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Interactive comment on “Onset of intense permafrost conditions in Northern Eurasia at ~ 2.55 Ma seen in a cryogenic weathering record from Lake El’gygytgyn” by G. Schwamborn et al.

Anonymous Referee #2

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The Article by Schwamborn et al: “Onset of intense permafrost conditions in Northern Eurasia at 2.55 Ma seen in a cryogenic weathering record from Lake El’gygytgyn” describes the application of quartz morphology and cryogenic weathering index (e.g. CWI) to lake sediment to determine environmental conditions based on experiments performed by Schwamborn et al. (2012) which showed that both criteria can determine the existence of frequent freeze/thaw cycles. The authors use two well-studied cores from the crater lake El’gygytgyn. One major concern is that the authors use occurrence of freeze/thaw cycles synonymous with the occurrence of permafrost but fail to describe why permafrost is a necessary condition when freeze/thaw cycles occur. Without establishing why the CWI and surface morphology of quartz reflect the

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existence of permafrost, the application of this method to determine the onset of permafrost has no significance. The method would need to be discussed in more details for example, how many freeze/thaw cycles are needed to establish change in grain size and quartz morphology, what are the necessary temperatures and what temperature gradient is needed? Will these conditions be sufficient to establish permafrost conditions? Another concern is the source of quartz grains. Since most of the quartz is in the silt fraction it should also be discussed which criteria are used to determine the source of the quartz since long-range atmospheric transport could contribute a significant amount of quartz. The correlation of CWI seem very weak and it seems that to establish when the CWI is >1 should be established from core 5011-1. Based on these shortcomings of the paper I recommend major revisions before being published in Climate of the Past.

Interactive comment on Clim. Past Discuss., 9, 6255, 2013.

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