**Table S1. Geographic information for sampling points of Kyrgyzstan in 2016**

| No. | Sampling date | Sample place | Latitude | Longitude | Elavation |
| --- | --- | --- | --- | --- | --- |
| 1 | 2016/5/17 | AK-TUZ | 42.89 | 76.16 | 2313 |
| 2 | 2016/5/17 | AK-TUZ | 42.83 | 76.02 | 1668 |
| 3 | 2016/5/18 | Chon-Kemin | 42.76 | 76.26 | 1769 |
| 4 | 2016/5/18 | Chon-Kemin | 42.69 | 75.98 | 1402 |
| 5 | 2016/5/19 | Ala-Archa | 42.57 | 74.48 | 2121 |
| 6 | 2016/5/19 | Ala-Archa | 42.76 | 74.57 | 1069 |
| 7 | 2016/5/19 | Alamedin | 42.62 | 74.67 | 1671 |
| 8 | 2016/5/19 | Alamedin | 42.79 | 74.65 | 1007 |
| 9 | 2016/5/20 | Sokuluk | 42.61 | 74.23 | 1503 |
| 10 | 2016/5/20 | Sokuluk | 42.86 | 74.28 | 718 |
| 11 | 2016/5/26 | Kozu-Baglan | 39.81 | 70.06 | 1224 |
| 12 | 2016/5/26 | Kozu-Baglan | 39.90 | 69.91 | 1003 |
| 13 | 2016/5/27 | Soh | 39.84 | 71.10 | 1262 |
| 14 | 2016/5/27 | Soh | 40.28 | 71.04 | 717 |
| 15 | 2016/5/28 | Kirkol | 40.26 | 72.74 | 1324 |
| 16 | 2016/5/28 | Ak-Suu | 40.14 | 71.73 | 1002 |
| 17 | 2016/5/28 | Isfairamsai | 40.02 | 72.09 | 1272 |
| 18 | 2016/5/28 | Isfairamsai | 40.24 | 72.04 | 914 |
| 19 | 2018/5/29 | Aravansai | 40.52 | 72.50 | 727 |
| 20 | 2016/5/29 | Kurshab | 40.18 | 73.50 | 1707 |
| 21 | 2016/5/29 | Kurshab | 40.66 | 73.13 | 939 |
| 22 | 2016/5/29 | Ak-Buura | 40.42 | 72.87 | 1114 |
| 23 | 2016/5/29 | Ak-Buura | 40.58 | 72.76 | 883 |
| 24 | 2016/5/30 | Jazy | 40.85 | 73.66 | 1299 |
| 25 | 2016/5/30 | Jazy | 40.82 | 73.22 | ??? |
| 26 | 2016/5/30 | Tar | 40.54 | 73.76 | 1428 |
| 27 | 2016/5/30 | Tar | 40.76 | 73.28 | 967 |
| 28 | 2016/5/31 | Kara-Shoro | 40.75 | 74.07 | 2241 |
| 29 | 2016/6/2 | Kok-Art | 41.15 | 73.29 | 1208 |
| 30 | 2016/6/2 | Kok-Art | 40.90 | 72.92 | 713 |
| 31 | 2016/6/4 | Tenteksai | 41.29 | 73.08 | 1064 |
| 32 | 2016/6/4 | Tenteksai | 41.03 | 72.73 | 719 |
| 33 | 2016/6/6 | Mailuu-Suu | 41.30 | 72.49 | 1018 |
| 34 | 2016/6/6 | Mailuu-Suu | 41.08 | 72.35 | 672 |
| 35 | 2016/6/8 | Naryn | 41.30 | 72.20 | - |
| 36 | 2016/6/9 | Naryn | 41.77 | 73.29 | 908 |
| 37 | 2016/6/10 | Torken | 41.89 | 73.22 | 1086 |
| 38 | 2016/6/10 | Torken | 41.83 | 73.15 | 913 |
| 39 | 2016/6/11 | Kara-Balta | 42.41 | 73.79 | 2026 |
| 40 | 2016/6/11 | Kara-Balta | 42.84 | 73.88 | 751 |
