

1 **A DOM continuum from the roof of the world – Tibetan molecular dissolved organic**
2 **matter characteristics track sources, land use effects, and processing along the fluvial-**
3 **limnic pathway**

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5 Supplementary material

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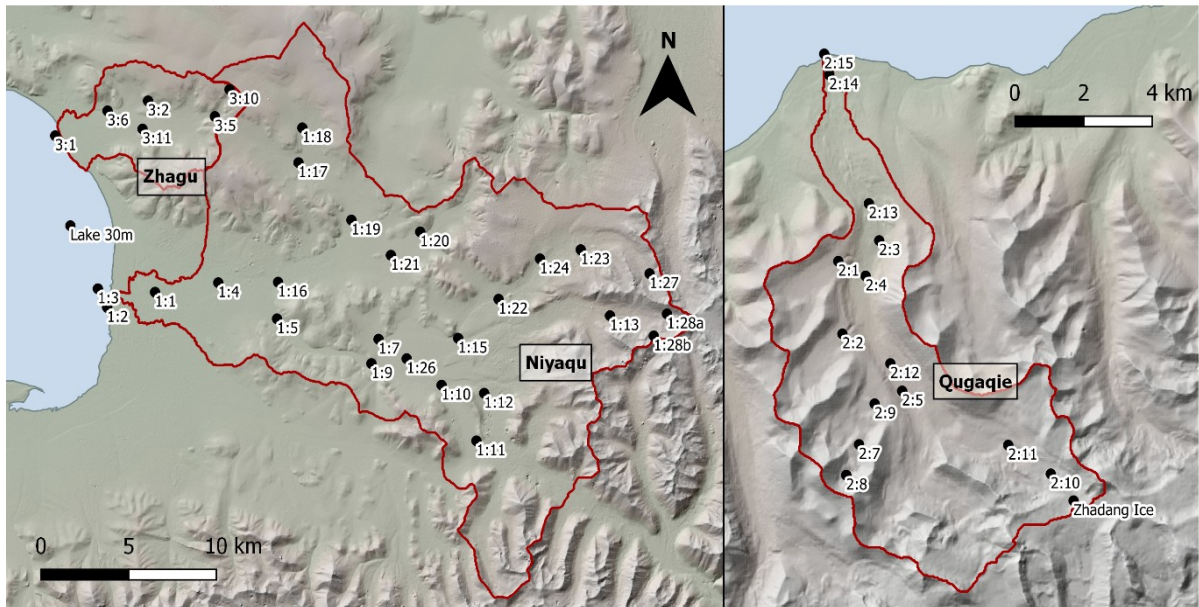
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● Sample Point

Data Source: JAXA ALOS World 3D - 30m (AW3030)
 Coordinate System: WGS 84/ UTM zone 46N EPSG:3264
 Landsat 5, 7, 8 imagery courtesy of the U.S. Geological Survey

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18 Figure S1: Individual IDs for the samples

19 Table S1: Multiple pairwise comparisons (Kruskal-Wallis H) with Bonferroni post-hoc correction for
 20 the independent factor: Site. Significance level $\alpha = 0.05$ (p value) are only reported when significant
 21 within groups, *n.s.* = not significant. Degrees of freedom: 2. Significant differences of sites are given
 22 for significant tests, letters (*a,b*) denote significant differences between groups.

Parameter	p value	Niyaqu	Qugaqie	Zhagu
N molecular count	<i>n.s.</i>			
S molecular count	0.005	<i>a</i>	<i>b</i>	<i>a,b</i>
P molecular count	<i>n.s.</i>			
$A_{i_{mod}}$	<i>n.s.</i>			
DBE	<i>n.s.</i>			
Total molecular count	<i>n.s.</i>			
AROR	<i>n.s.</i>			
AROP	<i>n.s.</i>			
HUSOR	0.000	<i>a</i>	<i>b</i>	<i>a</i>
HUSOP	0.000	<i>a</i>	<i>b</i>	<i>a,b</i>
USOR	0.020	<i>a</i>	<i>b</i>	<i>a,b</i>
USOP	0.007	<i>a</i>	<i>a</i>	<i>b</i>
USN	<i>n.s.</i>			
SAT	<i>n.s.</i>			
I_{DEG}	0.004	<i>a</i>	<i>a</i>	<i>b</i>
I_{TERR}	<i>n.s.</i>			
I_{OS}	0.04	<i>a</i>	<i>a</i>	<i>b</i>
CHO	0.04	<i>a,b</i>	<i>a</i>	<i>b</i>
OC	<i>n.s.</i>			
HC	0.009	<i>a</i>	<i>b</i>	<i>a, b</i>

