Melts in mantle columns beneath Siberian kimberlites

I.V. ASHCHEPKOV[1], N.P.POKHILENKO[1], N.P. VLADYKIN[2], A.M. LOGVINOVA[1], I. NIKOLAEVA[1], S.V. PALESSKY, L.N. POKHILENKO[1] AND A.YA ROTMAN[3]

[1]IGM SD RAS, Novosibirsk, Russia (garnet@uiggm.nsc.ru)
[2]IGC SD RASc, Irkutsk, Russia (vlad@igc.irk.ru)
[3]CSRGPI, ALROSA, Mirny (rotman@cnigri.alrosa-mir.ru)

Calculated parental melts (PM) for xenocrysts and xenoliths using KD ([2] and calculated Wood, Blundy, 2003 [1]) for garnets and clinopyroxenes reveal partial disequilibrium in TRE a resulting from polystage melt percolation. Garnets formed in HT and Gar/Cpx ratios reveal depression in HRRE due to chromatographic effects. Correlating of La/Yb_n and Sm/Ern with calculated pressures means pervasive melt migration. Peaks for Pb and lower for Sr, U probably reflect subduction stages. Cpx formed in lower melting degree and fertilization due to infiltrations of protokimberlitic melts at last stages reveal patterns close to kimberlites or more enriched in incompatible elements. LILE enrichment and Nd-Ta separation are due to fluid effect. Among PM for Cr-spinels most enriched compositions were formed in Gar- free assemblages. Those refractory reveal La/Yb_n close to PM for Gar- peridotites and Y minima. For ilmenite three groups are found: 1-flat and depleted in REE from the lithosphere base – originated in melt channels; 2- close to protokimberlites, but differentiated resulting from creation of feeding channels; 3- most enriched melts with perovskite admixture due to melting at the top of protokimelite magma system.

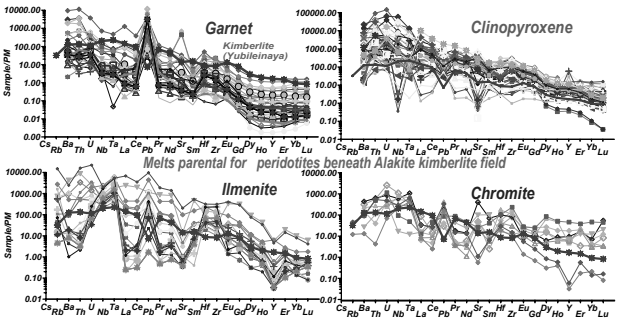

Figure 1: TRE spider diagram for parental melts for deep seated minerals from Alkite kimberlite pipes.

[1] Blundy J. & Wood B. (1994) *Nature* **372,** 452–454.
[2] Bedard J. H. (2006) *Geoch. Cosm. Acta* **70**, 1188 –1214

Possible extended hyper aridity during the late Pleistocene in the SW USA from speleothem data

Y. ASMEROM[1], V.J. POLYAK[1] AND S.J. BURNS[2]

[1]Dept. of Earth and Planetary Sciences, University of New Mexico, Albuquerque, NM 87110, USA (*correspondence: asmerom@unm.edu)
[2]Dept. of Geosciences, University of Massachusetts, Amherst, MA 01003, USA

The late Pleistocene was an important cultural and faunal transition in North American prehistory. The causes of the dramatic changes, such as the extinction of megafauna, are not clear to date. Climate change has been suggested as one of the causes, although there is no clear picture of climate variability during this period. Here, we report carbon and oxygen stable isotope data for a well-dated speleothem from SE New Mexico.

Between ca. 12,000 ybp and 15,000 the $\delta^{18}O$ values vary from -9.5 to -6, while the $\delta^{13}C$ vary from -7.6 to -1.4. The $\delta^{18}O$ data track changes exhibited by GISP-II $\delta^{18}O$ data. The $\delta^{13}C$ are decoupled from the $\delta^{18}O$ data. The $\delta^{13}C$ data increase monotonically for most of this period and is opposite in sign to the $\delta^{18}O$ data, ruling out kinetic fractionation as a cause for the variability, although we can't rule out prior calcite crystallization as a cause.

We interpret the variability in the $\delta^{18}O$ data to be the result of changes in the amount of winter precipitation due to Northern Hemisphere modulation of the Polar Jet Stream. Presently winter precipitation is as much as 10 units lighter than summer monsoon precipitation. Assuming $\delta^{13}C$ variability reflects changes in the amount of soil organic carbon, our data seem to suggest pronounced long-lived drought during the late Pleistocene and may have contributed to dramatic faunal and cultural changes in this part of North America.