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SUPPLEMENTARY MATERIAL

Sub-fossil chironomids as indicators of hydrological changes in the shallow and high-altitude lake Shen Co, Tibetan Plateau, over the past two centuries

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Suppl. 1: Environmental parameters of Shen Co taken during fieldwork in July 2018 at coring site.

Core ID	NC-18-C-40
Samling site	
Date	06.07.2018
Time	16:20
Weather	sunny
Latitude of sampling site	31.01631
Longitude of sampling site	90.50021
Altitude (m asl) of sampling site	4,733
Shore distance (m)	1,500
Max water depth (m) at sampling site	4,8
Macrophytes (%)	NO
Anthropogenic influence	grazing
Environmental data taken at sampling site	
Secchi depth (m)	1.96
Conductivity ($\mu\text{S cm}^{-1}$)	17,970
Salinity (mg L^{-1})	9
Water Temperature ($^{\circ}\text{C}$)	15.0
pH	9.51
O ₂ (mg L^{-1})	5.82
O ₂ (%)	103.4
Alkalinity (mmol L^{-1})	201.0

Suppl. 2a: ^{210}Pb , ^{137}Cs and ^{241}Am activities of sediment core NC-18-C-40b.

Depth	Dry mass	²¹⁰ Pb						Cum Unsupported					
		Total		Supported		Unsupp		²¹⁰ Pb		¹³⁷ Cs		²⁴¹ Am	
cm	g cm ⁻²	Bq Kg ⁻¹	±	Bq Kg ⁻¹	±	Bq Kg ⁻¹	±	Bq m ⁻²	±	Bq Kg ⁻¹	±	Bq Kg ⁻¹	±
0.5	0.1632	339.2	52.15	47.08	11.91	292.12	53.49	500.7	66.6	16.22	6.51	0	0
3	1.0252	172.51	19.93	23.6	4.05	148.91	20.34	2332.8	307.3	18.77	2.65	2.69	1.51
5	1.8116	137.35	9.54	33.22	2.15	104.13	9.78	3317.3	344.7	11.78	1.22	0	0
6	2.227	119.53	8.67	37.05	2.02	82.48	8.9	3703.2	348.6	11.22	1.13	0	0
7	2.6662	128	10.87	30.19	2.36	97.81	11.12	4098.2	351.5	12.99	1.45	1.46	0.9
8	3.1176	96.53	7.49	37.06	1.83	59.47	7.71	4446	355.1	15.99	1.14	0	0
9	3.5761	89.81	9.53	34.62	2.18	55.19	9.78	4708.7	357.3	15.24	1.33	0	0
10	4.0038	89.12	8.19	35.67	2.09	53.45	8.45	4941	359.9	12.95	1.18	0	0
11	4.3971	78.61	10.82	38.91	3	39.7	11.23	5122.8	361.9	15.21	1.72	0	0
12	4.8095	66.33	10.09	47.67	3.07	18.66	10.55	5237.8	364.7	10.99	1.62	0	0
13	5.2145	78.88	7.65	36.57	1.9	42.31	7.88	5354.8	367	2.43	0.85	0	0
13.5	5.4069	67.04	7.73	34.64	2.02	32.4	7.99	5426.2	367.5	2.38	0.75	0	0
14	5.5892	59.22	7.14	34.92	1.86	24.3	7.38	5477.6	367.8	0.00	0.00	1.12	0.64
15	5.969	46.97	7.67	42.83	2.39	4.14	8.03	5520.8	368.7	0.00	0.00	0	0
16	6.3942	35.98	4.25	37.03	1.18	-1.05	4.41	5527.4	369.9	2.32	0.43	0	0

Suppl. 2b: Sediment accumulation rates (SAR) of sediment core NC-18-C-40b.

Depth (cm)		cm	age diff	yr cm ⁻¹	cm yr ⁻¹	Chronology
0	2018					2018.0
0.5				5.1163	0.1955	2015.4
2.75				5.1163	0.1955	2003.9
4.75				5.1163	0.1955	1993.7
5.75				5.1163	0.1955	1988.6
6.75				5.1163	0.1955	1983.5
ou7.75				5.1163	0.1955	1978.3
8.75				5.1163	0.1955	1973.2
9.75				5.1163	0.1955	1968.1
10.75	1963	55	10.75	5.1163	0.1955	1963.0
11.75				4.3333	0.2308	1958.7
12.75				4.3333	0.2308	1954.3
13.25				4.3333	0.2308	1952.2
13.75	1950	13	3	4.3333	0.2308	1950.0
14.75				4.3333	0.2308	1945.7
15.75				4.3333	0.2308	1941.3

Suppl. 2c: Chronology of Shen Co of sediment core NC-18-C-40b determined using linear regression.

