Clim. Past Discuss., 8, C2214–C2216, 2012
www.clim-past-discuss.net/8/C2214/2012/

Climate of the Past Discussions

Interactive comment on "Testing the potential of OSL, TT-OSL, IRSL and post-IR IRSL luminescence dating on a Middle Pleistocene sediment record of Lake El'gygytgyn, Russia" *by* A. Zander and A. Hilgers

S. Lowick (Referee)

lowick@geo.unibe.ch

Received and published: 6 November 2012

I agree with the comments already posted by FP that this is an important paper and holds a lot of information for each of the luminescence methods applied. It will make it easier for the reader to take out the information they need if each of the methods is presented in the same way, and so I would endorse those comments, in light of this important work.

I understand that material is very precious from records such as this, but it is a pity

that a couple of younger samples could not have been added to this to be able to map the effective running out of the reliability of the quartz OSL, rather than only being able to show that it is not working at De values of $\sim$ 400 Gy. Perhaps as the IRSL seems problematic anyway, it may not have helped with this either. It is a little worrying that the IRSL50 was so problematic and yet the pIRIR protocol seems to be successful. As you have a figure with the dose recovery results of the IRSL, I would recommend that you also show the same for the pIRIR.

4786, 8: as FP requested you should be more specific regarding the statement. The fact that an EBG subtraction does not change the values calculated using a LBG, suggests that you have successfully isolated the fast component. Then using a LBG will give you a bigger signal, and reduce uncertainties.

4787, 19. Would deconvolution of the Lx/Tx signal be a better way to describe it? This is an excellent way to investigate the high dose region of the quartz OSL dose response curve and seems to beautifully identify a problem. I am already applying it to older samples and intend to recommend it as an additional performance criterion for samples in this problematic region.

Chapot et al., (A comparison of natural- and laboratory-generated dose response curves for quartz optically stimulated luminescence signals from Chinese Loess Original Research Article. Radiation Measurements, In Press, Corrected Proof, Available online 7 September 2012. M.S. Chapot, H.M. Roberts, G.A.T. Duller, Z.P. Lai) also show a very nice plot to help us identify problems with older samples. As they have an accepted chronology for the profile from which they have taken their samples, they were able to plot Ln/Tn against expected De value in their Figure 2. It would be very useful if you were to plot the same for your data for each of the protocols you apply, as you have an expected age. I suspect that even Ln/Tn against depth would be enough to highlight limits on each of the signals, but you have the benefit of a chronology already.

I would recommend you try plotting the deconvolution of Lx/Tx for each of the methods

CPD

8, C2214–C2216, 2012

as hopefully it will illustrate its usefulness. And also try plotting Ln/Tn against depth of expected De for each of the methods aswell. I'm not sure if this will be useful for all of them (eg the quartz OSL is already in saturation so it may not show so much), but it would be good to see if it gives you more information.

4788, 26. Modern test quartz, can you explain exactly what this is.

4790, 20. More detail on fading tests.

4791, 25. References for bleaching characteristics of feldspars. 4792, 22. Should you include some discussion of the fact that 6 months storage resulted in a successful dose recovery test. Doesn't this suggest that if De values are measured immediately they may overestimate to the same extent, and that a more realistic De value may be measured after 6 months storage. This seems quite important when we know it is difficult to separate out what exactly is contributing to a pIRIR signal.

4794, 10. It's a shame that you didn't add some more regenerative doses to these measurement in order to bracket the De measured, so I understand why you can only interpret these as minimum ages. If it was possible it would be best to measure some De values that have been bracketed. If not, it would be still be useful to properly characterise a pIRIR dose response at least up to doses beyond those De values measured; you could then hopefully show that the De values would not change so much.

Chapot, M. S., H. M. Roberts, G. A. T. Duller, and Z. P. Lai. "A Comparison of Natural- and Laboratory-Generated Dose Response Curves for Quartz Optically Stimulated Luminescence Signals from Chinese Loess." Radiation Measurements, In press, corrected proof.

Interactive comment on Clim. Past Discuss., 8, 4779, 2012.