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Supplement of

Chronostratigraphic and geomorphologic challenges of last glacial loess in Poland in the light of new luminescence ages

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Supplements

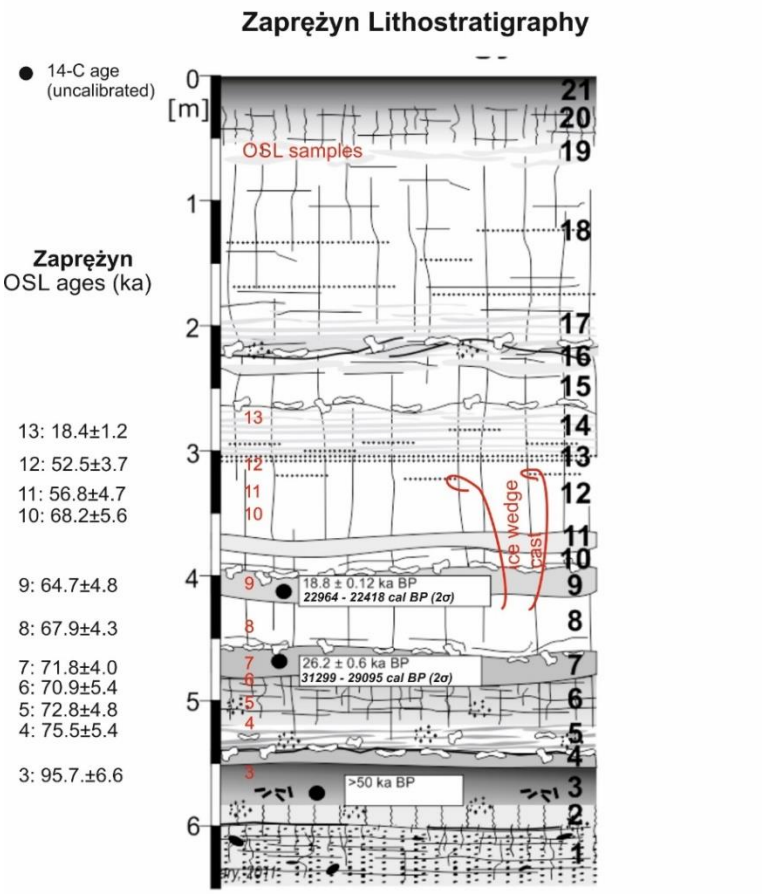


Fig. S1 The Zaprężyn section with OSL ages (quartz fine grains) obtained in the Bayreuth laboratory. This plot clearly demonstrates that samples 11 and 12 are situated below the unconformity (here at 3 m depth) and sample 13 above it (see Fig. 5).

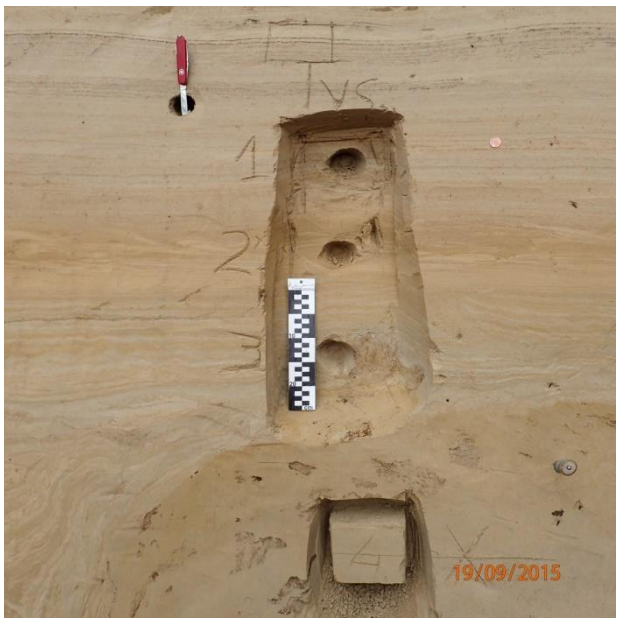


Fig. S2 Tyszowce, heterogeneity of periglacial loess above the ice wedge pseudomorph (bottom left) and samples TYS 1-4 (Foto P. Antoine).