Depth	corr age cal BP	Sed rate cm yr ⁻¹	year (AD)
0	-68	0.1955	2018
0.5		0.1955	2017
1		0.1955	2014
1.5		0.1955	2012
2		0.1955	2009
2.5		0.1955	2007
3	-54	0.1955	2004
3.5		0.1955	2002
4		0.1955	1999
4.5		0.1955	1997
5		0.1955	1994
5.5		0.1955	1992
6		0.1955	1989
6.5		0.1955	1987
7		0.1955	1984
7.5		0.1955	1982
8		0.1955	1979
8.5		0.1955	1977
9		0.1955	1974
9.5		0.1955	1972
10		0.1955	1969
10.5		0.1955	1967
11	-13	0.1955	1963
11.5		0.1955	1962
12		0.2308	1959
12.5		0.2308	1957
13		0.2308	1954
13.5		0.2308	1951
14	0	0.2308	1950
14.5		0.2308	1946
15		0.2308	1944
15.5		0.2308	1941
16	9	0.2308	1941
16.5			1936
17			1934
17.5			1931
18			1929
18.5			1926
19	25	0.1955	1925
19.5			1921
20			1919
20.5			1916
21			1914
21.5			1911

22			1909
22.5			1906
23	46	0.1955	1904
23.5			1901
24			1899
24.5			1896
25			1894
25.5			1891
26			1889
26.5			1886
27			1884
27.5			1881
28			1879
28.5			1876
29			1873
29.5			1871
30			1868
30.5			1866
31			1863
31.5			1861
32			1858
32.5			1856
33			1853
33.5			1851
34			1848
34.5			1846
35			1843
35.5			1841
36			1838
36.5	116	0.1955	1834
37			1833
37.5			1831

Suppl. 2d: Radiocarbon C14-dating of sediment core NC-18-C-40b.

Depth (cm)	Conventional age	Dev	Pb/Cs age	RE	Corr age cal BP	Sed rate yr cm ⁻¹	Cal yr BP weighted mean	Dev	Year (AD)
0.5			-68		-68	5.11627907	-68		2018
3	1540	30	-53.9	1594	-54	5.11627907	-54	-	2004
11			-13		-13	5.11627907	-13		1963
14			0		0	5.11627907	0		1950
16			9		9	4.333333329	9		1941
19	2650	30	25	2620	25	5.11627907	25	-	1925
20						5.11627907	31		1919
21						5.11627907	36		1914
22						5.11627907	41		1909
23	3140	30	46	3094	46	5.11627907	46	-	1904
36.5	4010	30	116	3894	116	5.11627907	125*	58	1834

Suppl 2e: IntCal20-calibration.

Calib 8.1.0 (2020)						
from	to	mean	dev	factor	cal yr BP	dev2
10	150	80	70	0.710452	56.8361	49.7316
187	197	192	5	0.01997	3.8342	0.0998
210	270	240	30	0.26957	64.696	8.0871
					125.3672	57.91859

Suppl. 3: Stratigraphy and lithology of sediment core NC-18-C-40b.

Depth	Units	Description	Boundaries	Colour	Munsell scale
0 - 2 cm	Unit 1	clay, massive, organic rich, aquatic plant remains, pale yellow, no organization		pale yellow	Hue 2,5 YR 8/3
2 - 3 cm				gray yellow-red	Hue 7,5 YR 8/2
3 - 5 cm				pale yellow	Hue 2,5 YR 8/3
5 - 9.5 cm				light gray yellow	Hue 10 Y 8/8
9.5 - 10.5 cm				yellow	Hue 5 Y 6/4
10.5 - 12.5 cm				pale yellow	Hue 2,5 YR 8/3
12.5 - 13.5 cm				yellow	Hue 5 YR 6/4
13.5 - 15.5 cm				yellow-orange	Hue 10 YR 8/6
15.5 - 17.5 cm				yellow	Hue 5 YR 7/6
17.5 - 18 cm	Unit 2	clay, laminated with fine sand layers	gradual inferior boundary	light yellow-red	Hue 7,5 YR 8/3
18 - 20.5 cm				yellow	Hue 5 YR 7/6
20.5 - 21.5 cm			erosive superior boundary	yellow	Hue 2,5 YR 8 /6
21.5 - 25.5 cm	Unit 3	silt, massive with alternation of dark fine sand of 1 cm thickness, well sorted, subrounded-rounded, and		yellowish	Hue 10 YR 7/6
25.5 - 26.5 cm		Dark, fine sand of 1 cm thickness	erosive superior boundary, gradual inferior	olive-yellow	Hue 5 YR 6/3
26.5 - 27.5 cm	Unit 3	silt, massive		dull yellow-orange	Hue 10 YR 7/4
27.5 - 28.5 cm		Dark, fine sand of 1 cm thickness	erosive superior boundary, gradual inferior	olive	Hue 5 YR 5/4
28.5 - 29.5 cm	Unit 3	silt, massive		olive	Hue 5 YR 5/4
29.5 - 30.5 cm		Dark, fine sand of 1 cm thickness	erosive superior boundary, gradual inferior	dull yellow-orange, olive	Hue 10 YR 7/4, Hue 5 YR 5/4
30.5 - 32.5 cm	Unit 3	silt, massive		yellowish	Hue 10 YR 7/6
32.5 - 34.5 cm	Unit 1	clay, massive, organic rich, aquatic plant remains, pale yellow, no organization		yellowish, yellow	Hue 10 YR 7/6, Hue 5 YR 6/4
34.5 - 35.5 cm		Dark, fine sand of 1 cm thickness		yellow, yellowish	Hue 10 YR 7/6, Hue 5 YR 6/4
36 - 37.5 cm	Unit 3	silt, massive		dull yellow-orange	Hue 10 YR 7/4

