Geophysical Research Abstracts
Vol. 19, EGU2017-8684, 2017
EGU General Assembly 2017

Ecosystem resilience to abrupt late Quaternary change in continental southern Siberia

Poppy Harding (1), Anson Mackay (1), Elena Bezrukova (2), and Alexander Shchetnikov (3)

(1) University College London, Department of Geography, London, United Kingdom (poppy.harding.14@ucl.ac.uk), (2) Institute of Geochemistry and Institute of Archaeology & Ethnography, SB RAS, Irkutsk Russia, (3) Institute of the Earth's Crust, SB RAS, Irkutsk, Russia

Quaternary climate variability is dominated by long term orbital forcing along with abrupt sub-Milankovitch events on the scales of millennia to centuries, driven by internal feedback mechanisms, volcanic forcing and fluctuating solar activity. Although these are well documented in the North Atlantic region, their expression is poorly understood in Siberia, particularly in relation to abrupt climatic events. Siberia has the world's highest level of continentality offering an opportunity to study changes remote from oceanic influences and improving understanding of interactions between the Siberian High and other atmospheric systems including the Aleutian Low, Arctic oscillation and Icelandic Low[1] and ENSO[2].

Understanding of palaeoenvironmental change in Siberia is essential due to the region's high sensitivity to climatic change, with warming rates considerably higher than the global average over the past 50 years[3], triggering significant environmental changes, including permafrost degradation, shifts in the forest–steppe biome, increases in forest fires and warming of seasonally ice-covered lakes. Additionally, the region provides essential palaeoenvironmental context for early hominins, for example at globally important sites such as Denisova cave[4], and megafauna extinctions[5].

This presentation outlines ongoing work at Lake Baunt, SE Siberia including: key quaternary climate forcings, the site and its regional context, the key methods and preliminary results. These include a dated record back to ~30ka BP (based on multiple ^{14}C dates and Bayesian age modelling), multiproxy indicators of palaeoproductivity (e.g. biogenic silica and diatom analyses) and lake mixing regimes (inferred from diatom analyses). Together these highlight several key Quaternary fluctuations potentially correlated to events recorded in Greenland Ice Cores (GS2, GS2.1, GI1, GS1), and these are considered against key Quaternary records including those from nearby Lake Baikal and Hulu Cave in east China. Our analyses suggest that teleconnections between the Siberian High and the East Asian monsoon are also significant for this study, with Lake Baunt showing a relationship between productivity and variability in strength of the Siberian High.

References:

1. Tubi, A. & Dayan, U. (2013). Int. J. Climatol. 33, 1357–1366.

2. Park, T.-W. et al. (2014). Clim. Dyn. 45, 1207–1217.

3. Tingley, M. P. & Huybers, P. (2013). Nature 496, 201–5.

4. Krause, J. et al.. (2010). Nature 464, 894–7.

5. Stuart, A. J. et al. (2004). Nature 431, 684–9.