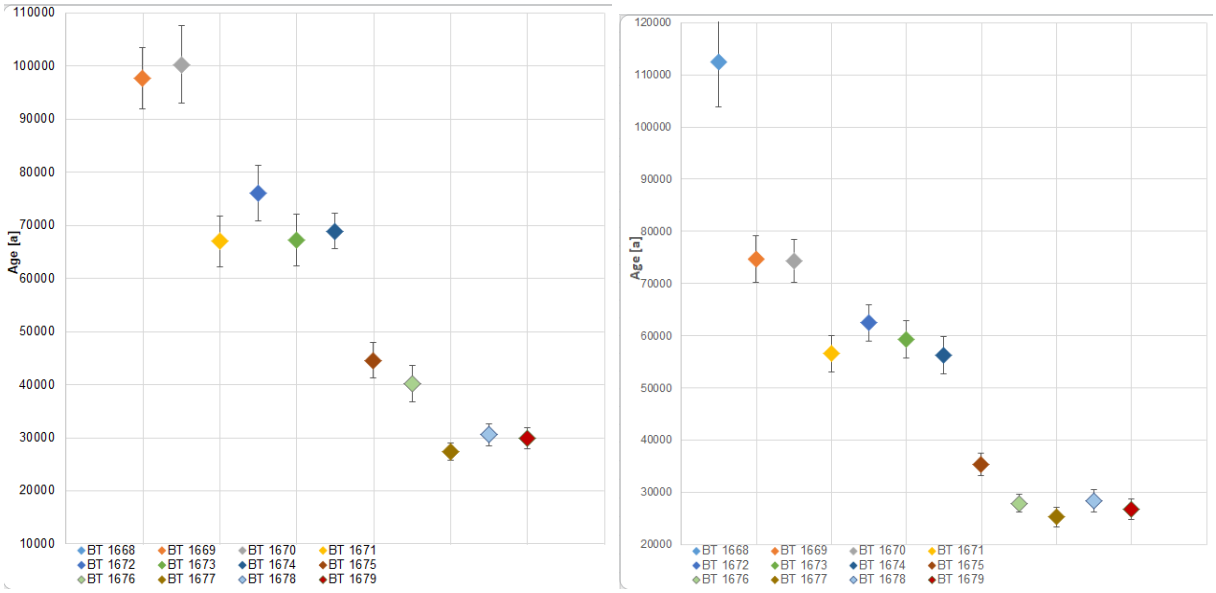
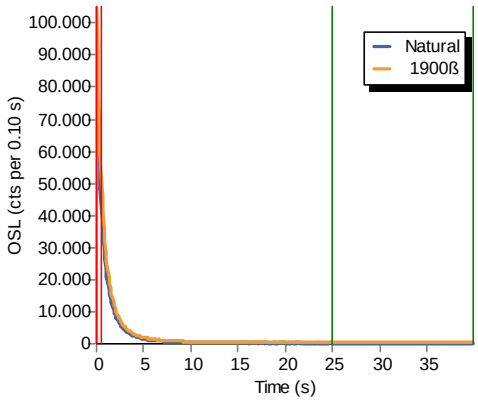
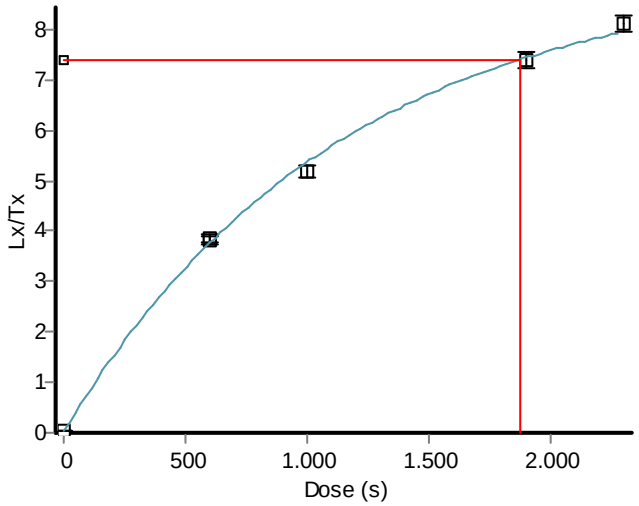


Fig. S3 Age-depth profiles for quartz OSL ages (fine grains) (left) and for pIRIR$_{290}$ ages (polymineral fine grains, for a=0.1) (right) from Biały Kościół. Depth is not to scale. The pIRIR$_{290}$ age of BT 1688 is not plotted as it is too far out of the age scale. The grouping of ages (see text) is illustrated.