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26 Table S2: Multiple pairwise comparisons (Kruskal-Wallis H) with Bonferroni post-hoc correction for
 27 the independent factor: Sample categories. Significance level $\alpha = 0.05$ (p value) are only reported
 28 when significant within groups, *n.s.* = not significant. Degrees of freedom: 2. Significant differences of
 29 sites are given for significant tests, letters (*a,b*) denote significant differences between groups.

Parameter	p value	Glacial effluent	Stream water	Brackish water
N molecular count	<i>n.s.</i>			
S molecular count	<i>n.s.</i>			
P molecular count	<i>n.s.</i>			
Ai_{mod}	<i>n.s.</i>			
DBE	<i>n.s.</i>			
Total molecular count	<i>n.s.</i>			
AROR	<i>n.s.</i>			
AROP	0.05	<i>a</i>	<i>a,b</i>	<i>b</i>
HUSOR	<i>n.s.</i>			
HUSOP	<i>n.s.</i>			
USOR	<i>n.s.</i>			
USOP	<i>n.s.</i>			
USN	<i>n.s.</i>			
SAT	<i>n.s.</i>			
I_{DEG}	<i>n.s.</i>			
I_{TERR}	<i>n.s.</i>			
IoS	<i>n.s.</i>			
CHO	<i>n.s.</i>			
OC	<i>n.s.</i>			
HC	<i>n.s.</i>			

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31 Table S3: Loadings of the samples for the three NMDS dimensions. SCN = Niyaqu catchment, SCQ =
 32 Qugaqie catchment, SCZ =Zhagu catchment.

Sample ID	NMDS 1	NMDS 2	NMDS 3
SCN_1_2	0,087685	-1,1772	0,346675
SCN_1_4	0,072454	-1,06426	0,291306
SCN_1_1	-0,11736	-0,622	0,06511
SCN_1_16	0,074152	-1,206	0,336504
SCN_1_17	0,059853	-1,17546	0,293232
SCN_1_18	0,054424	-1,16704	0,402607
SCN_1_19	-0,02776	-0,96675	0,213587
SCN_1_20	-0,03149	-1,06611	0,11981
SCN_1_3	-0,3843	-0,09443	-0,07249
SCN_1_22	-0,00024	-1,01415	0,179729
SCN_1_23	0,147413	-1,29735	0,56202
SCN_1_24	0,00635	-0,95761	0,152191
SCN_1_27	0,052577	-1,09517	0,232781
SCN_1_28a	0,344206	-0,21461	0,159075
SCN_1_28b	0,658598	-0,4567	0,205128
SCQ_2_1	0,122104	-1,2393	0,527872
SCQ_2_2	0,004387	-0,11855	-0,10717
SCQ_2_3	-0,01154	-0,4253	-0,0564
SCQ_2_5	0,157962	-0,98272	0,342997
SCQ_2_7	0,263631	-1,07548	0,495036
SCQ_2_10	0,235255	-0,96557	0,4106
SCQ_2_11	0,143729	-1,16501	0,428035

