

Testing the TT-OSL Single-Aliquot Protocol for Quartz Sediment Dating

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ABSTRACT

Thermally-transferred optically stimulated luminescence (TT-OSL) is a form of optically stimulated luminescence that saturates at much higher doses than conventional OSL (Wang et al, 2006b). Luminescence sediment dating is a technique whereby the natural radiation dose given to a sample is measured. This is divided by the environmental radiation rate of the sample site to give the sample's age. As TT-OSL is able to measure higher doses than conventional OSL, it has been considered a candidate for long range luminescence sediment dating, beyond one million years. In this thesis, TT-OSL single-aliquot sediment dating protocols were tested on selected samples from the south-east of South Australia (SESA) stranded dune sequence, a sequence of ancient dunes ranging from 0 to 900 thousand years of age that have previously been independently dated using luminescence and non-luminescence dating methods. A young sample with a high natural dose from Baldina Creek, Burra, South Australia was also dated. Measurements of the thermal depletion of the TT-OSL signal were also made.

It was found that, for the SESA samples, TT-OSL dating results do not agree with previous independent measurements above 200 ka. The results for the young Baldina Creek sample were within the expected range.

DECLARATION

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide.

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Signed

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