





## Supplementary Materials

**Table 1.** Sedimentological properties of the luminescence dating sites. The sampling locations are marked with yellow stars.

Sample ID	Taken from Geomorphological Unit	Sedimentology	Photo
<b>Samples taken from Terraces in Lower Catchment</b>			
C-T1-L	Terrace C-T1	Gravelly, with sandy to loamy matrix	
C-T2-L	Terrace C-T2	Gravelly, with loamy to sandy matrix	
C-T3-L	Terrace C-T3	Gravelly, with loamy to sandy matrix	
<b>Samples taken from Terraces at Apex of Alluvial Fan</b>			
A-T1-L	Terrace A-T1	Very gravelly, with loamy to sandy matrix	

A-T2L-L

Terrace A-T2

Very gravelly,  
with sandy to  
loamy matrix



A-T2R-L

Terrace A-T2

Very gravelly,  
with sandy to  
loamy matrix



A-T3-L

Terrace A-T3

Gravelly, with  
loamy to sandy  
matrix



A-T4-L

Terrace A-T4

Gravelly, with  
sandy to loamy  
matrix



Samples taken from Alluvial Fan

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A1-L

Generation II

Gravelly, with  
sandy to slightly  
loamy matrix



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A2-L

Generation II

Very gravelly,  
with sandy to  
slightly loamy  
matrix

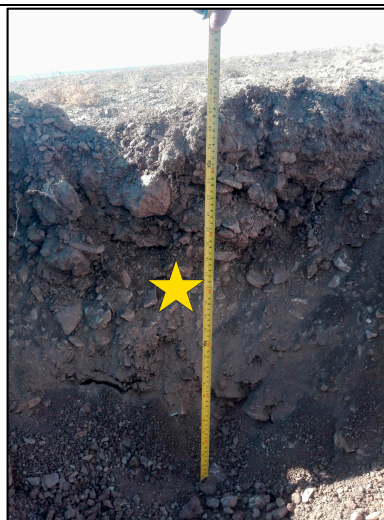


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A4-L

Generation I

Very gravelly,  
with sandy to  
slightly loamy  
matrix





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A5-L

Generation III

Gravelly, with  
sandy to slightly  
loamy matrix



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A7-L

Generation IV

Gravelly, with  
sandy to slightly  
loamy matrix



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A8-L

Generation IV

Gravels in sandy  
to slightly loamy  
matrix



**Table S2.** pIRIR protocol (Buylaert et al., 2012).

Step	Treatment	Observed
1	Give dose	-
2	Pre-heat (240-320 °C)	-
3	Stimulation at 50 °C	Lx
4	Stimulation at 290 °C	Lx
5	Give test dose	-
6	Pre-heat (240–320 °C)	-
7	Stimulation at 50 °C	Tx
8	Stimulation at 290 °C	Tx
9	IR Bleaching (at 320 °C)	-
10	Return to 1	-

**Table S3.** Generalized single-aliquot regenerated sequence.

Step	Treatment	Observed
1	Give dose	-
2	Pre-heat at 240–320 °C for 60 s	-
3	IRSL measurement at 50 °C	Lx
4	Give test dose	-
5	Cut-heat at 240–320 °C for 60 s	-
6	IRSL-measurement at 50 °C	Tx
7	IR bleaching at 320 °C	Tx
8	Return to 1	-

**Table S4.** Given doses and delay times of each cycle related to the fading of exemplary samples C-T2-L and A5-L.

Sample Name	Selected/Used		Fading Time				
	IRSL	TL	Given Dose	Delay 1	Delay 2	Delay 3	Delay 4
C-T2-L	50,290	320	800	5h	17h,54m,59s	2d,1h,49m,1s	11d,18d,41m,55s
A5-L	50,290	320	1000	17h,10m,36s	1d,7h,35m,43s	3d,5h,14m,53s	6m,11d,5h,12m,19s

