



Quantification of climate parameters using biological proxy indicators in lake sediments – potential, limits, and sources of uncertainty

C. Bigler

Umeå University, Ecology and Environmental Science, Umeå, Sweden (christian.bigler@emg.umu.se)

Lake sediment archives have played an important role in understanding long-term climate fluctuations, especially in remote places such as alpine, subarctic or arctic regions. The ultimate goal of paleoclimatological reconstructions using lake sediments is to improve the understanding of past climate conditions at high temporal and spatial resolution, which may lead to an increased understanding of the climate system and improve future predictions. The transfer from a biological assemblage recorded in lake sediments to a quantitative climate estimate is complicated and challenging. The first array of uncertainties is related to the archive itself, including dating uncertainties, post-depositional processes, or lags in sedimentation. The second array of uncertainties is associated to the biological climate-proxy organisms. Biota is always affected by additional environmental parameters besides just climate, such as nutrient and oxygen availability, water quality or light availability. Furthermore, climate parameters may influence the biota to a different degree during different life stages or seasons, leading to variable climate sensitivity. The third array of uncertainties is related to the environmental data used for calibration purposes. Climate stations are rarely located near lake sites of interest and major climatic parameters have to be estimated based on spatial and temporal interpolation. Last but not least, an array of uncertainties is also associated with numerical techniques, such as multiple regression and calibration. My contribution will illustrate and quantify uncertainties using biological proxy-data from lake sediments in subarctic and alpine areas.