**Table 1**

The chemical and isotopic data for samples from Nansi Lake and surrounding area, collected in July 2018 and January 2019.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample  ID | Site | Latitude(N) and  Longitude (E) | Sampling  period | T  (℃) | pH | EC  (μs/cm) | HCO3-(mg/L) | SO42-  (mg/L) | Cl­-  (mg/L) | NO3-  (mg/L) | K+  (mg/L) | Na+  (mg/L) | Mg2+  (mg/L) | Ca2+  (mg/L) | δ34Sso4  (‰) | δ18Oso4  (‰) |
| S1 | Hanzhuang  Canal | N34º35'14.8"  E117º23'8.9" | Nondiversion | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
|  | Diversion | 3.2 | 8.22 | 820 | 315.34 | 142.06 | 66.61 | 4.79 | 3.62 | 48.42 | 69.79 | 104.08 | 7.54 | 8.00 |
| S2 | Panlong  River | N 34º45'39.6"  E117º11'38.1" | Nondiversion | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
|  | Diversion | 4.3 | 7.76 | 992 | 256.06 | 350.14 | 62.56 | 2.46 | 2.99 | 54.95 | 13.32 | 79.35 | 7.99 | 8.97 |
| S3 | Chengguo  River | N34º57'38.8"  E116º58'43.1" | Nondiversion | 31.2 | 8.21 | 2370 | 159.78 | 685.49 | 184.95 | 2.59 | 11.63 | 415.24 | 4.11 | 117.31 | -0.07 | 10.12 |
|  | Diversion | 4.0 | 8.11 | 1011 | 248.83 | 263.02 | 101.44 | 0.71 | 8.34 | 146.83 | 20.30 | 56.53 | 7.87 | 8.87 |
| S4 | Zhaoyang  sublake | N 35º00'29.1"  E116º53'53.4" | Nondiversion | 31.1 | 7.66 | 1027 | 191.85 | 158.08 | 120.92 | 4.16 | 1.65 | 101.48 | 1.32 | 73.39 | 9.50 | 8.33 |
|  | Diversion | 4.3 | 8.14 | 768 | 246.59 | 170.49 | 73.76 | 1.11 | 3.08 | 101.85 | 19.19 | 64.58 | 11.78 | 8.60 |
| S5 | Dushan  sublake | N 35º04'33.6"  E116º50'59.4" | Nondiversion | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
|  | Diversion | 3.8 | 8.05 | 867 | 270.01 | 194.66 | 97.08 | 0.36 | 6.11 | 117.07 | 23.04 | 57.34 | 14.63 | 9.88 |
| S6 | Baima  River | N 35º08'28.0"  E116º41'42.0" | Nondiversion | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
|  | Diversion | 1.8 | 8.47 | 1448 | 292.92 | 477.82 | 187.22 | 3.13 | 14.48 | 217.30 | 37.38 | 128.61 | 9.47 | 9.32 |
| S7 | Dongyu  River | N34º59'56.5"  E116º43'57.5" | Nondiversion | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
|  | Diversion | 3.5 | 8.10 | 1474 | 368.65 | 381.17 | 217.97 | 0.75 | 13.41 | 297.19 | 48.59 | 78.08 | 7.60 | 9.17 |
| S8 | Ground-  water | N 35º18'43.2"  E116º42'2.7" | Nondiversion | 18.0 | 7.13 | 1610 | 506.47 | 91.17 | 181.24 | 15.44 | 1.39 | 68.91 | 10.19 | 143.81 | 4.82 | 6.34 |
|  | Diversion | 16.2 | 7.02 | 1988 | 686.72 | 286.42 | 253.03 | 10.08 | 2.54 | 159.15 | 91.64 | 213.07 | 5.51 | 5.24 |
| S9 | Sihe  River | N 35º18'19.0"  E116º43'47.0" | Nondiversion | 31.6 | 8.11 | 1969 | 143.89 | 424.43 | 244.78 | 0.347 | 2.29 | 224.45 | 2.58 | 80.26 | 5.57 | 9.67 |
|  | Diversion | 2.6 | 8.13 | 1185 | 245.10 | 309.65 | 175.15 | 0.48 | 10.92 | 186.35 | 16.73 | 102.16 | 4.62 | 6.27 |

