

Interactive comment on “Chronology of Lake El’gygytgyn sediments” by N. R. Nowaczyk et al.

N. R. Nowaczyk et al.

nowa@gfz-potsdam.de

Received and published: 26 August 2013

The main purpose of this paper was to develop a precise and reliable high-resolution age model. To achieve this goal, we agreed upon that for the tuning process data from as many different disciplines as possible, providing information on paleoclimatic variations, should be consulted (XRF-data, biogenic silica, sedimentological parameters, physical properties, pollen). Thus, it was possible to obtain an age model with minimum discrepancies, using this multi-proxy-parameter approach. However, it was also decided that all the contributors shall have their own papers discussing their special paleoclimatic proxies in the very detail and what are the implications for the paleoclimate history of the study area. Therefore, our paper focusses mainly on the physical properties, that is, magnetic susceptibility, color photospectrometry and the tuning procedure. All other methods are only shortly introduced with references to the associated papers which should be available to the public soon (after the end of the deadline). We

C1842

agree, that many papers deal with color data, but often only the three basic colors (red, green, blue) or the lightness L^* is used. This turned out to be not useful for El’gygytgyn sediments. Instead the hue yielded much more useful variations. Therefore, we think the presentation of the methods related to the proxies should not be changed. Detailed information on paleomagnetic methods and obtained results are presented by Haltia & Nowaczyk in the same issue of Climate of the Past, now being processed for publication as a discussion paper. Publication of all other tuning parameters involved lie in the responsibility of the respective author(s). Because of various interdependencies, technical issues, and so forth, it was not possible that all papers were submitted at the same time.

The record of total organic carbon does not reflect primary bioproductivity in the case of El’gygytgyn. Taking TOC, XRF, biogenic silica and magnetic susceptibility data together, also consulting core descriptions providing information on where the cores are laminated or not, the only interpretation possible is, that TOC and magnetic susceptibility mostly reflect the redox-conditions at the lake floor. During anoxic conditions organic carbon is best preserved whereas magnetic minerals are being dissolved. During oxic conditions organic carbon is degraded but magnetic minerals are best preserved. Thus it comes that magnetic susceptibility is largely anti-correlated to lithogenic input (monitored e.g. by Ti-counts) and TOC is highest during glacials when bioproductivity was lower. The reaction of redox conditions to climatic forcing is non-linear, that is, changes between the two major conditions (oxic vs. anoxic) are depending on threshold levels. This has been discussed in detail already in Nowaczyk et al. (2007). But, we will check the text of the new paper in order to make this point clear again, largely independent of what has been previously published. This will be further supported by an additional schematic Figure.

Both reviewers suggest time series analysis in order to strengthen the outcome of the tuning process. Therefore, we will perform wavelet analysis of obtained data sets using both the pure paleomagnetic age model and the final age model based on multi-

C1843

parameter tuning. This will be then presented in a new Figure.

Data will be made available through PANGAEA data base, once the manuscript is accepted for final publication.

We will extend the title of the paper to: "Chronology of Lake El'gygytgyn sediments – achievements from magneto- and cyclostratigraphy"

Interactive comment on Clim. Past Discuss., 9, 3061, 2013.

C1844