

# **Hydrochemical and Isotopic Characterization of the Impact of Water Diversion on Water in Drainage Channels, Groundwater, and Lake Ulansuhai in China**

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## **Supplementary Materials**

Table S1. Measurement methods and detectable limits for the monitoring of hydrochemical indices.

Table S2. The contribution rate of different water bodies to lake water based on IsoSource software.

Table S1. Measurement methods and detectable limits for the monitoring of hydrochemical indices.

Index	Unit	Measuring Site	Measuring Method	Detectable Limit
pH	—	Field	HANNA-HI9828	—
Temperature	°C	Field	HANNA-HI9828	—
ORP	mV	Field	HANNA-HI9828	—
TDS	mg/L	Field	HANNA-HI9828	1
K <sup>+</sup>	mg/L	Lab	ICS-2100	0.006
Na <sup>+</sup>	mg/L	Lab	ICS-2100	0.005
Ca <sup>2+</sup>	mg/L	Lab	ICS-2100	0.005
Mg <sup>2+</sup>	mg/L	Lab	ICS-2100	0.003
Cl <sup>-</sup>	mg/L	Lab	ICS-2100	0.005
SO <sub>4</sub> <sup>2-</sup>	mg/L	Lab	ICS-2100	0.007
HCO <sub>3</sub> <sup>-</sup>	mg/L	Lab	Acid-base titration	0.01
NH <sub>4</sub> <sup>+</sup> -N	mg/L	Lab	Spectrophotometer UV1102	0.025
NO <sub>3</sub> <sup>-</sup> -N	mg/L	Lab	Spectrophotometer UV1102	0.08
δD	‰	Lab	PICARRO L2140-i	—
δ <sup>18</sup> O	‰	Lab	PICARRO L2140-i	—

The 133 possible results (solutions, can be seen in Table S2) are calculated by the use of IsoSource software, which is a program written in Microsoft Visual Basic® for Windows® operating systems by Robert Gibson (Computer Sciences Corp.) to perform the stable isotope mixing model calculations. In this open access software, the results can be calculated after the isotopic values representing the end elements of water bodies are assigned, and the tolerance error value is input. If multiple solutions are obtained, it is necessary to eliminate unreasonable solutions in combination with other information, and finally get the unique solution.

For more information and operation methods of the software, please refer to, which will not be repeated in this file:

Donald, L. P., Jillian, W. G. Source partitioning using stable isotopes: coping with too many sources. *Oecologia*. 2002, 136(2), 261-269. <https://doi.org/10.1007/s00442-003-1218-3>.

Table S2. The contribution rate of different water bodies to lake water based on IsoSource software.

Possible results	Drainage channel	West bank groundwater	Precipitation	East bank groundwater
1	0	0.04	0.59	0.37
2	0	0.22	0.54	0.24
3	0	0.33	0.51	0.16
4	0	0.44	0.48	0.08
5	0	0.55	0.45	0
6	0.01	0.1	0.57	0.32
7	0.01	0.21	0.54	0.24
8	0.01	0.39	0.49	0.11
9	0.01	0.5	0.46	0.03
10	0.02	0.05	0.58	0.35
11	0.02	0.16	0.55	0.27
12	0.02	0.27	0.52	0.19
13	0.03	0.11	0.56	0.3
14	0.03	0.22	0.53	0.22
15	0.03	0.33	0.5	0.14
16	0.03	0.44	0.47	0.06
17	0.04	0.17	0.54	0.25
18	0.04	0.28	0.51	0.17
19	0.04	0.39	0.48	0.09