**Table 1** (continued)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample  ID | Site | Latitude(N) and  Longitude (E) | Sampling  period | T  (℃) | pH | EC  (μs/cm) | HCO3-(mg/L) | SO42-  (mg/L) | Cl­-  (mg/L) | NO3-  (mg/L) | K+  (mg/L) | Na+  (mg/L) | Mg2+  (mg/L) | Ca2+  (mg/L) | δ34Sso4  (‰) | δ18Oso4  (‰) |
| S10 | Nanyang  sublake(NE) | N 35º16'2.3"  E116º37'59.6" | Nondiversion | 29.1 | 8.35 | 1283 | 188.50 | 227.65 | 145.08 | 0.07 | 24.29 | 138.80 | 4.89 | 38.45 | 12.50 | 10.87 |
|  | Diversion | 2.7 | 8.42 | 1001 | 278.11 | 631.50 | 262.02 | 1.03 | 7.27 | 150.97 | 26.17 | 55.52 | 14.10 | 9.45 |
| S11 | Old  Canal | N 35º19'59.4"  E116º37'13.2" | Nondiversion | 29.4 | 8.05 | 976 | 214.31 | 149.00 | 97.628 | 0.008 | 14.91 | 87.26 | 1.93 | 49.16 | 11.64 | 9.08 |
|  | Diversion | 5.9 | 8.19 | 1144 | 333.13 | 559.69 | 213.53 | 6.10 | 13.95 | 172.80 | 32.85 | 97.70 | 14.42 | 9.51 |
| S12 | Guangfu  River | N 35º20'7.7"  E116º37'13.2" | Nondiversion | 31.0 | 8.06 | 1569 | 274.81 | 197.46 | 201.62 | 3.38 | 8.03 | 236.54 | 6.33 | 84.59 | 10.25 | 7.59 |
|  | Diversion | 4.8 | 8.19 | 1191 | 389.66 | 229.61 | 164.41 | 9.51 | 9.32 | 151.60 | 31.25 | 101.55 | 11.07 | 8.04 |
| S13 | Zhushui  River | N 35º15'34.6"  E116º33'19.8" | Nondiversion | 29.2 | 7.81 | 1426 | 263.29 | 217.35 | 154.87 | 0.09 | 2.64 | 210.93 | 7.11 | 61.01 | 13.78 | 11.16 |
|  | Diversion | 3.7 | 8.19 | 1794 | 371.65 | 288.23 | 128.59 | 0.64 | 8.51 | 295.66 | 64.42 | 118.90 | 10.77 | 11.74 |
| S14 | Zhuzhaoxin River | N 35º12'21.8"  E116º34'45.8" | Nondiversion | 29.8 | 8.79 | 2370 | 237.63 | 590.65 | 212.94 | 0.03 | 9.15 | 429.70 | 8.34 | 61.98 | 22.15 | 13.45 |
|  | Diversion | 4.7 | 8.25 | 1886 | 337.13 | 671.32 | 246.85 | 0.83 | 3.26 | 357.04 | 56.55 | 79.60 | 14.55 | 11.81 |
| S15 | Wanfu  River | N 35º10'3.5"  E116º35'11.1" | Nondiversion | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
|  | Diversion | 2.6 | 8.52 | 1650 | 444.68 | 445.71 | 219.90 | 1.15 | 5.13 | 262.89 | 64.48 | 115.25 | 12.84 | 11.13 |
| S16 | Nanyang  sublake(SW) | N 35º06'24.5"  E116º39'4.6" | Nondiversion | 29.5 | 8.50 | 1388 | 245.51 | 215.28 | 155.51 | 0.52 | 2.64 | 226.59 | 7.77 | 41.81 | 13.35 | 11.22 |
|  | Diversion | 3.5 | 8.40 | 1150 | 344.64 | 273.19 | 138.02 | 0.40 | 12.52 | 170.33 | 42.85 | 62.65 | 12.86 | 9.43 |
| S17 | Old Wanfu River | N 35º05'13.9"  E116º37'40.6" | Nondiversion | 29.8 | 7.93 | 2110 | 370.88 | 337.13 | 232.74 | 0.47 | 5.37 | 522.48 | 17.40 | 77.67 | 13.14 | 11.06 |
|  | Diversion | 3.5 | 7.67 | 1967 | 451.18 | 524.67 | 320.66 | 0.20 | 10.83 | 340.86 | 73.42 | 83.24 | 13.55 | 10.09 |

-- meaning no data

**Table 2**

Contributions of sulfate from different inflowing rivers and evaporite dissolution in Nanyang sublake during the nondiversion water period.

|  |  |  |  |
| --- | --- | --- | --- |
| Sources | δ34SSO4 (‰) | δ34SSO4(‰) in Nanyang sublake | Contribution (%) |
| Sihe River | 5.57 | 12.50 | 7.74 |
| Guangfu River | 10.25 | 12.50 | 11.44 |
| Zhushui River | 13.78 | 12.50 | 21.89 |
| Zhuzhaoxin River | 22.15 | 13.35 | 0.77 |
| Old Wanfu River | 13.14 | 13.35 | 32.56 |
| Evaporite dissolution | 15.70 | 12.50 | 25.60 |

**Table 3**

Contributions of sulfate from different inflowing rivers into the NSL in diversion water period.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sample ID | Site | δ34SSO4 (‰) | δ34SSO4(‰) in sublake | Contribution (%) |
| S1 | Hanzhuang Canal | 7.54 | 11.78 | 5.34 |
| S2 | Panlong River | 7.99 | 11.78 | 5.65 |
| S3 | Chengguo River | 7.87 | 11.78 | 5.56 |
| S6 | Baima River | 9.47 | 14.63 | 2.86 |
| S7 | Dongyu River | 7.60 | 14.63 | 2.20 |
| S9 | Sihe River | 4.62 | 14.10 | 1.20 |
| S11 | Old Canal | 14.42 | 14.10 | 7.54 |
| S12 | Guangfu River | 11.07 | 14.10 | 0.80 |
| S13 | Zhushui River | 10.77 | 14.10 | 1.21 |
| S14 | Zhuzhaoxin River | 14.55 | 14.10 | 7.12 |
| S15 | Wanfu River | 12.84 | 12.86 | 8.10 |
| S17 | Old Wanfu River | 13.55 | 12.86 | 0.24 |