BT 1673 – BK18-6 OSL



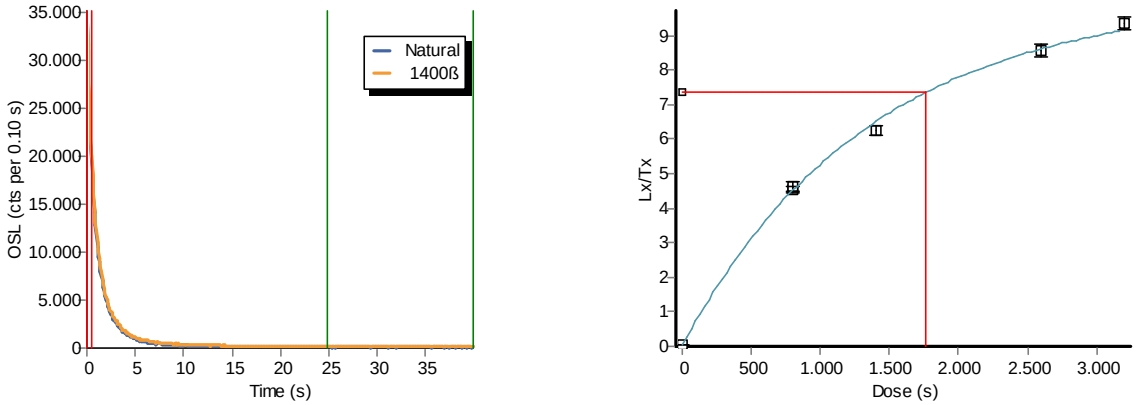


Curve Fitting: Exponential
Y = a (1-exp[-(x+c)/b])
a: 9.16E+000 ± 2.85E-001
b: 1.14E+003 ± 5.96E+001
c: 3.01E+000 ± 1.43E-001

Average error in fit: 0.0441
Reduced Chi^2: 2.42

Fig. S4a BK18-6 (BT 1673) OSL quartz fine grains. Top: natural (blue) and regenerated (orange, 1 900 s ß, ca. 228 Gy) decay curves; bottom: dose-response curve of a suitable aliquot, single exponential fit, regeneration dose ca. 215 Gy.

BT 1672 – BK18-5 OSL

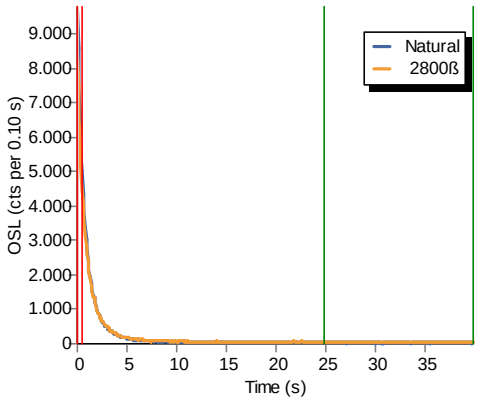


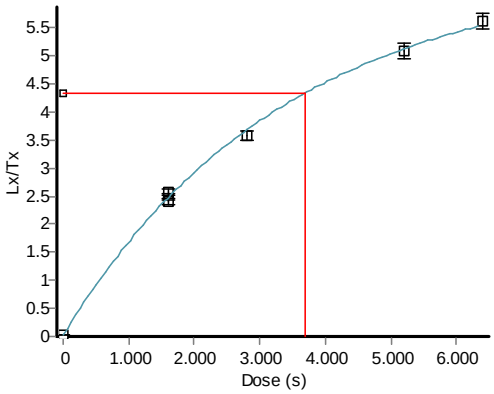
Curve Fitting: Exponential
Y = a (1-exp[-(x+c)/b])
a: 1.01E+001 ± 2.81E-001
b: 1.36E+003 ± 6.78E+001
c: 4.34E+000 ± 2.43E-001

Average error in fit: 0.0588
Reduced Chi^2: 3.09

Fig. S4b BK18-5 (BT 1672) OSL quartz fine grains. Top: natural (blue) and regenerated (orange, 1 400 s β, ca. 168 Gy) decay curves; bottom: dose-response curve of a suitable aliquot, single exponential fit, regeneration dose ca. 212 Gy.