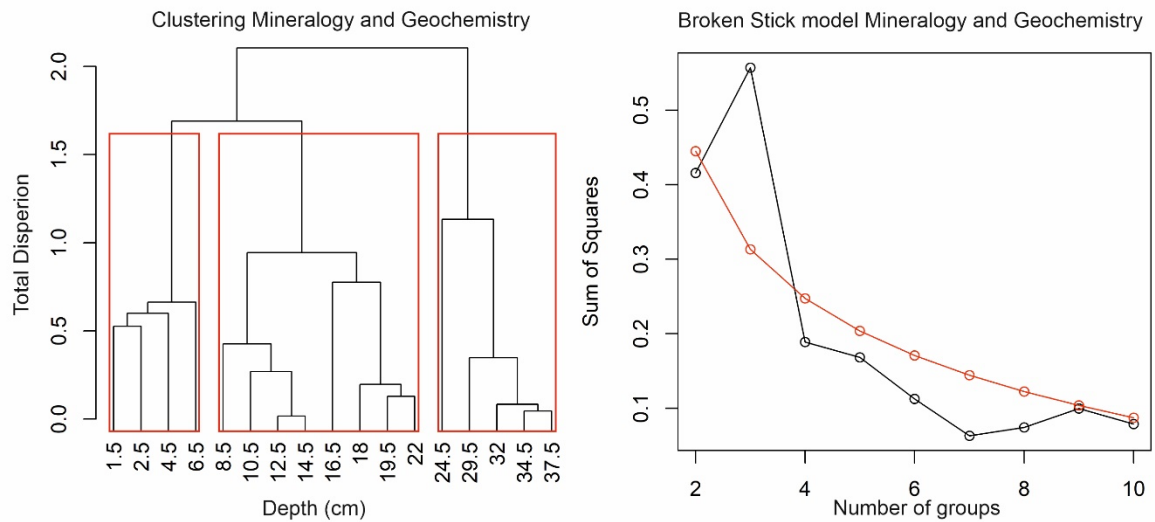
Supp. 4a: Mineralogical composition of sediment core NC-18-C-40b.

Depth	Quartz	Biotite	Muscovite	Montmorillonite	Illite	Calcite	Dolomite	Magnetite	Albit	Orthoclase
1.5	21.3	5.3	0	0	0	59.2	0	4.6	9.6	0
2.5	7.1	2.9	0	0	0	84.1	0	5.9	0	0
4.5	21.7	17.3	0	0	0	58.1	0	2.9	0	0
6.5	7.5	3.3	0	0	0	83.7	0	5.5	0	0
8.5	36.7	4.2	0	0	0	41.7	0	0	0	17.4
10.5	51.1	2.4	0	0	0	44.5	0	2	0	0
12.5	45.9	2.3	0	0	0	40.3	0	1.3	0	10.2
14.5	45.4	2.4	0	0	0	40.8	0	0	0	11.4
16.5	38.4	0	21.2	0	7.6	32.8	0	0	0	0
18	49.5	2	0	0	6.8	41.7	0	0	0	0
19.5	46.9	6.2	0	0	11.6	35.3	0	0	0	0
22	46	2.2	0	0	21.9	29.9	0	0	0	0
24.5	18	7.9	0	0	22.1	45.5	6.5	0	0	0
26.5	21.8	11.7	0	0	0	56.4	8	2.1	0	0
29.5	23.8	4.1	0	0	0	62.6	9.5	0	0	0
32	20	0	0	3.8	0	55.7	18.2	2.3	0	0
34.5	21.7	0	0	2.1	0	60.9	13.1	2.2	0	0
37.5	21.5	0	0	3	0	62.4	13.1	0	0	0

Suppl. 4b: Geochemical analysis of sediment core NC-18-C-40b.

	TOC (%)	TIC (%)	TN (%)	C/N	Al/Si	Ca/Fe	Sr/Rb
1.5	2.04	6.64	0.39	6.2	0.521	13.425	16.29
2.5	1.84	6.48	0.34	6.4	0.44	14.845	17.80
4.5	1.93	6.58	0.3	7.5	0.428	14.917	19.47
6.5	1.9	5.92	0.26	8.7	0.359	15.106	17.26
8.5	1.09	6.45	0.23	5.6	0.399	14.817	16.94
10.5	1.61	5.87	0.24	8	0.341	16.168	18.10
12.5	3.29	5.14	0.24	15.8	0.436	16.602	21.75
14.5	3.17	5.56	0.28	13.1	0.387	13.299	21.47
16.5	2.07	5.39	0.23	10.5	0.324	12.713	13.9
18	3.91	4.92	0.29	15.8	0.399	12.951	17.47
19.5	1.85	6.55	0.25	8.6	0.375	14.345	18.88
22	0.86	5.87	0.11	9.1	0.28	13.668	16.11
24.5	3.24	5.64	0.18	21.2	0.425	24.178	34.29
26.5	NA	7.09	0.09	NA	0.265	16.896	17.79
29.5	0.15	5.76	0.09	NA	0.264	17.711	17.19
32	1.01	6.92	0.15	7.7	0.372	19.89	25.45
34.5	0.59	6.77	0.11	NA	0.286	17.944	23.4
37.5	1.13	6.44	0.1	13.9	0.334	21.36	25.16

Suppl. 4c: Constrained Clustering Mineralogy and Geochemistry of sediment core NC-18-C-40b.



