1 Introduction

Studies on lakes have become an important concern for many scientists since it is well known that lakes can monitor detailed information about ecological, hydrological and sedimentary cycles which can be attributed to climate change and non-climatic processes (Coleman et al., 2007; Wünnemann et al., 2010; Dietze et al., 2012, 2013; Zhang et al., 2013). Lakes in general cannot be considered as isolated systems for reconstructing their histories through time. Instead, interactions with their catchments are required to decipher complex patterns of process-response behavior in a certain system. They strongly depend on the local geological setting, lake shape, basin morphology, elevation and exposition to climatic parameters, such as wind trajectories and strength, rainfall and seasonal temperature variations. Reconstructing their evolution through time by using multi proxy records still suffer from reliable chronologies for each individual system which is, however, the backbone for enabling regional scale or even global tele-connections in terms of climate influence. This is one of the major challenges, still...
facing the scientific community conducting lake research. Furthermore, reconstructing past hydrological budgets, on- and offshore sedimentary processes and ecological stages depend on the location of sites which are selected for the identification of climate-driven variations (Wünnemann et al., 2012, Yan and Wünnemann, 2014), a further challenge for researchers with respect to validation of obtained data. I will demonstrate on the base of selected lake systems from the Tibetan Plateau, how differently lakes monitored catchment-lake interactions throughout the Late Quaternary and which factors controlled the hydrological and ecological cycles.

Five aspects influencing lake-catchment records through time are highlighted:

1. Tectonic impact
2. Lake-internal sediment allocation
3. Periglacial processes
4. Spatio-temporal geochemical variability in lake sediments
5. Biological diversity with respect to algae formation and ostracod assemblages

**Key words:** Lake basin, Lake catchment, sediment variability, tectonics, climate change, Tibetan Plateau, China.

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**References**