BT 1675 – BK18-8 OSL





Curve Fitting: Exponential
Y = a (1-exp[-(x+c)/b])
a: 6.53E+000 ± 2.28E-001
b: 3.40E+003 ± 1.84E+002
c: 1.11E+001 ± 1.16E+000

Average error in fit: 0.0250
Reduced Chi^2: 1.73

Fig. S4c BK18-8 (BT 1675) OSL quartz fine grains. Top: natural (blue) and regenerated (orange, 2 800 s β with weaker source, ca. 100 Gy) decay curves; bottom: dose-response curve of a suitable aliquot, single exponential fit, regeneration dose ca. 120 Gy.

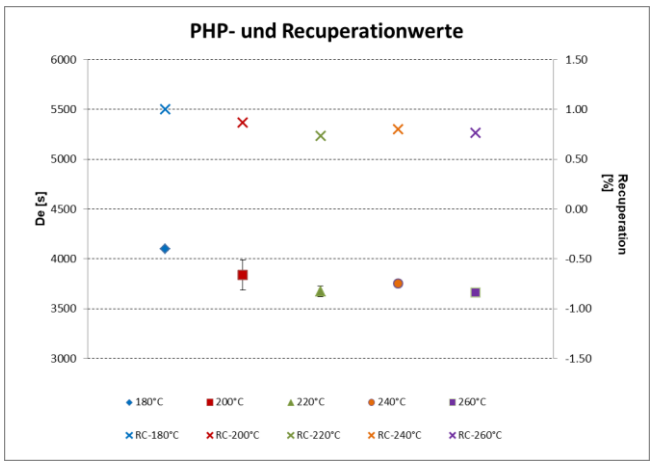
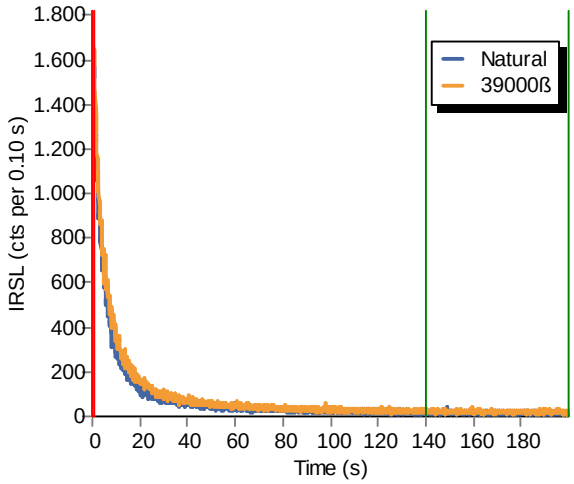
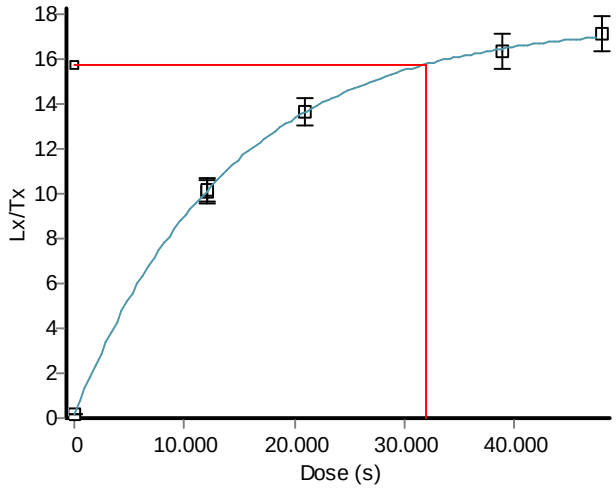


Fig. S5 BK18-8 (BT 1675) OSL quartz fine grains, Preheat Plateau Test and Recuperation.

BT1668 – BK18-1 pIRIR$_{290}$





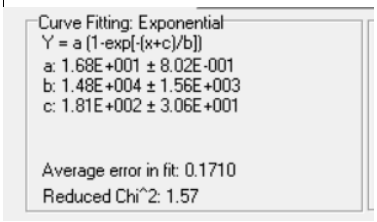


Fig. S6 BK18-1 (BT 1668) pIRIR$_{290}$. Top: natural (blue) and regenerated (orange, 39 000 s ß, ca. 1370 Gy) decay curves; bottom: dose-response curve of a suitable aliquot, single exponential fit, regeneration dose ca. 1150 Gy.

