

Table A2. OSL and TL dating of sediments at Batu Caves and Badak Cave C sites: dose rate data, equivalent doses, and ages.

Sample code ^a	Cave site	Radionuclide activities (Bq kg ⁻¹) ^b						Field gamma dose rate ^c (Gy ka ⁻¹)	Cosmic-ray dose rate ^d (Gy ka ⁻¹)	Water content ^e (%)	Total dose rate ^f (Gy ka ⁻¹)	Equivalent dose ^{g,h} (Gy)	Age ^{h,i} (ka)	
		²³⁸ U	²²⁶ Ra	²¹⁰ Pb	²²⁸ Ra	²²⁸ Th	⁴⁰ K							
M-CIS	BATU	26.2 ± 6.8	24.3 ± 1.2	11.0 ± 5.8	47.7 ± 2.4	51.1 ± 1.7	49.7 ± 8.3	0.509 ± 0.059	0.043	5.9 / 6 ± 2	1.35 ± 0.12	R B	90 ± 21 -	66 ± 16 -
M-SWA	BATU	32.0 ± 5.5	31.8 ± 1.1	39.7 ± 5.2	42.2 ± 2.2	47.3 ± 1.5	55.1 ± 7.8	-	0.080	0.4 / 2 ± 0.2	1.40 ± 0.12	R R _M B	85 ± 17 75 ± 6 67 ± 3	61 ± 13 54 ± 11 48 ± 5
M-VIL	BATU	71.8 ± 9.9	75.9 ± 1.8	82.2 ± 8.7	187.9 ± 4.6	191.0 ± 4.4	221 ± 14	0.843 ± 0.061	0.046	81 / 50 ± 10	2.26 ± 0.17	R R _M B	159 ± 44 114 ± 59 92 ± 5	57 ± 17 41 ± 18 33 ± 3
M-BAD4	BADAK	53.5 ± 6.5	48.5 ± 1.3	40.0 ± 5.3	64.6 ± 2.6	70.6 ± 1.9	132.6 ± 10.3	-	0.044	0.7 / 5 ± 2	1.93 ± 0.13	R B	402 ± 22 -	208 ± 18 -
M-BAD5	BADAK	13.6 ± 6.0	13.3 ± 1.1	13.8 ± 5.7	25.0 ± 2.3	27.6 ± 1.3	70.6 ± 8.8	-	0.044	1.4 / 5 ± 2	1.46 ± 0.11	R B	398 ± 43 -	274 ± 36 -

^a Samples processed using the 90-125 m size fraction

^b Concentrations determined from high-resolution gamma spectrometry measurements of dried and powdered sediment samples.

^c Determined from U, Th and K concentrations measured using a portable gamma-ray spectrometer at field water content.

^d Time-averaged cosmic-ray dose rates (for dry samples), each assigned an uncertainty of ± 10%.

^e Field / time-averaged water contents, expressed as (mass of water/mass of dry sample) x 100. The latter values were used to calculate the total dose rates and OSL/TL ages.

^f Mean ± total (1σ) uncertainty, calculated as the quadratic sum of the random and systematic uncertainties. An internal dose rate of 0.03 Gy ka⁻¹ is also included.

^g Palaeodoses include a ± 2% systematic uncertainty associated with laboratory beta-source calibrations.

^h R – easy-to-bleach red signal (i.e., light-sensitive signal last reset when the grains were exposed to sunlight), R_M derived from the minimum value of multiple estimates of red TL D_e. B – UV OSL signal measured using small (0.5 mm) single-aliqouts and analysed using a minimum age model (Roberts *et al.*, 1998). On average only 12 discs were run for each sample due to the small amounts of quartz available.

ⁱ Uncertainties at 68% confidence interval.

