



A continuous 250 ky long terrestrial paleoclimatic record from Lake El'gygytyn, Chukotka Peninsula, NE Asia

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A combined analysis of high-resolution magnetic susceptibility logs, total organic carbon (TOC), biogenic silica (opal), and inorganic geochemistry (main elements) data of a 12.6m long composite core PG1351 recovered from Lake El'gygytyn, Chukotka Peninsula, give indications for a clear response of the lacustrine sediments to global climate variations. The impact is not direct, but through variations in oxygenation of the bottom waters. Mixing of the water body is typical for warmer climates, whereas the development of a stratified water body with anoxic conditions at the lake floor appears preferably during cold climates. Oxidic conditions lead to good magnetite preservation and thus to high magnetic susceptibility values but to a large-scale degradation of organic matter, as reflected by low TOC (total organic carbon) values. During anoxic conditions, magnetite is severely dissolved yielding very low susceptibility values, whereas organic matter is best preserved, reflected by high TOC values. Hence, in general, neither susceptibility reflects the lithogenic fraction, nor does TOC reflect bioproductivity. Based on available infrared stimulated luminescence (IRSL) dating, the obtained high-resolution susceptibility pattern of core PG1351 was tuned to the northern hemisphere insolation. Thus it turned out that the change between oxidic and anoxic conditions is obviously a function of insolation variation, since magnetic susceptibility resembles nearly perfectly the pattern of 70°N insolation, with a dominating contribution of the Earth's 18ka and 23ka precessional cycles. Besides this long-term correlation to insolation variations also short-term events on a millennial scale, such as the Younger Dryas, are recorded in the sediment's magnetic properties. Lake El'gygytyn is sited within an impact crater formed 3.6 Mio. years ago. Assuming a continuous sedimentation this lake represents an ideal target for a terrestrial

paleoclimate study crossing the time of the onset of northern hemisphere glaciation.