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Supplementary Information for

Single grain K-feldspar MET-IRSL sediment transport determination: bleaching patterns and rates

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Table S1. Details of multiple grain conventional single aliquot short shine (SS) bleaching protocol used to explore equilibrium bleaching of the IRSL signal at 50°C. The steps marked OSL may represent bleaching by blue or green diodes, and IR bleaching using IR diodes can also be used at these steps. The correction procedure for signal loss owing to the SS IRSL measurements is described in the main text, and uses the procedure shown to the right. Results from these procedures are displayed in main text Figure 3.

	Short Shine $IRSL_{50}$ protocol			Short Shine $IRSL_{50}$ correction	
1)	Natural or laboratory beta dose		1)	Natural or laboratory beta dose	
2)	Preheat 60s 170°C 5°Cs^{-1}		2)	Preheat 60s 170°C 5°Cs^{-1}	
3)	**MG IRSL**	**50°C 0.1s 90% power**	**3)**	**MG IRSL**	**50°C 0.1s 90% power**
4)	MG OSL	50°C 1.0s 90% power	4)		
5)	**MG IRSL**	**50°C 0.1s 90% power**	**5)**	**MG IRSL**	**50°C 0.1s 90% power**
6)	MG OSL	50°C 1.0s 90% power	6)		
7)	**MG IRSL**	**50°C 0.1s 90% power**	**7)**	**MG IRSL**	**50°C 0.1s 90% power**
8)	MG OSL	50°C 1.0s 90% power	8)		
9)	**MG IRSL**	**50°C 0.1s 90% power**	**9)**	**MG IRSL**	**50°C 0.1s 90% power**
10)	MG OSL	50°C 1.0s 90% power	10)		
11)	**MG IRSL**	**50°C 0.1s 90% power**	**11)**	**MG IRSL**	**50°C 0.1s 90% power**
12)	MG OSL	50°C 1.0s 90% power	12)		
13)	**MG IRSL**	**50°C 0.1s 90% power**	**13)**	**MG IRSL**	**50°C 0.1s 90% power**
14)	MG OSL	50°C 1.0s 90% power	14)		
15)	**MG IRSL**	**50°C 0.1s 90% power**	**15)**	**MG IRSL**	**50°C 0.1s 90% power**
16)	MG OSL	50°C 1.0s 90% power	16)		
17)	**MG IRSL**	**50°C 0.1s 90% power**	**17)**	**MG IRSL**	**50°C 0.1s 90% power**
18)	MG OSL	50°C 1.0s 90% power	18)		
19)	**MG IRSL**	**50°C 0.1s 90% power**	**19)**	**MG IRSL**	**50°C 0.1s 90% power**
20)	MG OSL	50°C 1.0s 90% power	20)		
21)	**MG IRSL**	**50°C 0.1s 90% power**	**21)**	**MG IRSL**	**50°C 0.1s 90% power**
22)	MG OSL	50°C 1.0s 90% power	22)		
23)	**MG IRSL**	**50°C 0.1s 90% power**	**23)**	**MG IRSL**	**50°C 0.1s 90% power**
24)	MG OSL	50°C 1.0s 90% power	24)		
25)	**MG IRSL**	**50°C 0.1s 90% power**	**25)**	**MG IRSL**	**50°C 0.1s 90% power**
26)	MG OSL	50°C 1.0s 90% power	26)		
27)	**MG IRSL**	**50°C 0.1s 90% power**	**27)**	**MG IRSL**	**50°C 0.1s 90% power**
	continuing as required			continuing as required	

