Geophysical Research Abstracts
Vol. 15, EGU2013-9270, 2013
EGU General Assembly 2013

Elemental stoichiometry of seston and zooplankton in subarctic lakes situated along an altitude gradient in northern Sweden

Daniel Karlsson, Jan Karlsson, and Ann-Kristin Bergström
Department of Ecology and Environmental Science, Umeå University, 90187 Umeå, Sweden (dak_81531@hotmail.com)

Lake ecosystems in subarctic areas are sensitive to climate changes. This is partly because climate change (increased air temperature and enhanced nitrogen deposition) is predicted to be pronounced in northern latitudes, but also because lakes in this area are unproductive and sensitive to even small changes in environmental conditions. Here we assess how carbon:nitrogen:phosphorus (C:N:P) stoichiometry varies in seston and zooplankton in subarctic lakes situated along an altitude gradient (400 to >1000 m.a.s.l). The studied 11 lakes are situated in the Abisko region (68^{o}N, 18^{o}E), northern Sweden, which is one of the few areas in the world where it's still possible to study lakes with low anthropogenic environmental impact (i.e. low N deposition). Lake water chemistry, stoichiometry of seston and zooplankton, and zooplankton biomass was measured three times over the ice-free season (from June to mid-September) in 2011. The highest situated lakes are typically clear-water lakes with no or limited vegetation cover in their catchment. With decreasing altitude warmer conditions promotes the presence of higher coverage of vegetation in the catchment, thus, increasing inputs of allochtonous dissolved organic carbon (DOC) and nutrients, such as nitrogen (N) and phosphorus (P). We found that differences in catchment characteristics and climate resulted in increasing DOC and total N concentrations, but declining dissolved inorganic N: total P (DIN:TP) ratios, with lower altitudes. Seston C concentrations were overall low and declined with increasing altitude. Zooplankton biomass and species composition varied between lakes and sampling occasion and was not correlated to seston C concentrations or with altitude. Stoichiometry of seston (C:P; C:N, N:P) varied little with altitude and between lakes. For zooplankton (i.e. both Cladocerans and Copepods) C:N and ratios were generally lower than in seston, whereas the C:P and N:P ratios generally were higher. Hence, when assessing elemental imbalance between seston and zooplankton the results indicates that zooplankton was mainly N limited and recycled P. Our results therefore differs from other studies, implying that P recycling by zooplankton, may skew the N:P ratios to even lower values, possibly enhancing N-limitation in phytoplankton in these lakes.