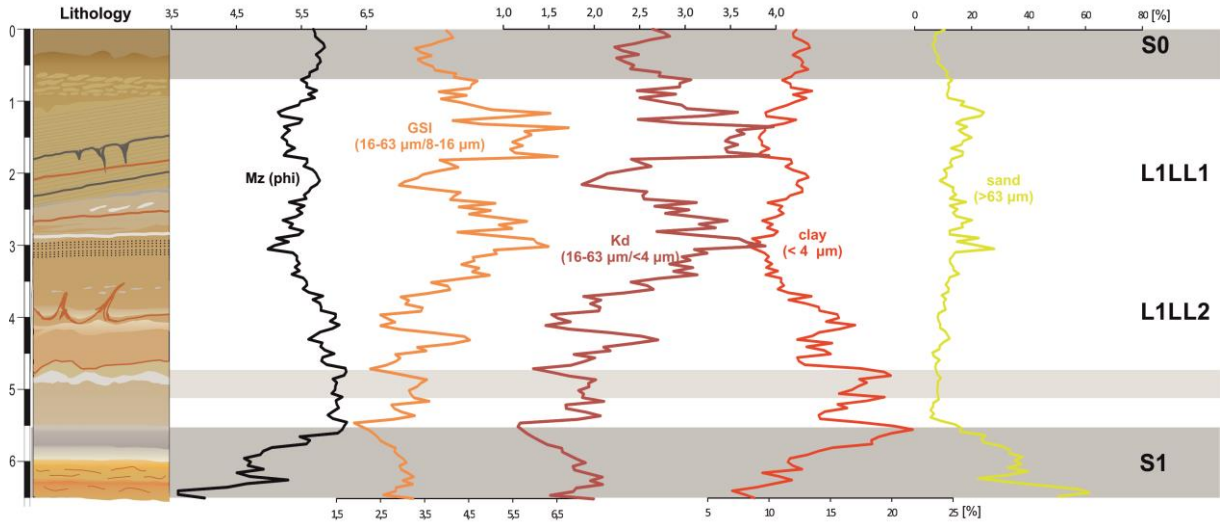


Fig. S7 Grain size composition of the Zaprężyn section (obtained by laser diffractometer Malvern Mastersizer 2000).

