



Frozen ground history at El'gygytgyn Meteorite Crater in the Russian Arctic

G.J. Schwamborn (1), G.B. Fedorov (2), L. Schirrmeyer (1), B. Diekmann (1), B.R. Chaplgin (1), and H.-W. Hubberten (1)

(1) Alfred Wegener Institute for Polar and Marine Research, 14473 Potsdam, (2) Arctic and Antarctic Research Institute, Bering Street, 199397 St. Petersburg

El'gygytgyn Meteorite Crater in Central Chukotka holds the unique chance to trace back frozen ground conditions to the Pliocene/Pleistocene boundary. The production of silt size debris, a peculiar single grain morphometry, and the enrichment of quartz grains in the silt fraction with respect to feldspar occurrence serve as indicators of frozen ground conditions in near surface deposits. The proxy data reflect thaw and freeze dynamics in the active layer resulting in a selective grain break-up. In El'gygytgyn Crater deposits accumulate at piedmont settings and in a lake basin that partially fills the crater. A set of surface samples and two five-meter-sections extracted from slope deposits serve as reference for the modern and the Holocene situation. Sediments cored in the neighbouring Crater Lake allow extending the geologic time.

Recent deep drilling into the permafrost margin of El'gygytgyn recovered a core 140 m in length and recent drilling into the lake basin provides a core that stretches back to 3.6 Myr BP, the time of the meteor impact.

The presentation sums up current results of both permafrost and lake sediment records when displaying the sediment-mineralogical properties. They illustrate the persistence of cryogenic weathering at least back to about 220,000 yrs BP, the time our study covers up to now.