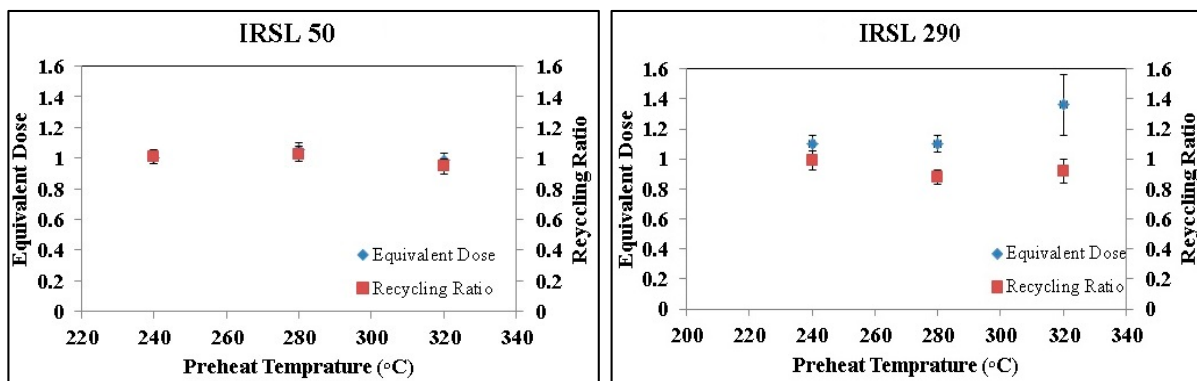


Figure S1. Dose recovery and recycling ratio of exemplary sample A1-L (pre-heat plateau test).