Possible results	Drainage channel	West bank groundwater	Precipitation	East bank groundwater
20	0.04	0.5	0.45	0.01
21	0.05	0.05	0.57	0.33
22	0.05	0.16	0.54	0.25
23	0.05	0.34	0.49	0.12
24	0.05	0.45	0.46	0.04
25	0.06	0	0.58	0.36
26	0.06	0.11	0.55	0.28
27	0.06	0.22	0.52	0.2
28	0.07	0.06	0.56	0.31
29	0.07	0.17	0.53	0.23
30	0.07	0.28	0.5	0.15
31	0.07	0.39	0.47	0.07
32	0.08	0.12	0.54	0.26
33	0.08	0.23	0.51	0.18
34	0.08	0.34	0.48	0.1
35	0.08	0.45	0.45	0.02
36	0.09	0	0.57	0.34
37	0.09	0.11	0.54	0.26
38	0.09	0.29	0.49	0.13
39	0.09	0.4	0.46	0.05
40	0.1	0.06	0.55	0.29
41	0.1	0.17	0.52	0.21
42	0.1	0.46	0.44	0
43	0.11	0.01	0.56	0.32
44	0.11	0.12	0.53	0.24
45	0.11	0.23	0.5	0.16
46	0.11	0.34	0.47	0.08
47	0.12	0.07	0.54	0.27
48	0.12	0.18	0.51	0.19
49	0.12	0.29	0.48	0.11
50	0.12	0.4	0.45	0.03
51	0.13	0.06	0.54	0.27
52	0.13	0.24	0.49	0.14
53	0.13	0.35	0.46	0.06
54	0.14	0.01	0.55	0.3
55	0.14	0.12	0.52	0.22
56	0.14	0.41	0.44	0.01
57	0.15	0.07	0.53	0.25
58	0.15	0.18	0.5	0.17
59	0.15	0.29	0.47	0.09
60	0.16	0.02	0.54	0.28
61	0.16	0.13	0.51	0.2
62	0.16	0.24	0.48	0.12

Possible results	Drainage channel	West bank groundwater	Precipitation	East bank groundwater
63	0.16	0.35	0.45	0.04
64	0.17	0.01	0.54	0.28
65	0.17	0.19	0.49	0.15
66	0.17	0.3	0.46	0.07
67	0.18	0.07	0.52	0.23
68	0.18	0.36	0.44	0.02
69	0.19	0.02	0.53	0.26
70	0.19	0.13	0.5	0.18
71	0.19	0.24	0.47	0.1
72	0.2	0.08	0.51	0.21
73	0.2	0.19	0.48	0.13
74	0.2	0.3	0.45	0.05
75	0.21	0.14	0.49	0.16
76	0.21	0.25	0.46	0.08
77	0.21	0.36	0.43	0
78	0.22	0.02	0.52	0.24
79	0.22	0.31	0.44	0.03
80	0.23	0.08	0.5	0.19
81	0.23	0.19	0.47	0.11
82	0.24	0.03	0.51	0.22
83	0.24	0.14	0.48	0.14
84	0.24	0.25	0.45	0.06
85	0.25	0.09	0.49	0.17
86	0.25	0.2	0.46	0.09
87	0.25	0.31	0.43	0.01
88	0.26	0.26	0.44	0.04
89	0.27	0.03	0.5	0.2
90	0.27	0.14	0.47	0.12
91	0.28	0.09	0.48	0.15
92	0.28	0.2	0.45	0.07
93	0.29	0.04	0.49	0.18
94	0.29	0.15	0.46	0.1
95	0.29	0.26	0.43	0.02
96	0.3	0.21	0.44	0.05
97	0.31	0.09	0.47	0.13
98	0.31	0.27	0.42	0
99	0.32	0.04	0.48	0.16
100	0.32	0.15	0.45	0.08
101	0.32	0.26	0.42	0
102	0.33	0.1	0.46	0.11
103	0.33	0.21	0.43	0.03
104	0.34	0.16	0.44	0.06
105	0.35	0.04	0.47	0.14

Possible results	Drainage channel	West bank groundwater	Precipitation	East bank groundwater
106	0.35	0.22	0.42	0.01
107	0.36	0.1	0.45	0.09
108	0.36	0.21	0.42	0.01
109	0.37	0.05	0.46	0.12
110	0.37	0.16	0.43	0.04
111	0.38	0.11	0.44	0.07
112	0.39	0.17	0.42	0.02
113	0.4	0.05	0.45	0.1
114	0.4	0.16	0.42	0.02
115	0.41	0	0.46	0.13
116	0.41	0.11	0.43	0.05
117	0.42	0.06	0.44	0.08
118	0.42	0.17	0.41	0
119	0.43	0.12	0.42	0.03
120	0.44	0	0.45	0.11
121	0.44	0.11	0.42	0.03
122	0.45	0.06	0.43	0.06
123	0.46	0.01	0.44	0.09
124	0.46	0.12	0.41	0.01
125	0.47	0.07	0.42	0.04
126	0.48	0.06	0.42	0.04
127	0.49	0.01	0.43	0.07
128	0.52	0.06	0.37	0.05
129	0.53	0.07	0.38	0.02
130	0.54	0.03	0.38	0.05
131	0.56	0.07	0.36	0.01
132	0.59	0.02	0.36	0.03
133	0.6	0.02	0.38	0.01