

## Aberystwyth University

### *A comparison of multiple luminescence chronometers at Voordrag, South Africa*

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### **Supplementary information**

Thomsen et al. (2016) suggested an alternative acceptance criterion, which excludes grains with low  $D_0$  values (i.e. where  $D_0$  is less than a sample average  $D_e$ ). When applied to the Voordrag dataset it resulted in: (i) a significant decrease in  $n$ ; (ii) the almost complete elimination of  $n_{\text{sat}}$ ; (iii) an increase in OD; and (iv) no change in stratigraphic consistency for the resulting ages down section (Table S1).

Minimal change can be observed in the CAM ages for seven samples (Aber215/VRD08-VRD02) when applying the  $D_0$  criterion; the ratio of ages calculated using the standard criteria to ages calculated using the standard and  $D_0$  criteria lie between 0.91 and 1.03 (Table S1). Furthermore, the dose distribution for sample Aber215/VRD09 remains unchanged after applying the  $D_0$  criterion. An interesting outcome was the exclusion of every  $D_e$  value in the, admittedly limited, dose distributions for the two lowermost samples (Aber215/VRD01 and Aber215/VRD10). However, several reasons to disregard the ages obtained from these two samples are discussed in the main text (i.e. low  $n$ , high  $n_{\text{sat}}$ ,  $D_e > 2D_0$ ,  $D_e > 150$  Gy and  $I_n/I_0 > 100\%$ ) and the exclusion of these grains serves to reinforce the decision that these samples are beyond the range of quartz OSL.

Since neither the SG ages nor their stratigraphic consistency changed, the application of the  $D_0$  criterion was disregarded as an acceptance criterion for the Voordrag samples.

Table S1: Application of the  $D_0$  criterion of Thomsen et al. (2016) to the single grain quartz OSL dataset. Standard criteria are those outlined at the end of Section 3.3.1. Values shown include the number of saturated grains ( $n_{\text{sat}}$ ), the number of grains included in the dose distribution ( $n$ ), the overdispersion (OD) and age. For comparison purposes, the equivalent dose ( $D_e$ ) was calculated using the Central Age Model (CAM) for all samples.

Sample	Standard criteria					Standard + $D_0$ criteria					Ratio
	$n_{\text{sat}}$	$n$	OD (%)	$D_{e\text{-CAM}}$ (Gy)	Age (ka)	$n_{\text{sat}}$	$n$	OD (%)	$D_{e\text{-CAM}}$ (Gy)	Age (ka)	
VRD09	4	93	110	$3.26 \pm 0.39$	$1.14 \pm 0.14$	4	93	110	$3.26 \pm 0.39$	$1.14 \pm 0.14$	1.00
VRD08	20	82	31	$59.6 \pm 2.2$	$23.4 \pm 1.3$	0	29	34	$65.4 \pm 4.4$	$25.7 \pm 2.0$	0.91
VRD07	17	78	34	$65.7 \pm 2.8$	$23.2 \pm 1.4$	0	28	43	$64.7 \pm 5.5$	$22.8 \pm 2.1$	1.01
VRD06	35	115	23	$75.8 \pm 2.0$	$30.5 \pm 1.5$	0	33	24	$73.5 \pm 3.3$	$29.6 \pm 1.8$	1.03
VRD05	62	89	30	$87.8 \pm 3.3$	$31.1 \pm 1.7$	1	18	37	$89.4 \pm 8.2$	$31.7 \pm 3.2$	0.98
VRD04	69	90	24	$106 \pm 3$	$42.8 \pm 2.3$	0	16	34	$102 \pm 9$	$41.4 \pm 4.1$	1.03
VRD03	132	93	35	$89.4 \pm 3.8$	$35.6 \pm 2.1$	1	10	32	$90.4 \pm 9.7$	$35.9 \pm 4.1$	0.99
VRD02	47	31	36	$94.4 \pm 7.0$	$42.1 \pm 3.6$	0	8	50	$98.5 \pm 18.6$	$43.9 \pm 8.5$	0.96
VRD01	56	5	12	$137 \pm 20$	$55.3 \pm 8.4$	0	0	-	-	-	-
VRD10	28	5	34	$195 \pm 38$	$57.2 \pm 11.5$	0	0	-	-	-	-