

Terrestrial Arctic Climate from Lake El'gygytgyn: Normal vs. Super Interglacial Teleconnections

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Lake El'gygytgyn is a meteorite crater lake formed 3.58 Ma on the continental divide in Chukotka, NE Russia. Over the past decade we have documented numerous proxy records from this large unglaciated basin that record the timing and frequency of glacial/interglacial change, the evolution of Arctic climate since the warm Pliocene, and the occurrence of numerous super interglacials (n>17) that have physical characteristics suggesting much warmer conditions. This begs the question as to what drives the difference between normal interglacials vs superinterglacials at Lake "E" and how do these different interglacial intensities compare with the magnitude of interglacial variability at lower latitude terrestrial and marine sites? Many of these super interglacials correspond with times in the Plio-Pleistocene when the West Antarctic Ice Sheet was either diminished or possibly gone based on ANDRILL records. Normal interglacials follow global patterns with some exceptions. But the forcing of super interglacials was not necessarily the result of high atmospheric CO₂ but likely the result of preconditioning during periods of extremely low eccentricity and high obliquity. The challenge is to incorporate oceanographic models (as suggested in Melles et al. 2012) to gauge ice sheet and ocean circulation sensitivity and timescales to preconditioning. This direction of investigation and modeling is important to better inform us of bipolar sensitivities to forcings that mimic the global response to increasing greenhouse gases today.