



Small Lake - Large Impact? Sedimentary records from Northern Alaska reveal lake expansion history and carbon dynamics

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Thermokarst lakes are characteristic and dynamic landscape features of ice-rich permafrost environments. Our study of sedimentary records and shoreline expansion of Peatball Lake on the Alaska Arctic Coastal Plain reveals 1,400 years of thermokarst activity. While Peatball Lake likely initiated from a remnant pond of a drained lake basin, the catchment is likewise characterized by mid to late Holocene aged drained basins and remnants of Pleistocene and early Holocene aged uplands. As the lake expanded through lateral permafrost degradation, the sediment source has changed as indicated by internal-lake variability in sediment deposition. Reversed radiocarbon ages show recycling of “old” carbon and degraded organic matter became redeposited in the lake basin resulting in nutrient-poor sublittoral deposits. Our sedimentary records reflect the complexity of depositional environments in thermokarst lakes due to spatio-temporal changes in lake and catchment morphology as well as the impact of thermokarst lake activity on carbon storage of periglacial landscapes.