



Seasonal climate variability in historical and prehistorical times deduced from varved lake sediments: Calibration of records from Lakes Woseriner See and Tiefer See

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Societies are susceptible to the effects of even short-term climate variations on water supply, health, and agricultural productivity. However, understanding of human-climate interactions is limited due to the lack of high-resolution climate records in space and time. Varved lake sediments provide long time-series of seasonal climate variability directly from populated areas that can be compared to historical and archeological records. Calibration against meteorological data enables process-based insights into sediment deposition within the lake that can be extrapolated into the past using transfer functions.

Lakes Woseriner See (53°40'N/12°2'E; 37 m asl.) and Tiefer See (53°23'N/13°97'E, 65 m asl.) in northeastern Germany are located only 35 km apart. Situated within the former settlement areas, the lakes are well suited for studying climate influences on society related to the Neolithic Funnelbeaker culture or the Slavic colonization. Sub-recent annual laminations allow to establish climate proxy data-series at seasonal resolution that can be calibrated against the long meteorological record from the nearby City of Schwerin.

Seasonal climate proxy data-series covering the last 90 years have been obtained from short sediment cores applying a combination of microfacies analyses, X-ray fluorescence scanning (μ -XRF), and varve counting. Main sediment microfacies in both lakes are endogenic calcite varves comprising calcite and organic layer couplets of varying thickness, diatom layers, and dispersed detrital grains. Calibration against meteorological data indicates that variations in sediment layer thickness and composition are not stationary through time but influenced by inter-annual variations in meteorological conditions.