitats: karstic, hyporheic and benthic in streams, interstitial in lacustrine and marine habitats

Climate change and progressive glacier loss are leading to rapid ecological shifts in alpine aquatic systems. Rock glaciers and paraglacial features such as proglacial lakes, moraines, and taluses can alter the gradients of glacial influence along alpine river networks. Particularly relevant is the effect of rock glacial streams on invertebrates, although the hydrology and ecology of such high-elevation stream types is still scarcely known. We investigated the main meiofaunal component of benthic communities of different stream types in a deglaciating area of the Italian Alps, i.e., Crustacea Copepoda. We used an index of habitat mildness based on water temperature, channel stability, turbidity, and organic detritus, to measure the difference in community metrics over a gradient of habitat amelioration, driven by the mixing of distinct stream types (glacial, rock-glacial, snowmelt, mixed) and their interactions with paraglacial features. The composition of copepod communities of rock-glacial sites differed from the one of the other stream types, particularly it was very different from the kryal sites, and more similar to the rhithral and krenal ones. Under progressive deglaciation, rock glaciers and paraglacial features will increasingly influence the meiofaunal communities of alpine river networks. As they host a higher number of taxa and individuals than non-glacial locations, rock glacial streams may act as stepping stones facilitating colonization following glacier retreat. After glacier loss, rock glacial streams may represent climate refugia for cold-adapted taxa and/or kryal specialists, because the slow thawing of their ice might sustain cold water conditions for a longer period of time.