Suppl. 5a: Chironomidae assemblage of sediment core NC-18-C-40b.

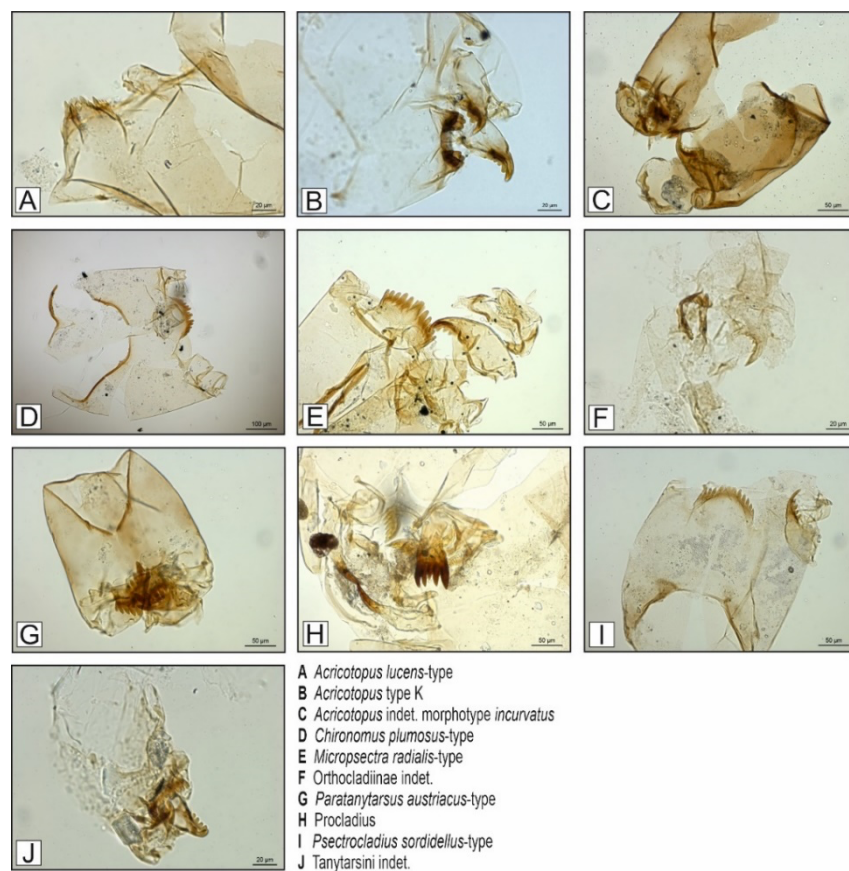
Depth	Concentration of head capsules	Number of head capsules	Number of non-rare taxa	<i>Procladius</i>	<i>Tanytarsini</i> indet.	<i>Paratanytarsus austriacus</i> -type	<i>Micropectra radialis</i> -type	<i>Orthocladiinae</i> indet.	<i>Acricotopus</i> type K	<i>Acricotopus</i> indet. morphotype <i>incurvatus</i>	<i>Acricotopus lucens</i> -type	<i>Psectrocladius sordidellus</i> -type	<i>Chironomus plumosus</i> -type
0.5	202.25	54.0	4.0	77.8	0.0	3.7	1.9	0.0	0.0	0.0	0.0	14.8	1.9
1	110.04	57.0	2.0	85.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.8	0
1.5	175.76	80.5	5.0	68.3	0.0	1.2	0.0	0.0	0.0	0.0	0.0	29.2	1.2
2	284.59	90.5	5.0	86.2	0.0	1.1	0.0	0.0	1.1	5.5	0.0	6.1	0
2.5	246.89	79.5	4.0	88.7	0.0	0.0	0.0	0.0	0.0	11.3	0.0	0.0	0
3	204.20	107.0	3.0	81.3	0.0	0.0	0.0	0.0	2.8	15.9	0.0	0.0	0
3.5	112.07	53.0	3.0	73.1	0.0	0.0	0.0	0.0	0.0	26.0	0.0	1.0	0
4	97.70	51.0	4.0	60.8	0.0	0.0	0.0	2.0	0.0	35.3	0.0	2.0	0
4.5	135.66	54.5	5.0	72.4	0.0	0.0	1.9	0.0	3.8	20.0	0.0	1.9	0
5	100.98	62.0	2.0	69.4	0.0	0.0	0.0	0.0	0.0	30.6	0.0	0.0	0
5.5	86.42	49.0	3.0	67.3	0.0	0.0	0.0	2.0	0.0	30.6	0.0	0.0	0
6	59.62	46.5	4.0	60.2	0.0	2.2	0.0	0.0	1.1	36.6	0.0	0.0	0
6.5	129.03	60.0	3.0	66.7	0.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0
7	166.94	101.0	4.0	74.5	0.0	0.0	0.0	0.0	0.0	24.5	0.0	1.0	0
7.5	96.87	68.0	3.0	73.5	0.0	0.0	0.0	1.5	0.0	25.0	0.0	0.0	0