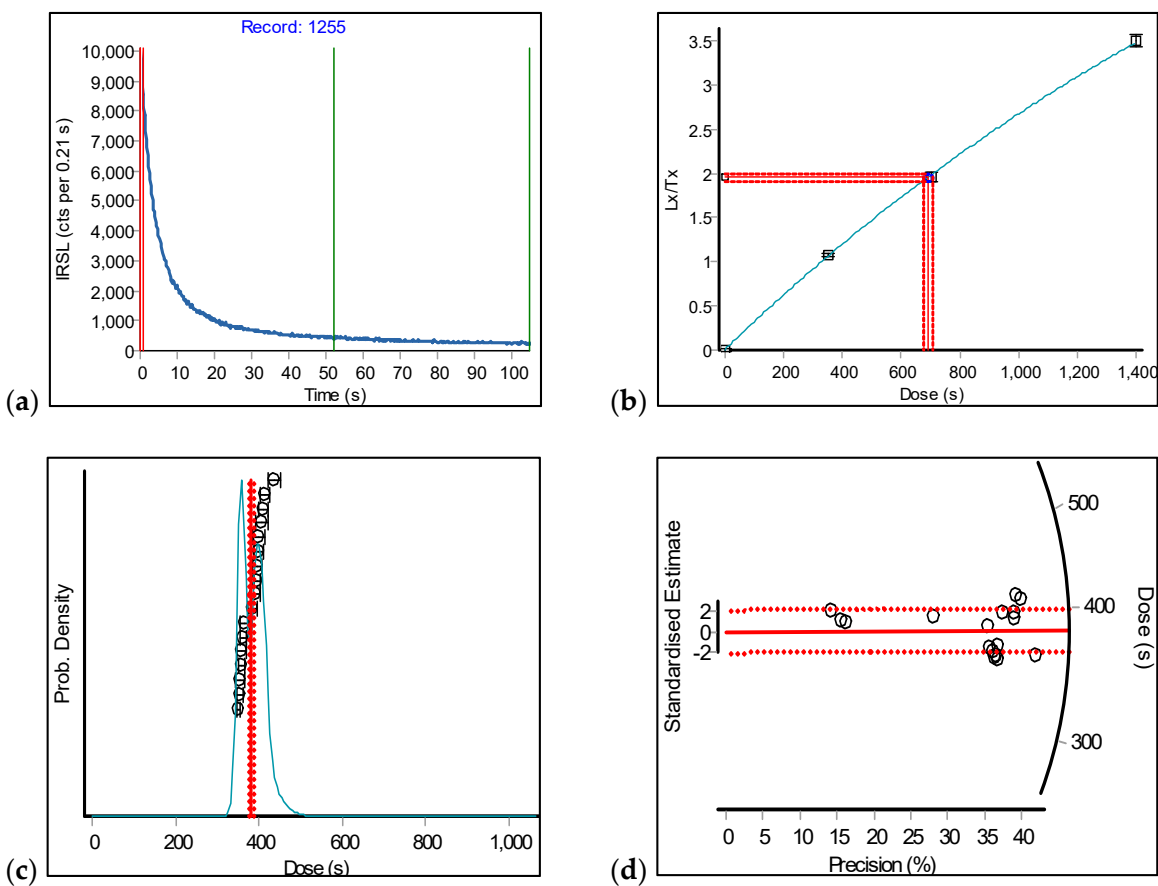
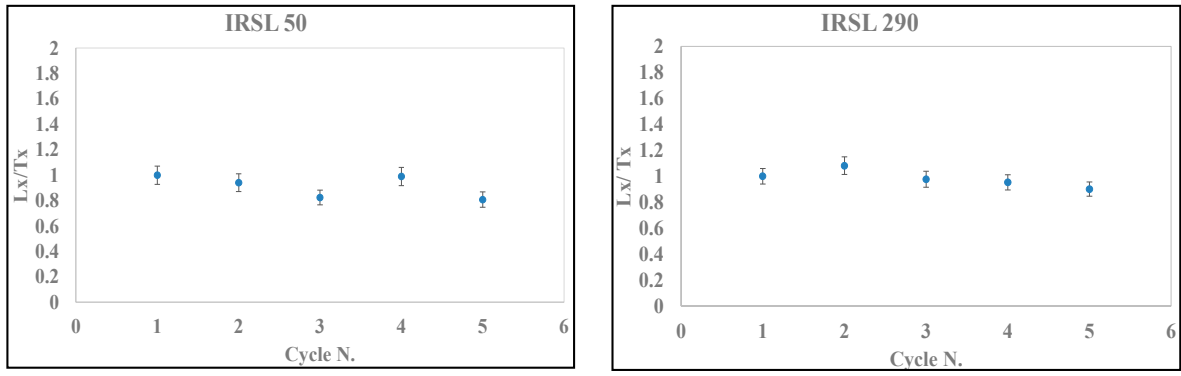
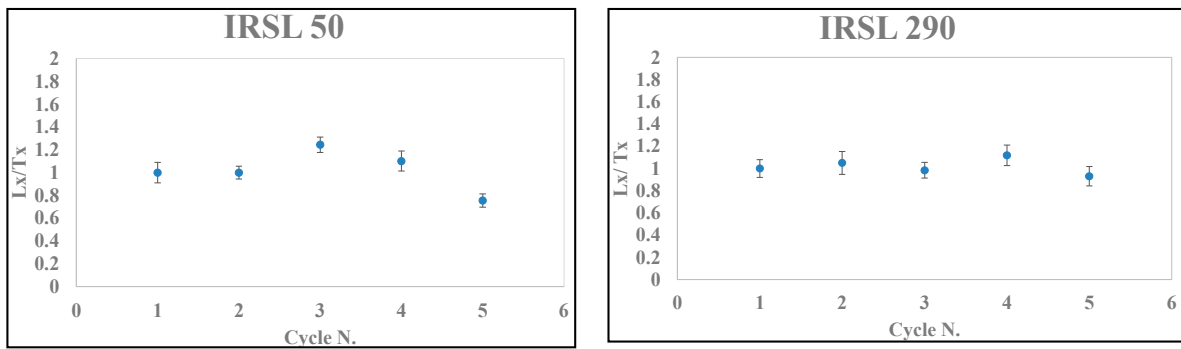


Figure S2. Measurements of exemplary sample A5-L (IRSL 50) (a) Decay curve, (b) Growth curve fitting, and De distribution of feldspar grains in (c) weighted mean, and (d) central age.

### Sample C-T2-L



### Sample A5-L



**Figure S3.** Fading tests of exemplary samples C-T2-L and A5-L. The sequence of Table S2 was applied, and pre-heat and cut-heat were fixed at 320°C. Cycle 1 is the prompt measurement, and cycles 2 to 5 represent the delays according to Table S4.