SCQ_2_12	0,15865	-1,09184	0,404203
SCN_1_5	0,011563	-0,36718	-0,08663
SCQ_2_14	-0,02347	-0,1637	-0,19761
SCQ_2_15	-0,02501	-0,24661	-0,1092
SCN_1_6	0,237413	-1,22035	1,052236
SCZ_3_2	0,031523	-0,38182	-0,08328
SCZ_3_5	-0,08282	-0,92493	0,022167
SCZ_3_6	-0,06704	-0,28087	-0,15221
SCQ_Zhadang_Ice	0,303771	-0,83211	0,430128
SCN_1_21	0,312109	-0,00836	0,147803
SCQ_2_4	-0,28489	-0,35436	-0,13942
SCQ_2_8	0,134136	-0,22386	0,011247
SCQ_2_9	0,152178	-0,37412	0,042017
SCQ_2_13	0,483425	-0,64943	0,133389
SCN_1_7	0,254065	-0,9631	1,056203
SCN_1_9	0,339653	-0,95607	1,101475
SCN_1_10	0,296664	-0,8365	0,993272
SCN_1_11	0,286045	-0,86696	0,971239
SCN_1_12	-0,23311	-0,79461	0,000412
SCN_1_13	-0,19292	-0,94946	0,060638
SCN_1_15	-0,15378	-1,00839	0,110429

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34 Table S4: Scores of the internal variables for the two major NMDS dimensions.

Internal variable	NMDS 1	NMDS 2
ARO	-0. 84985682690839	0. 527013637164355
USAT	0. 854196719207775	0. 519949963837554
HUSAT	-0. 407913273347075	0. 913020679627397
SAT	0. 818688729963233	0. 574237549652745
IDEG	-0. 999240657827933	0. 0389629021455057
IOS	-0. 991295354085005	0. 131656830318386
ITERR	-0. 999524929030953	0. 0308207113102116
Almod	-0. 994525776528508	-0. 104491529897732
N	0. 0535023920603983	0. 998567721310786
P	-0. 0509217017689782	0. 998702648584127
S	0. 483014615080082	0. 875612289554595

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40 Table S5: Scores of the external variables for the two major NMDS dimensions

External variable	NMDS 1	NMDS 2
FDOM	-0. 783975814707886	-0. 620791367492418
DIC	0. 8054726857903	-0. 592632898551675
DOC	-0. 837542331836805	-0. 546372439258577
$\delta^{13}C$	-0. 781167390095403	-0. 624321638782076
Plant Cover	-0. 84121127196077	-0. 540706571003297
NO3	-0. 571521267093232	0. 820587253898174

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42 Table S6: Goodness of fit (R²) and p value of the internal variable vectors. Significant < α (0.05)
 43 variables are marked bold.

Internal variable	R²	p value
ARO	0.919	0.001
USAT	0.882	0.001
HUSAT	0.932	0.001
SAT	0.549	0.001
IDEG	0.626	0.001
IOS	0.052	0.31
ITERR	0.349	0.001
Almod	0.664	0.001
N	0.887	0.001
P	0.554	0.001
S	0.77	0.001

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45 Table S7: Goodness of fit (R²) and p value of the external variable vectors. Significant < α (0.05)
 46 variables are marked bold.