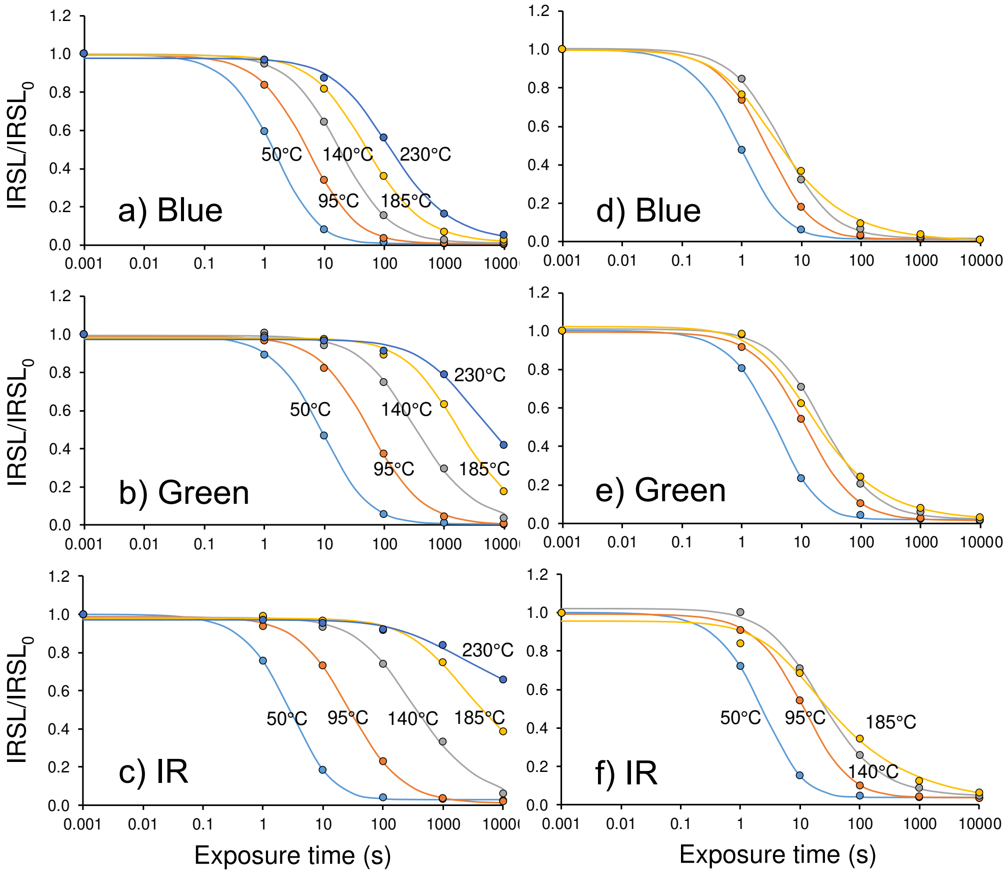

Figure S1. Bleaching of METx-IRSL signals by three different stimulation sources (blue, green, infra-red) using LEDs within a RisøTL-DA-20 DASH reader at 51°C. The left panels (plots a: blue, b: green, c: IR) represent bleaching of signals from an orthoclase K-feldspar sample (MJ39) using conventional multiple grain aliquots (the same as Figure 2); the right plots (d: blue, e: green, f: IR) used similar aliquots and identical measurement sequence for a bytownite plagioclase feldspar sample (MJ40). Note the plagioclase sample shown in the right hand plots displayed no significant signal for the 230°C measurement, and that the bleaching rates of the 95, 140 and 185°C signals vary much less than for the orthoclase K-feldspar sample shown on the left.