8	118.35	84.5	4.0	68.6	0.0	0.0	1.2	0.0	0.0	27.2	0.0	3.0	0
8.5	125.80	59.0	4.0	91.5	0.0	0.0	0.0	0.0	1.7	6.8	0.0	0.0	0
9	138.72	93.5	3.0	62.6	0.0	0.0	0.0	0.0	0.0	35.8	0.0	1.6	0
9.5	87.84	58.5	4.0	63.2	0.0	1.7	0.0	1.7	0.0	33.3	0.0	0.0	0
10	187.88	62.0	3.0	62.9	0.0	0.0	1.6	0.0	0.0	35.5	0.0	0.0	0
10.5	181.65	97.0	3.0	70.6	0.0	0.0	0.0	0.0	0.0	27.8	0.0	0.5	1.0
11	192.15	97.0	5.0	78.5	0.0	0.0	0.0	0.0	3.2	12.9	0.0	5.4	0
11.5	86.63	52.5	4.0	83.8	0.0	1.9	0.0	0.0	0.0	10.5	0.0	1.9	1.9
12	131.79	65.5	4.0	88.5	0.0	0.0	0.0	0.8	0.0	6.1	0.0	4.6	0
12.5	118.26	68.0	4.0	73.5	0.0	0.0	0.0	1.5	0.0	6.6	0.0	18.4	0
13	168.33	50.5	4.0	71.3	0.0	0.0	0.0	0.0	0.0	4.0	0.0	24.8	0
13.5	66.34	60.5	4.0	76.0	0.0	0.0	0.0	0.0	0.0	14.9	0.0	9.1	0
14	265.07	128.5	5.0	69.0	0.8	0.0	0.0	0.8	0.0	22.4	0.8	6.3	0
14.5	34.61	57.0	5.0	12.3	0.0	1.8	1.8	1.8	0.0	82.5	0.0	0.0	0
15	49.37	51.0	4.0	7.8	0.0	3.9	0.0	2.9	0.0	85.3	0.0	0.0	0
15.5	47.58	52.0	3.0	28.8	0.0	0.0	0.0	1.9	0.0	69.2	0.0	0.0	0
16	77.55	52.5	3.0	44.8	0.0	0.0	0.0	0.0	1.9	53.3	0.0	0.0	0
16.5	18.79	19.5	2.0	56.4	0.0	0.0	0.0	0.0	0.0	43.6	0.0	0.0	0
17	46.38	52.5	4.0	49.5	0.0	1.9	3.8	0.0	0.0	44.8	0.0	0.0	0
17.5	51.08	61.5	4.0	26.8	0.0	0.0	0.0	0.0	4.1	69.1	0.0	0.0	0
18	221.84	65.0	3.0	7.7	0.0	0.0	0.0	1.5	0.0	90.8	0.0	0.0	0
18.5	45.96	61.5	4.0	1.6	0.0	1.6	0.0	2.4	0.0	94.4	0.0	0.0	1.6
19	41.28	62.5	1.0	0.0	1.6	0.0	0.0	0.0	0.0	96.7	0.0	0.0	0
19.5	42.64	54.5	3.0	1.8	0	0	0	0	0	96.3	0	1.8	0
20	4.20	1.5	2.0	1.5	1	0	0	0	0	0	0.5	0	0
20.5	32.77	17.5	3.0	15.5	14	0	0	0	0	0	1	0	0
21	0.90	1.0	1.0	1	1	0	0	0	0	0	0	0	0
21.5	3.79	4.0	2.0	4	2	0	0	0	0	0	2	0	0
22	3.13	3.5	3.0	3.5	0	0	0	0.5	0	0	2	0	0
22.5	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
23	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
23.5	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
24	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
24.5	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
25	2.16	1.0	1.0	1	0	0	0	0	0	0	1	0	0
25.5	1.62	1.0	1.0	1	0	0	0	0	0	0	1	0	0
26	9.87	3.0	2.0	3	2	0	0	0	0	0	1	0	0
26.5	10.03	4.0	2.0	4	0	0	0	1	0	0	3	0	0
27	4.79	3.0	1.0	3	0	0	0	0	0	0	3	0	0
27.5	2.31	1.0	1.0	1	0	0	0	0	0	0	1	0	0
28	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
28.5	4.04	2.0	2.0	2	1	0	0	0	0	0	0	0	0
29	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
29.5	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
30	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
30.5	13.68	6.5	3.0	6.5	1	0	0	0	0	0	1.5	0	0
31	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0