Field code	Lab. code	Alpha counting: Mean counts [cph]	(error)	Th [cph]	(error)	U [cph]	error)	Thorium [ppm]	±	Uranium [ppm]	±	ICP-OES: K (mg/g) (‰)	moist. W (estim.) ± (estim.)	Q 4-11 µm: Dose rate (Gy/ka) (Gy/ka)	error (Gy/ka)	De (Gy)	Age (ka)	PM 4-11 µm pIRIR290: Dose rate (Gy/ka) a=0.085	De (Gy)	Age (ka)	PM 4-11 µm: Dose rate (Gy/ka) a=0.1	Age (ka)
BK18-1	BT 1668	37,1	0,47	18,8	1,76	18,4	1,83	10,4	0,97	2,97	0,30	10,6	11.1±1.1	2,77	0,26	312±17	**112±8.6**	3.36±0.27	1150±20	343±18	3.53±0.28	**326±17**
BK18-2	BT 1669	34,8	0,45	14,0	1,56	20,8	1,62	7,8	0,86	3,35	0,26	14,5	11.1±1.1	3,01	0,28	225.±5.4	**74.7±4.5**	3.57±0.29	365±13	102±6.1	3.74±0.30	**97.7±5.7**
BK18-3	BT 1670	32,6	0,44	12,5	1,47	20,1	1,53	6,9	0,81	3,25	0,25	15,1	16±1.6	2,81	0,26	209.±2.8	**74.3±4.1**	3.31±0.27	346±19	105±7.7	3.45±0.28	**100±7.3**
BK18-4	BT 1671	38,7	0,39	20,2	1,48	18,5	1,53	11,2	0,82	2,99	0,25	18,1	17±1.7	3,32	0,21	188±6.1	**56.6±3.5**	3.89±0.31	272±15	69.9±5.0	4.06±0.31	**66.9±4.7**
BK18-5	BT 1672	38,2	0,38	19,0	1,44	19,2	1,49	10,5	0,80	3,10	0,24	18,4	15±1.5	3,40	0,30	212.±4.7	**62.5±3.5**	3.97±0.31	315±16	79.3±5.5	4.15±0.31	**76.0±5.2**
BK18-6	BT 1673	40,9	0,40	16,7	1,40	24,2	1,46	9,3	0,77	3,91	0,24	19,1	14±1.4	3,62	0,31	215±6.4	**59.4±3.5**	4.25±0.33	307±17	72.3±±5.3	4.44±0.33	**69.2±5.0**
BK18-7	BT 1674	37,3	0,38	16,2	1,35	21,1	1,40	9,0	0,75	3,41	0,23	19,2	14±1.4	3,47	0,30	195±7.1	**56.3±3.6**	4.04±0.31	298±17	73.8±5.5	4.21±0.32	**70.8±5.2**
BK18-8	BT 1675	53,8	0,50	18,3	1,87	17,5	1,93	10,1	1,03	2,83	0,31	17,9	15±1.5	3,40	0,30	120±3.7	**35.3±2.1**	3.75±0.32	174±9.6	46.5±3.4	3.91±0.33	**44.6±3.3**
BK18-9	BT 1676	37,2	0,47	16,3	1,69	21,0	1,76	9,0	0,94	3,39	0,28	17,8	14±1.4	3,35	0,30	93.8±3.1	**28.0±1.8**	3.92±0.32	165±12	42.0±3.6	4.10±0.33	**40.2±3.4**
BK18-10	BT 1677	40,4	0,49	19,9	1,86	20,4	1,93	11,0	1,03	3,30	0,31	18,8	11.1±1.1	3,64	0,33	92.0±4.2	**25.3±1.8**	4.27±0.35	122±4.4	28.7±1.7	4.47±0.36	**27.4±1.6**
BK18-11	BT 1678	40,2	0,49	16,0	1,72	24,2	1,79	8,8	0,95	3,91	0,29	18,1	15±1.5	3,40	0,30	96.6±5.3	**28.4±2.2**	4.33±0.35	138±6.8	32.0±2.2	4.52±0.35	**30.6±2.1**
BK18-12	BT 1679	38,4	0,48	18,3	1,78	20,0	1,85	10,1	0,98	3,23	0,30	17,7	15±1.5	3,39	0,30	91.3±4.8	**26.9±2.0**	4.22±0.34	132±5.8	31.3±2.0	4.42±0.35	**29.9±1.9**
BK-5*	BT 1482	38,5	0,60	25,1	3,36	14,4	3,41	13,9	1,86	2,33	0,55	16,0	10±5	3,47	0,33	131±4.1	**37.7±2.4**					
BK-6*	BT 1483	38,5	0,54	25,2	1,68	13,3	1,77	13,9	0,93	2,15	0,29	17,3	10±5	3,53	0,26	229±14.2	**64.9±4.9**					
BK-7*	BT 1484	40,0	0,66	17,8	2,38	22,2	2,46	9,8	1,32	3,58	0,40	18,5	10±5	3,71	0,29	219±11	**59.0±4.0**					
Zapr_3	BT 1468	25,9	0,43	12,5	1,53	13,5	1,58	6,9	0,85	2,17	0,26	10,7	11±1.1	2,28	0,22	218±8.7	**95.7±6.6**					
