

**Table S1.** Summary of OSL data. w.c the water content by weight, n the number of aliquots used to determine the equivalent dose ( $D_e$ ). Ages are relative to the year 2011 CE.

| Risø<br>lab. ID | Sample depth<br>(m below surface) | Sample level<br>(m DVR90) | w.c.<br>(%) | n  | $D_e$<br>(Gy) | Total dose rate<br>(mGy yr <sup>-1</sup> ) | OSL-age<br>(ka)        |
|-----------------|-----------------------------------|---------------------------|-------------|----|---------------|--------------------------------------------|------------------------|
| H05541          | 0.64                              | 6.3                       | 35          | 25 | 1.39±0.03     | 0.60±0.04                                  | 2.33±0.16              |
| H05542          | 1.77                              | 5.17                      | 29          | 24 | 1.83±0.06     | 0.68±0.04                                  | 2.68±0.19              |
| H05543          | 2.64                              | 4.3                       | 21          | 23 | 1.60±0.04     | 0.59±0.04                                  | 2.74±0.19              |
| H05544          | 3.34                              | 3.6                       | 19          | 24 | 1.69±0.04     | 0.63±0.04                                  | 2.68±0.19              |
| H05545          | 4.21                              | 2.73                      | 28          | 23 | 1.87±0.05     | 0.68±0.04                                  | 2.76±0.18              |
| H05546          | 4.34                              | 2.6                       | 25          | 24 | 1.85±0.06     | 0.64±0.04                                  | 2.90±0.22              |
| H05547          | 5.29                              | 1.65                      | 31          | 23 | 1.68±0.04     | 0.59±0.04                                  | 2.82±0.20              |
| H05548          | 5.68                              | 1.26                      | 28          | 23 | 2.37±0.07     | 0.75±0.04                                  | 3.17±0.20              |
| H05549          | 6.66                              | 0.28                      | 15          | 18 | 2.17±0.07     | 1.04±0.06                                  | 2.08±0.14 <sup>a</sup> |
| H05550          | 7.61                              | -0.67                     | 25          | 23 | 1.85±0.06     | 0.58±0.04                                  | 3.17±0.25              |
| H05551          | 8.84                              | -1.9                      | 30          | 24 | 2.60±0.10     | 0.81±0.05                                  | 3.20±0.24              |
| H05552          | 9.55                              | -2.61                     | 30          | 23 | 2.82±0.07     | 0.77±0.04                                  | 3.67±0.23              |
| H05553          | 10.59                             | -3.65                     | 16          | 23 | 3.03±0.09     | 0.89±0.06                                  | 3.41±0.26              |
| H05554          | 11.51                             | -4.57                     | 22          | 22 | 2.91±0.09     | 0.75±0.04                                  | 3.87±0.26              |
| H05555          | 12.36                             | -5.42                     | 16          | 23 | 3.99±0.17     | 1.03±0.06                                  | 3.88±0.29              |

<sup>a</sup> Age reversal possibly due to an overestimated total dose rate.