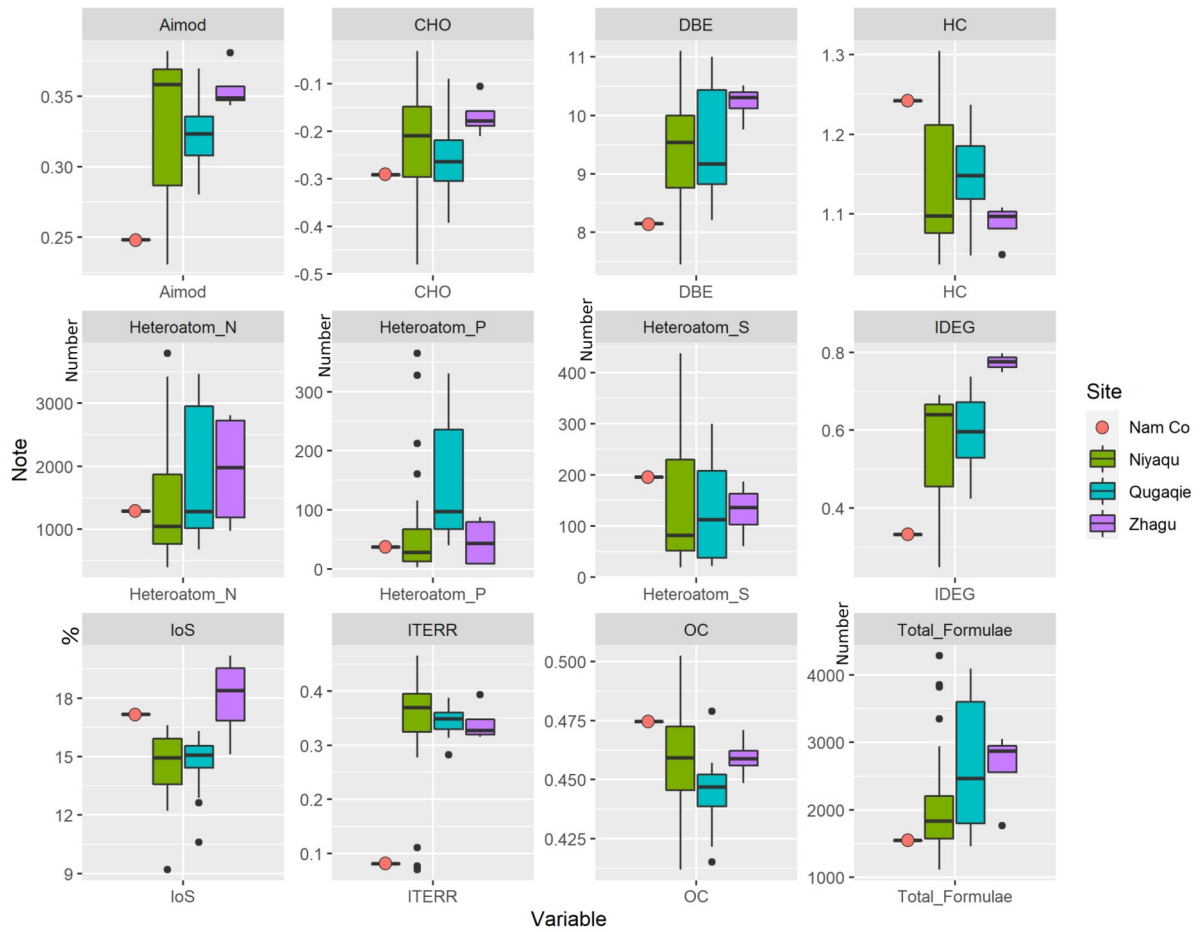
External variable	R²	p value
FDOM	0.197	0.019
DIC	0.209	0.006
DOC	0.116	0.089
$\delta^{13}C$	0.016	0.7
Plant Cover	0.051	0.345
NO3	0.095	0.118

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48 Table S8: Extraction efficiency of SPE-DOC samples; SCN =Niyaqu, SCQ= Qugaqie, SCZ = Zhagu, SCL=
 49 Lake Nam Co.