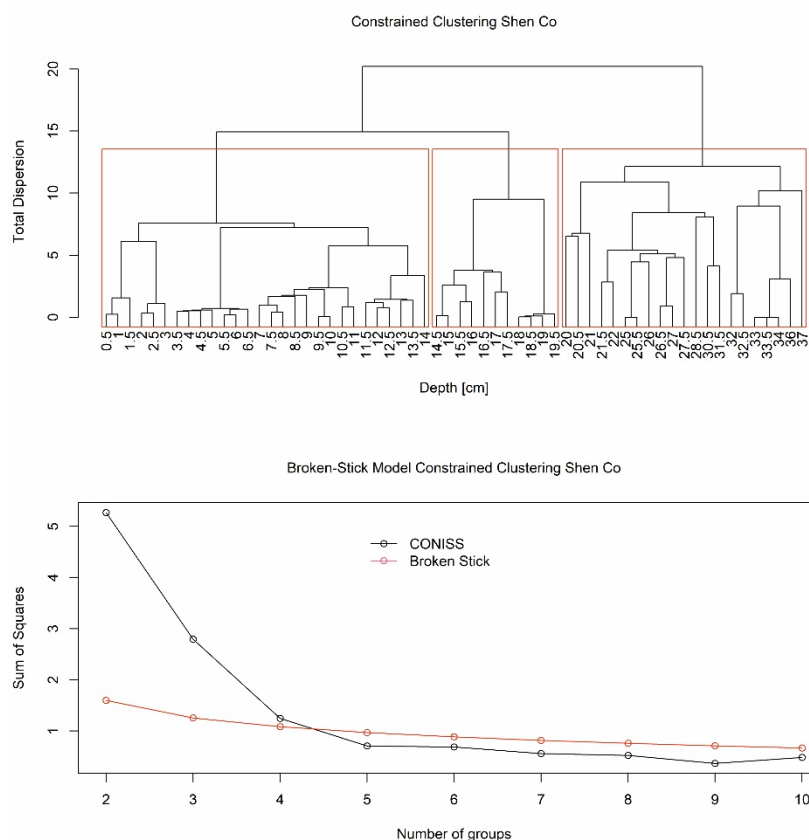
31.5	15.63	2.0	1.0	2	0	0	0	0	0	0	2	0	0
32	35.21	5.0	1.0	5	5	0	0	0	0	0	0	0	1
32.5	14.99	7.0	3.0	7	4	0	0	1	0	0	0	0	0
33	4.62	2.0	1.0	2	2	0	0	0	0	0	0	0	0
33.5	4.20	2.0	1.0	2	2	0	0	0	0	0	0	0	0
34	4.43	2.0	1.0	2	2	0	0	0	0	0	0	0	0
34.5	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
35	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
35.5	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
36	8.70	1.0	1.0	1	1	0	0	0	0	0	0	0	0
36.5	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0
37	4.16	1.5	1.0	1.5	0	0.5	0	0	0	0	0	0	0
37.5	0.00	0.0	0.0	0	0	0	0	0	0	0	0	0	0

Grey parts = total abundance of chironomid morphotypes

Suppl. 5b: Images of chironomid morphotypes from Shen Co sediment core NC-18-C-40b.



Suppl. 5c: Constrained clustering of chironomid assemblage of sediment core NC-18-C-40b.

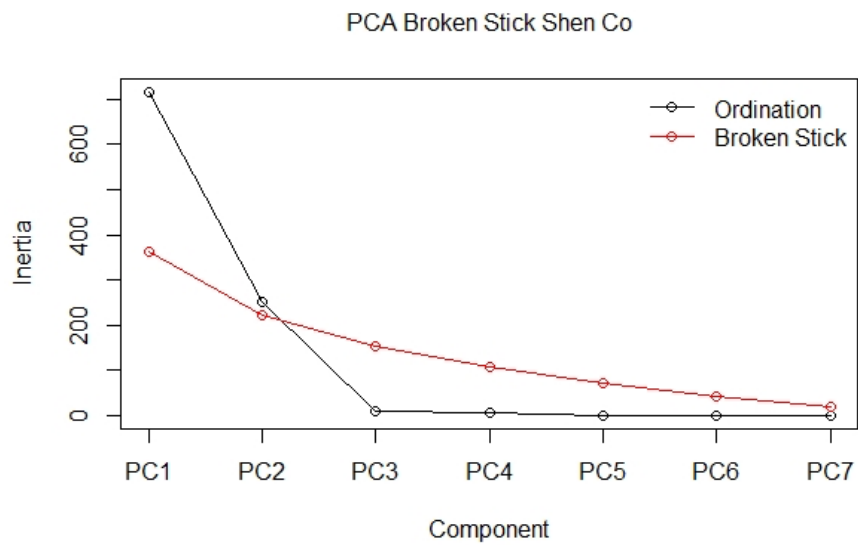


Supp. 6a: Results of PCA and RDA from chironomid and geochemical data of sediment core NC-18-C-40b.