Zapr_4	BT 1469	36,4	0,51	16,9	1,86	19,5	1,92	9,4	1,03	3,15	0,31	16,7	23±2.3	2,95	0,28	223±10	**75.5±5.4**					
Zapr_5	BT 1470	37,6	0,52	15,7	1,82	22,0	1,89	8,7	1,01	3,54	0,31	15,7	19±1.9	3,04	0,28	221±8.2	**72.8±4.8**					
Zapr_7	BT 1472	35,3	0,43	15,3	1,51	20,0	1,57	8,4	0,84	3,23	0,25	16,0	17±1.7	3,03	0,27	217±4.3	**71.8±4.0**					
Zapr_8	BT 1473	37,5	0,44	17,7	1,62	19,8	1,68	9,8	0,90	3,20	0,27	15,5	19±1.9	3,03	0,28	206±7.1	**67.9±4.3**					
Zapr_9	BT 1474	40,2	0,46	16,8	1,62	23,4	1,68	9,3	0,90	3,78	0,27	16,0	14±1.4	3,35	0,30	217±11.2	**64.7±4.8**					
Zapr_10	BT 1475	35,4	0,60	14,9	2,09	20,5	2,17	8,2	1,16	3,31	0,35	15,5	12±1.2	3,16	0,31	215±12.9	**68.2±5.6**					
Zapr_11	BT 1476	39,7	0,63	16,7	2,25	23,0	2,34	9,3	1,25	3,71	0,38	14,9	12±1.2	3,31	0,33	188±11.6	**56.8±4.7**					
Zapr_12	BT 1477	40,7	0,64	22,7	2,53	18,0	2,61	12,6	1,40	2,90	0,42	15,5	12±1.2	3,43	0,34	180±7.8	**52.5±3.7**					
Zapr_13	BT 1478	36,5	0,61	16,9	2,20	19,7	2,29	9,3	1,22	3,17	0,37	12,2	12±1.2	2,96	0,.30	54.5±2.1	**18.4±1.2**					
ZL_1	BT 1485	38,8	0,65	15,9	2,27	22,9	2,36	8,8	1,26	3,70	0,38	14,6	15±5	3,17	0,20	159±16	**50.0±5.4**					
ZL_2	BT 1486	37,7	0,64	20,0	2,44	17,8	2,52	11,1	1,35	2,87	0,41	13,6	15±5	3,03	0,20	117±10	**38.6±3.6**					
ZL_3	BT 1487	35,6	0,51	14,6	1,73	21,0	1,80	8,1	0,96	3,39	0,29	13,4	15±5	2,92	0,19	93.1±4.6	**31.9±1.9**					
ZL_4	BT 1488	37,3	0,51	18,3	1,90	19,0	1,97	10,1	1,05	3,06	0,32	14,4	15±5	3,09	0,20	85.2±5.5	**27.6±2.0**					
ZL_5	BT 1489	39,4	0,53	18,2	1,93	21,2	2,00	10,1	1,07	3,42	0,32	15,1	15±5	3,24	0,21	85.9±3.6	**26.5±1.5**					
ZL_6	BT 1490	34,4	0,60	13,2	2,01	21,2	2,10	7,3	1,11	3,43	0,34	15,1	15±5	3,03	0,20	80.9±5.1	**26.7±1.9**					
Tys_1	BT 1491	36,4	0,62	16,0	2,19	20,5	2,28	8,8	1,21	3,31	0,37	15,7	15±5	3,06	0,28	76.8±2.7	**25.1±1.6**					
Tys_2	BT 1492	39,6	0,53	17,3	1,92	22,3	1,99	9,6	1,06	3,60	0,32	12,6	11±5	3,10	0,29	78.8±3.0	**25.4±1.7**					
Tys_3	BT 1493	38,6	0,53	21,0	2,05	17,7	2,11	11,6	1,13	2,86	0,34	14,7	13±5	3,18	0,30	76.0±4.7	**23.9±2.0**					
Tys_4	BT 1494	31,7	0,60	14,1	3,36	17,6	3,34	7,8	1,86	2,85	0,54	14,3	15±5	2,76	0,33	84.6±1.9	**30.7±2.2**					
Tys_5	BT 1495	35,0	0,62	16,5	2,26	18,5	2,34	9,1	1,25	2,99	0,38	15,6	18±5	2,93	0,29	81.4±3.3	**27.8±1.9**					
Tys_6	BT 1496	30,5	0,54	15,9	1,68	14,6	1,76	8,8	0,93	2,36	0,28	14,2	18±5	2,74	0,29	186±14	**67.9±7.0**					
Tys_7	BT 1497	37,5	0,51	16,7	1,83	20,5	1,90	9,2	1,01	3,31	0,31	13,3	18±5	2,74	0,24	119±5.3	**43.3±3.0**					

* samples from 2015,
old profile

Table S1 Analytical data and ages

Note: In column "moisture W" W means the saturation water content, here defined as the weight of water divided by the *dry* weight of sediment (Aitken 1998, p.58) in %.