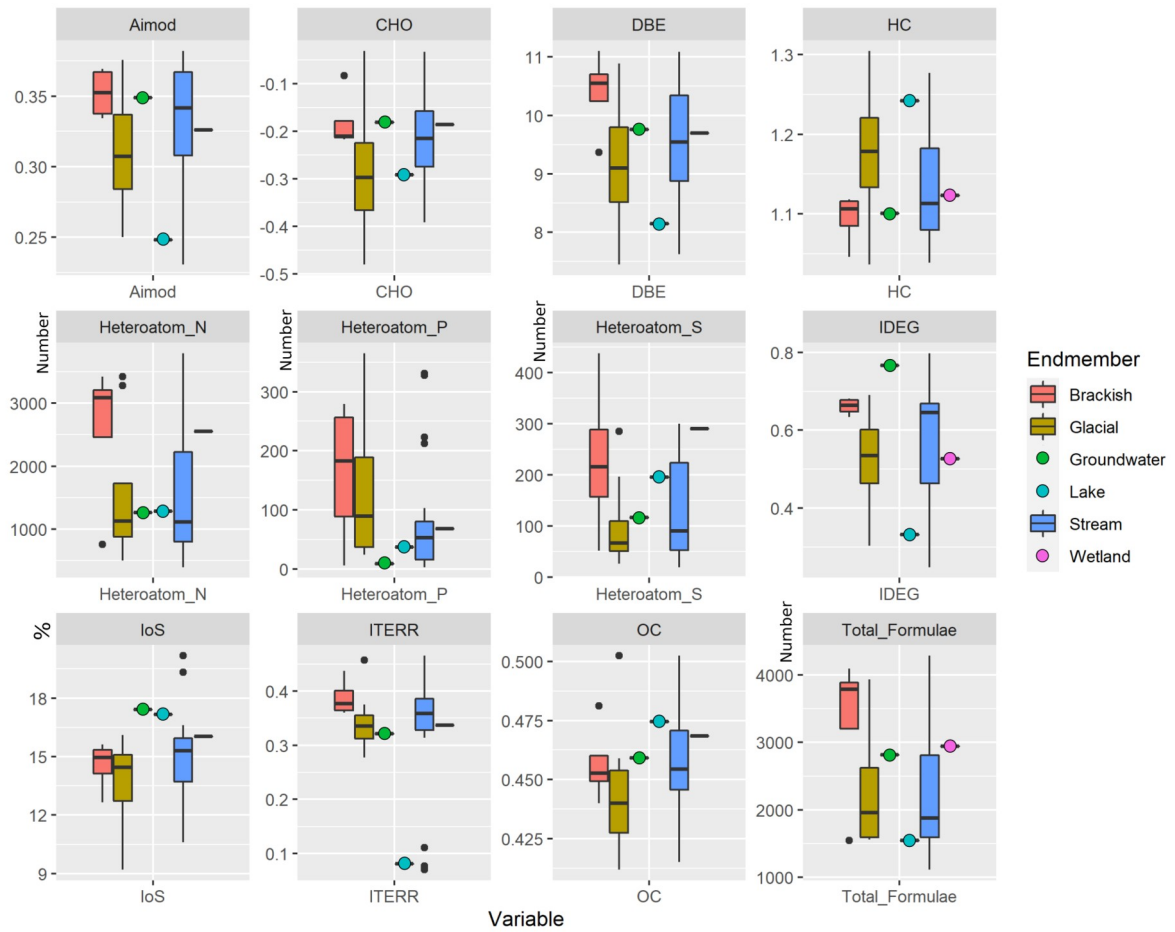
Sample ID	Extraction efficiency [%]
SCN_1_1	61.1
SCN_1_2	77.1
SCN_1_3	50.2
SCN_1_4	45.2
SCN_1_5	45.9
SCN_1_6	98.2
SCN_1_7	57.7
SCN_1_9	67.0
SCN_1_10	74.9
SCN_1_11	56.2
SCN_1_12	60.9
SCN_1_1	27.3
SCN_1_15	16.8
SCN_1_16	78.9
SCN_1_17	83.2
SCN_1_18	63.8
SCN_1_19	83.3
SCN_1_20	92.7
SCN_1_21	91.5
SCN_1_22	68.4
SCN_1_23	84.7

SCN_1_24	55.5
SCN_1_2	79.6
SCN_1_27	84.7
SCN_1_28a	>50%; initial DOC < 25 $\mu\text{M L}^{-1}$
SCN_1_28b	>50%; initial DOC < 25 $\mu\text{M L}^{-1}$
SCQ_2_1	46.8
SCQ_2_2	43.7
SCQ_2_3	52.8
SCQ_2_4	50.6
SCQ_2_5	45.5
SCQ_2_6	55.9
SCQ_2_7	37.7
SCQ_2_8	43.8
SCQ_2_9	52.5
SCQ_2_10	37.8
SCQ_2_11	54.7
SCQ_2_12	43.7
SCQ_2_13	84.1
SCQ_2_14	44.1
SCQ_2_15	67.5
SCQ_Zhadang_Ice	>50%; initial DOC < 25 $\mu\text{M L}^{-1}$
SCZ_3_1	34.1
SCZ_3_2	73.0
SCZ_3_5	50.1
SCZ_3_6	15.0
SCZ_3_10	91.3
SCL_SC2	41.0
IHSS Standard	60.6



51 Figure S2: Boxplots corresponding to Table 1 of the main text body. Sites with $n < 3$ are expressed as
 52 individual points.

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54 Figure S3: Boxplots corresponding to Table 2 of the main text body. Endmembers and sample
 55 categories with n<3 are expressed as individual points.