PCA importance of components:			
	PC1	PC2	PC3
Eigenvalue	715.94	250.32	9.23
Proportion explained	0.73	0.26	0.01
Cumulative proportion	0.73	0.99	0.99
RDA importance of components:			
	RDA1	RDA2	RDA3
Eigenvalue	8.6153	5.9403	0.81446
Proportion Explained	0.4193	0.2891	0.03964
Cumulative Proportion	0.4193	0.7084	0.74809
RDA species scores			
	RDA1	RDA2	RDA3
<i>Procladius</i>	-3.614994	1.11119	0.29026
<i>Paratanytarsus austriacus</i> -type	-0.056566	-0.06364	-0.20903
<i>Micropsectra radialis</i> -type	0.005124	-0.18035	-0.12168
<i>Orthocladiinae</i> indet.	-0.532358	-0.01764	-0.33848
<i>Acricotopus</i> type K	-0.103631	0.13076	-0.06536
<i>Acricotopus</i> indet. morphotype <i>incurvatus</i>	-1.700683	-2.7364	-0.08552
<i>Psectrocladius sordidellus</i> -type	-0.872298	0.72834	-0.80899

	PCA and RDA Site scores				Diversity
Depth	PC1	PCA2	RDA1	RDA2	Shannon index
0.5	1.37194	-1.66103	-0.92635	2.72013	0.668331
1	1.86431	-1.7603	-1.19176	2.89793	0.438413
1.5	2.34697	-1.93548	-1.64583	3.30667	0.756225
1.75	3.94977	-1.57543	-2.43838	1.90658	0.557874
2.25	3.41331	-1.18844	-2.11608	1.12148	0.367658
2.75	4.67365	-0.23977	-2.81425	0.4828	0.560731
3.25	1.17856	0.05854	-1.32818	0.02116	0.623974
3.75	0.72658	0.69745	-1.27733	-0.44622	0.824369
4.25	1.15932	-0.30533	-1.28509	0.34584	0.831213
4.75	1.57789	0.6461	-1.57691	-0.42984	0.616232
5.25	0.83697	0.3161	-1.16843	-0.33539	0.708035
5.75	0.50238	0.62621	-0.96435	-0.59913	0.804618
6.25	1.36665	0.69186	-1.5378	-0.49371	0.702686
6.75	3.94777	0.6371	-2.83518	0.01281	0.642327
7.25	2.05486	0.30659	-1.82814	-0.15294	0.634717
7.75	2.6828	0.88897	-2.32791	-0.20994	0.769145
8.25	2.2154	-1.42644	-1.4541	1.46035	0.370741
8.75	2.80709	2.1429	-2.51744	-0.84713	0.727448
9.25	1.15927	0.7959	-1.44674	-0.60653	0.79506
9.75	1.32219	1.06346	-1.50478	-0.76135	0.725814
10.25	3.45118	1.22622	-2.62006	-0.39885	0.624982
10.75	3.65967	-0.65685	-2.6025	1.03086	0.749122
11.25	1.53279	-0.98822	-1.29616	1.01647	0.526427
11.75	2.51645	-1.38463	-1.79191	1.62204	0.456857
12.25	1.99595	-1.26849	-1.78766	1.7078	0.779197
12.75	0.98125	-1.35613	-1.13051	1.8556	0.783756
13.25	1.71548	-0.74631	-1.67651	0.98623	0.761666
13.75	4.74433	-1.33992	-2.99407	1.81483	0.937912
14.25	-0.71445	4.52185	-0.40036	-3.07335	0.629397
14.75	-0.95712	4.14844	-0.06818	-3.03996	0.566046
15.25	-0.2468	3.09127	-0.79845	-2.16253	0.743618
15.75	0.28359	2.00583	-1.00939	-1.4283	0.770504
16.25	-0.77438	-0.14104	0.21373	-0.34928	0.684906
16.75	0.41778	1.43353	-1.02197	-1.187	0.907741
17.25	-0.08239	3.78079	-0.96125	-2.36731	0.782749
17.75	-0.75747	5.8671	-0.39793	-3.60447	0.406092
18.25	-1.04849	5.80742	0.16251	-3.89554	0.334571
18.75	-1.09784	6.11568	0.69764	-4.23471	0
19.25	-1.0856	5.25792	0.23116	-3.51378	0.182738
19.75	-1.55135	-0.95104	1.74658	0.45225	0.636
20.25	-0.62631	-1.08466	0.35327	1.09001	0.379535

20.75	-1.55579	-1.01081	1.89854	0.89935	0
21.25	-1.46744	-0.78637	1.4054	0.1115	0.693
21.75	-1.60864	-0.75658	2.04473	-0.29579	0.9556
22.25	-1.62638	-0.99618	2.35535	0.64259	0
22.75	-1.62638	-0.99618	2.35535	0.64259	0
23.25	-1.62638	-0.99618	2.35535	0.64259	0
23.75	-1.62638	-0.99618	2.35535	0.64259	0
24.25	-1.62638	-0.99618	2.35535	0.64259	0
24.75	-1.61751	-0.87666	2.14044	0.01029	0
25.25	-1.61751	-0.87666	2.14044	0.01029	0
25.75	-1.47632	-0.9059	1.49441	0.37341	0.636
26.25	-1.5997	-0.63731	1.98377	-0.49426	0.562
26.75	-1.59975	-0.6376	1.98312	-0.45258	0
27.25	-1.617	-0.8766	2.14044	0.01029	0
27.75	-1.62638	-0.99618	2.35535	0.64259	0
28.25	-1.55162	-1.01728	1.78831	1.06765	0.693
28.75	-1.62638	-0.99618	2.35535	0.64259	0
29.25	-1.62638	-0.99618	2.35535	0.64259	0
29.75	-1.62638	-0.99618	2.35535	0.64259	0
30.25	-1.54261	-0.82989	1.62104	0.09554	0.9251
30.75	-1.62638	-0.99618	2.35535	0.64259	0
31.25	-1.60863	-0.75713	2.05142	-0.25161	0
31.75	-1.2734	-1.06929	1.33389	1.21672	0
32.25	-1.34398	-1.05398	1.43523	1.09973	0.867
32.75	-1.48519	-1.02543	1.70932	1.0057	0
33.25	-1.48519	-1.02543	1.70932	1.0057	0
33.75	-1.48519	-1.02543	1.70932	1.0057	0
34.25	-1.62638	-0.99618	2.35535	0.64259	0
34.75	-1.62638	-0.99618	2.35535	0.64259	0
35.25	-1.62638	-0.99618	2.35535	0.64259	0
35.75	-1.55579	-1.01081	1.89854	0.89935	0
36.25	-1.62638	-0.99618	2.35535	0.64259	0
36.75	-1.62642	-0.99578	2.3482	0.62788	0
37.25	-1.62638	-0.99618	2.35535	0.64259	0