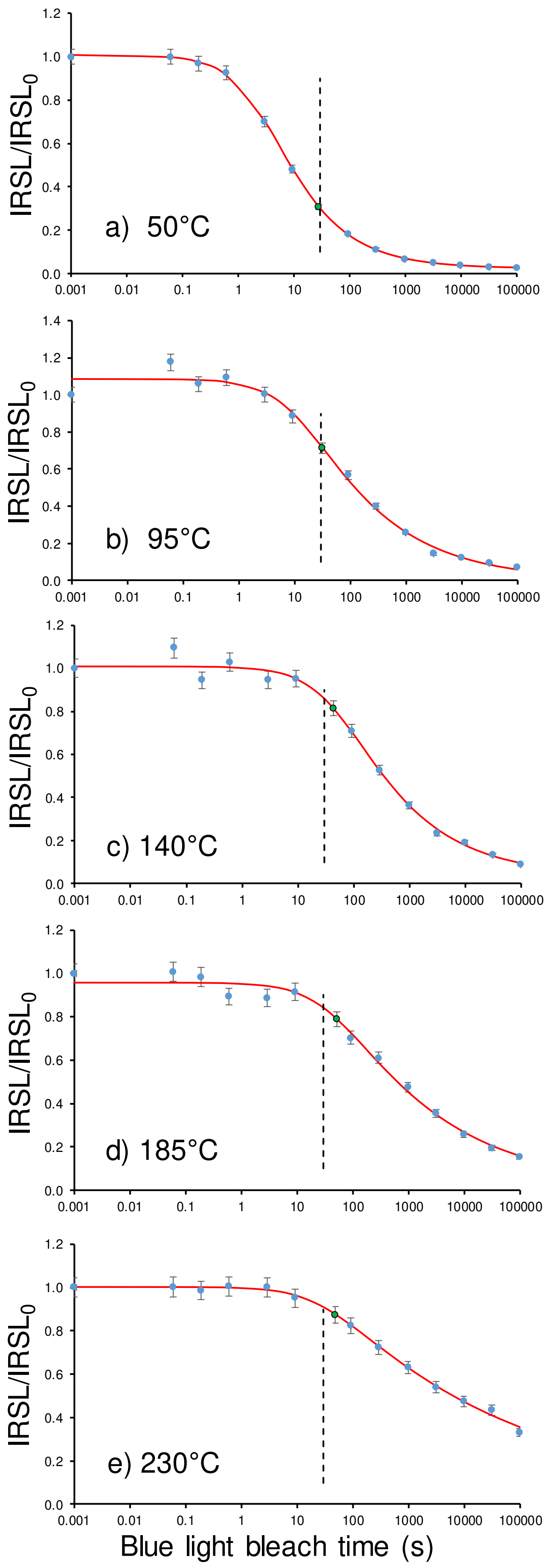

Figure S2. Blue light bleaching of different METx-IRSL signals of sample L0602s from the Solimões River, Brazil. Blue LEDs within a Risø DASH reader were used as the bleaching light source. Signals represent the light sums from 100 single grains ("sum all grains"). The red lines represent the best fit of the function given in Equation 1 for the data excluding the 32s exposure point. The measured intensity for the 32s data point was then convolved with the fitted curve as an estimate of the bleach time, to form a simple bleach recovery experiment. The resulting data point is shown in green on each plot, and the 32s position is shown by the vertical dashed line. Close estimates are achieved for the 50 and 95°C METx-IRSL signals, while at the higher temperatures, the exposure time is slightly over-estimated. These small over-estimates appear consistent with the measurement uncertainties indicated by vertical 1 sigma error bars.

