Submitted Abstract

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Abstract

Alpine lakes and rivers shelter biodiversity treasures, host essential ecological processes and protect quality and quantity of water resources. Unfortunately, several mountain aquatic habitats are experiencing dramatic water scarcity, due to global climate change and increasing water abstraction, with expected detrimental effects on their biodiversity and functionality. In particular, mountain streams in western European Alps are increasingly shifting from perennial to intermittent flow due to the combined effects of climate change and local anthropogenic pressures. Because such flow reduction or intermittency is a recently documented phenomenon in the Alps, only scattered studies have investigated their effects, and only few data are available on benthic communities. In this study we summarized some of our results related to the consequence of water shortage on aquatic ecosystems. First, we analyze the impact of flow reduction/droughts comparing biodiversity, taxonomic richness and functionality of benthic macroinvertebrates and algae in control (i.e., permanent) versus intermittent Alpine stream reaches. Then, we report some case-studies related to the combining effect of water shortage and human use (i.e., hydroelectric plans and dam management). In addition, we present the first results of a new line of research aiming at investigating how the reduction of flow can affect the effectiveness of wastewater treatment plants in mountain areas, thus impacting biodiversity and altering the environmental conditions of the rivers of the Alps. Finally, we also want to present here the great opportunity for collaboration offered by the UNITA consortium (Universitas Montium), as a network for teaching and research in the mountain environment, to which belong among others the Université Savoie Mont Blanc (with the CARRTEL - Alpine Center for research on trophic networks and lake ecosystems, Le Bourget-du-Lac) and the Università degli Studi di Torino (with ALPSTREAM – Alpine Stream Research Center, Ostana).