Suppl. 6b: Results of ANOVA.

Variable	Df	Variance	F	Pr(>F)	Significance	ViF
TOC	1	2.7617	4.3233	0.014	*	16.67
TN	1	7.1232	11.151	0.001	***	15.91
Ca/Fe	1	1.901	2.9759	0.062	.	10.08
Al/Si	1	1.7104	2.6776	0.074	.	7.75
Sr/Rb	1	1.0685	1.6727	0.189		9.15
C/N	1	0.0421	0.0658	0.985		12.47
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1						

Suppl. 7: Lake surface area from 1973 - 2021 of Shen Co determined by Landsat imagery.

CE	Lake surface area [km ²]	Island surface area [km ²]
1973	42.121	0.196901
1977	42.8	0.172938
1989	40.9349	0.145135
1995	43.0773	0.088307
2001	44.1518	0.051064
2005	52.8	0
2008	51.7617	0
2015	50.6333	0
2021	52.0971	0

Suppl. 8: Paleoclimatic records from the Tibetan Plateau.

Age	Dunde	Guliya	Puruogangri	Kusai Lake	Dulan	Sugan Lake	Nir'pa Co	Ximencuo
	Ice core	Ice core	Ice core	Pollen	Treering	Chironomids	Lake sediment	Lake sediment
	$\delta^{18}\text{O}$	$\delta^{18}\text{O}$	$\delta^{18}\text{O}$	MAP	MAP	Salinity	Silt	TOC
	per mil	per mil	per mil	(mm)	(mm)	(sigma units)	(%)	(%)
2010					365.05			
2006				311				
2004				298				5.27
2002						1.729		
2001				304				
2000					290.039			
1999				303			76.58	
1996				298				
1994						0.3105		5.57
1993				289				
1990		-12.35	-12.2		246.35			
1989				296				
1987	-10.09							
1986				288				
1984								5.85
1980	-10.33	-13.75	-12.05		271.658			
1979						-0.4931		
1978				283				
1974								5.55
1972				293				
1970	-10.39	-12.63	-13.05		229.564			
1969						0.881		
1967				280				
1964								5.27
1963				289				
1962						-0.2835	78.38	
1960	-9.74	-13.74	-12.97	283	221.999			
1955				293				
1954								5.27
1950	-9.22	-12.78	-13.53		235.187			
1949						0.2262		
1947				295				
1945				269				
1944						-0.076		5.02
1940	-9.43	-13.46	-14.23		246.46			
1936				272		0.7179		
1934								4.73
1933						0.4019		

1930	-9.85	-13.29	-13.11	274	200.585			
1926				282				
1924							71.47	4.61
1923				273				
1922						0.7575		
1920	-9.74	-14.22	-11.4		211.999			
1916				287				
1914								4.41
1913				289				
1911				284				
1910	-10.86	-14.18	-12.9		201.094			
1909				278				
1905				278				
1904							69.18	4.37
1901						0.5726		
1900	-10.16	-14.1	-15.39	268	249.633			
1898				277				
1894				271				4.24
1893						0.5513		
1891				274				
1890	-9.89	-12.28	-15.3		244.888			
1887				270				
1885						0.7184		
1884							71.15	4
1881				260				
1880	-11.63	-15.86	-13.53		216.14			
1875				263				
1874								3.83
1872				262				
1870	-10	-14.77	-13.34		203.133	0.4348		
1865				264				
1864								3.73
1863							72.2	
1862						1.156		
1861				262				
1860	-10.08	-15.29	-14.33		217.662			
1858				274				
1856				254				
1854								4.71
1851						1.371		
1850	-10.56	-14.75	-15.02	260	229.722			
1845				266				
1844								3.69
1843						0.3968		
1841							66.78	
1840	-10.24	-17.14	-14.74	269	220.457			
1835								4.1

1832				276				
1830	-10.77	-14.38	-13.87	274	206.425			

Note: All plots were fitted using spline smoothing with a spline tension factor of 2 and 200 number of points.