| 41 | 2016/9/14 | Kurkuroo | 42.42 | 71.07 | 1640 |
| 42 | 2016/9/14 | Kurkuroo | 42.51 | 71.12 | 1213 |
| 43 | 2016/9/15 | Kara-Buura | 42.46 | 71.54 | 1240 |
| 44 | 2016/9/15 | Kara-Buura | 42.60 | 71.63 | 933 |
| 45 | 2016/9/15 | Talas | 42.73 | 71.59 | 776 |
| 46 | 2016/9/16 | Yrmaral | 42.39 | 71.98 | 1314 |
| 47 | 2016/9/16 | Yrmaral | 42.56 | 71.94 | 1036 |
| 48 | 2016/9/17 | Besh-Tash | 42.39 | 72.28 | 1557 |
| 49 | 2016/9/17 | Besh-Tash | 42.45 | 72.29 | 1404 |
| 50 | 2016/9/17 | Talas | 42.54 | 72.21 | 1200 |
| 51 | 2016/9/18 | Ych-koshoi | 42.45 | 72.75 | 1720 |
| 52 | 2016/9/18 | Talas | 42.48 | 72.96 | 1952 |
| 53 | 2016/10/19 | Alabuga | 41.11 | 74.32 | 1965 |
| 54 | 2016/10/20 | Naryn City | 41.43 | 75.95 | 2026 |
| 55 | 2016/10/21 | At-Bashy | 41.23 | 76.24 | 2470 |
| 56 | 2016/10/21 | At-Bashy | 41.20 | 75.74 | 1996 |
| 57 | 2016/10/22 | Kichi Naryn | 41.50 | 76.42 | 2260 |
| 58 | 2016/10/22 | Chon Naryn | 41.50 | 76.42 | 2260 |
| 59 | 2016/10/23 | On-Archa | 41.57 | 75.87 | 2112 |
| 60 | 2016/10/23 | On-Archa | 41.56 | 75.85 | 2086 |
| 61 | 2016/10/24 | Jumgal | 42.06 | 75.02 | 2309 |
| 62 | 2016/10/24 | Jumgal | 41.89 | 74.44 | 1570 |
| 63 | 2016/10/25 | Kochkor | 42.23 | 75.75 | 1798 |
| 64 | 2016/10/25 | Kochkor | 42.30 | 75.87 | 1743 |
| 65 | 2016/10/26 | Chon Ak-Suu | 42.76 | 77.48 | 1857 |
| 66 | 2016/10/26 | Chon Ak-Suu | 42.72 | 77.47 | 1749 |
| 67 | 2016/10/27 | Tyup | 42.74 | 78.54 | 1859 |
| 68 | 2016/10/27 | Tyup | 42.74 | 78.35 | 1621 |
| 69 | 2016/10/28 | Jyrgalan | 42.65 | 78.88 | 1886 |
| 70 | 2016/10/28 | Jyrgalan | 42.59 | 78.39 | 16.19 |
| 71 | 2016/10/29 | Ak-Suu | 42.46 | 78.55 | 19.63 |
| 72 | 2016/10/29 | Ak-Suu | 42.51 | 78.53 | 1780 |
| 73 | 2016/10/30 | Karakol | 42.43 | 78.42 | 1944 |
| 74 | 2016/10/30 | Karakol | 42.50 | 78.37 | 1722 |
| 75 | 2016/10/31 | Chon Kyzyl-Suu | 42.29 | 78.11 | 2023 |
| 76 | 2016/10/31 | Chon Kyzyl-Suu | 42.35 | 78.00 | 1731 |
| 77 | 2016/11/1 | Juuku | 42.23 | 77.96 | 1946 |
| 78 | 2016/11/2 | Barskoon | 42.03 | 77.61 | 2229 |
| 79 | 2016/11/2 | Barskoon | 42.18 | 77.57 | 1609 |
| 80 | 2016/11/3 | Ak-Terek | 42.13 | 76.59 | 1939 |
| 81 | 2016/11/3 | Ak-Terek | 42.19 | 76.68 | 1700 |
| 82 | 2016/11/4 | Tuura-Suu | 42.25 | 76.35 | 1860 |
| 83 | 2016/11/4 | Tuura-Suu | 42.32 | 75.39 | 1665 |

