



Resilience of a Subarctic catchment to climate change

Sarah Mosser (1), Kai Hartmann (2), and Bernhard Diekmann (3)

(1) Freie Universität Berlin, Institute of Geological Sciences, Tectonics and Sedimentary Systems, Germany (sarah.mosser@fu-berlin.de), (2) Freie Universität Berlin, Institute of Geographical Sciences, Applied Physical Geography, Germany, (3) Alfred-Wegener-Institute, Helmholtz-Centre for Polar and Marine Sciences, Potsdam, Germany

Lake sediments are frequently used to reconstruct Holocene climates on catchment scale. However, recent research highlights the complex interplay between external forcing and internal dynamics within drainage basins. This study presents a 5000-years long sedimentary record from a crater-shaped lake in Central Yakutia (Siberia), a region well known for strong Holocene climate variability. To distinguish between external forcing and internal dynamics of the lake system, we performed geochemical, mineralogical and sedimentological analyses on the sedimentary record in high temporal resolution. Multivariate statistical analyses suggest: a) variations of the derived system variables appear not significantly different from Gaussian white noise, b) the sediment routing-system remains in a steady-state despite known variation in external (climate) forcing, c) the record appears suitable as a model for randomness (Null-hypotheses) versus climate forcing in physiochemical lacustrine proxy-records and d) self-organization arising from complex interactions in the drainage system damp the propagation of climatic signals to the sediment record. Our findings highlight the importance of internal dynamics in the sediment-routing system for reading past climates from sediment records.