Climate change and stoichiometric implications for zooplankton

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Global change is affecting aquatic systems in many ways, through temperature increase, changes in transparency, irradiation and nutrient loads, affecting ecosystem stoichiometry, and so organismic fitness. Due to temperature increase, glaciers around the globe are melting rapidly, threatening the receiving environments of the world's fresh water reservoirs with significant changes. The meltwater, carried by rivers, contains large amounts of suspended sediment particles, affecting downstream lakes. These suspended particles modify lake transparency depending if the suspended material tends to increase or decrease according to glacier recession. Changes in underwater photosynthetically active radiation would affect food quality for zooplankton by changes the light-nutrient ratio in the water column. In addition, changes in water transparency also affects URV penetration, and hence the oxidative stress generated by these light wavelengths. Here we analysed how food quality, in terms of elemental ratios, interact with factors as UVR and oxidative stress. In a first step, through laboratory and field experiments, we analysed how food quality affects the capacity of zooplankters (*Daphnia* and calanoid copepods) to respond to UVR generated oxidative stress. Then we moved to field studies to evaluate these results in natural zooplankton populations. Lake Mascardi, located in the North-Patagonian Andean lake district, is a deep ultra-oligotrophic lake that receives the Upper Manso River, which begins at the largest glacier of Tronador Mountain (3554 m a.s.l.). Glacier fluctuations on Mountain Tronador have been observed since 1976 and show a continuous recession. We took advantage of a 10 km light gradient in Lake Mascardi, analysing interannual variations in water transparency, UVR penetration and food quality as interacting factors affecting zooplankton populations. Along this transparency gradient we found significant differences in light:nutrient ratio and stoichiometric food quality of the seston, together with a switch from dominance of P-rich *Daphnia* in low carbon:nutrient stations to the dominance of low-P copepods in high carbon:nutrient stations. In addition, we analysed the oxidative stress due to UVR in *Daphnia commutata* and how this factor can modulate the coexistence with other potential competitors such as the copepod *Boeckella gracilipes*. In summary, here we showed how climate change would affect zooplankton via changes in food quality and UVR effect.