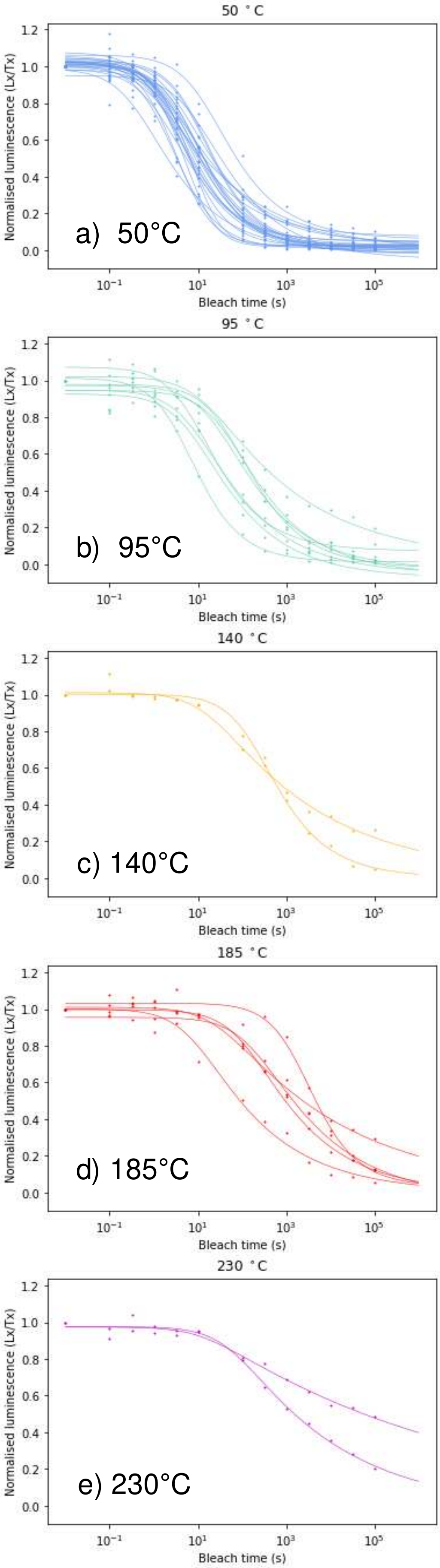

Figure S3. Blue light bleaching of different METx-IRSL signals of sample L0602s from the Solimões River, Brazil. Individual single grain data of the more sensitive grains from 200 grains measured, including those shown in Figure S2. Blue LEDs within a Risø DASH reader were used as the bleaching light source. The solid lines represent the best fit of the function given in Equation 1 for each grain excluding the 32s exposure point. Note the wide range in bleaching rate and form at each METx measurement temperature, and the low number of sensitive grains at 140 and 230°C.

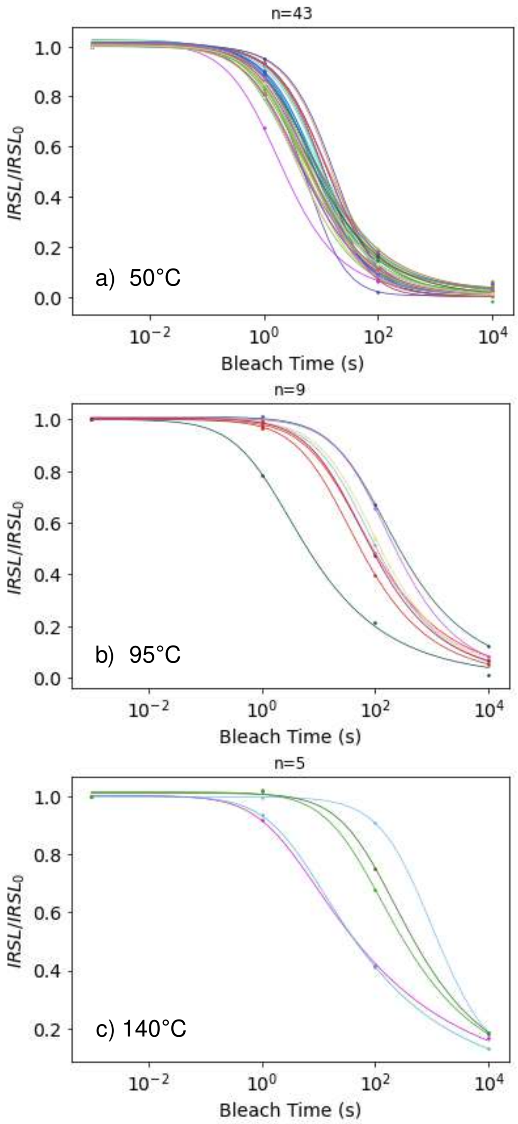

Figure S4. Blue light bleaching of different ILT3ET-IRSL signals of sample 22183 from the Allt Dubhaig, Scotland, UK. These data form the basis of a bleach recovery experiment described in the main text. Plots show individual single grain data for the more sensitive grains from 200 grains measured. Blue LEDs within a Risø DASH reader were used as the bleaching light source. The solid lines represent the best fit of the function given in Equation 1 for each grain. Note the wide range in bleaching rate and form at each IRSL measurement temperature, and the lower numbers of sensitive grains at 95 and 140°C.