**Table S2. Geographic information for sampling points of Kyrgyzstan in 2017**

| No. | Sampling date | Sample place | Latitude | Longitude | Elavation |
| --- | --- | --- | --- | --- | --- |
| 1 | 2017/5/5 | Ak-Suu (Ch) | 42.60 | 74.01 | 1370 |
| 2 | 2017/5/5 | Ak-Suu (Ch) | 42.84 | 74.08 | 734 |
| 3 | 2017/5/5 | Sokuluk | 42.61 | 74.23 | 1501 |
| 4 | 2017/5/5 | Sokuluk | 42.86 | 74.28 | 719 |
| 5 | 2017/5/6 | Ala-Archa | 42.57 | 74.48 | 2131 |
| 6 | 2017/5/6 | Ala-Archa | 42.76 | 74.57 | 1077 |
| 7 | 2017/5/7 | Alamedin | 42.62 | 74.67 | - |
| 8 | 2017/5/7 | Alamedin | 42.79 | 74.65 | 1008 |
| 9 | 2017/5/8 | On-Archa | 41.57 | 75.87 | 2119 |
| 10 | 2017/5/8 | On-Archa | 41.56 | 75.85 | 2093 |
| 11 | 2017/5/9 | Alabuga | 41.11 | 74.32 | 1964 |
| 12 | 2017/5/10 | At-Bashy | 41.23 | 76.24 | 2470 |
| 13 | 2017/5/10 | At-Bashy | 41.20 | 75.74 | 2003 |
| 14 | 2017/5/11 | Chon Naryn | 41.50 | 76.42 | 2270 |
| 15 | 2017/5/11 | Kichi Naryn | 41.50 | 76.42 | 2270 |
| 16 | 2017/5/11 | Naryn | 41.43 | 75.95 | 2028 |
| 17 | 2017/5/12 | Jumgal | 42.06 | 75.02 | 2300 |
| 18 | 2017/5/12 | Jumgal | 41.89 | 74.44 | 1570 |
| 19 | 2017/5/13 | Kochkor | 42.23 | 75.75 | 1802 |
| 20 | 2017/5/13 | Kochkor | 42.30 | 75.87 | 1750 |
| 21 | 2017/5/14 | Toru-Aigir | 42.51 | 76.41 | 1664 |
| 22 | 2017/5/14 | Toru-Aigir | 42.49 | 76.42 | 1639 |
| 23 | 2017/5/15 | Chon Ak-Suu | 42.76 | 77.48 | 1862 |
| 24 | 2017/5/15 | Chon Ak-Suu | 42.72 | 77.47 | 1745 |
| 25 | 2017/5/16 | Tyup | 42.74 | 78.84 | 1857 |
| 26 | 2017/5/16 | Tyup | 42.74 | 78.35 | 1623 |
| 27 | 2017/5/17 | Jyrgalan | 42.65 | 78.88 | 1903 |
| 28 | 2017/5/17 | Jyrgalan | 42.59 | 78.39 | 1634 |
| 29 | 2017/5/18 | Ak-Suu (Is) | 42.45 | 78.55 | 1976 |
| 30 | 2017/5/18 | Ak-Suu (Is) | 42.51 | 78.53 | 1774 |
| 31 | 2017/5/18 | Karakol | 42.43 | 78.43 | 1959 |
| 32 | 2017/5/18 | Karakol | 42.50 | 78.37 | 1722 |
| 33 | 2017/5/19 | Chon Kyzyl-Suu | 42.29 | 78.11 | 2023 |
| 34 | 2017/5/19 | Chon Kyzyl-Suu | 42.35 | 78.00 | 1736 |
| 35 | 2017/5/20 | Juuku | 42.23 | 77.96 | 1950 |
| 36 | 2017/5/20 | Juuku | 42.32 | 77.90 | 1693 |
| 37 | 2017/5/21 | Barskoon | 42.03 | 77.60 | 2210 |
| 38 | 2017/5/21 | Barskoon | 42.18 | 77.57 | 1615 |
| 39 | 2017/5/22 | Kumtor | 41.87 | 78.12 | 3618 |
| 40 | 2017/5/23 | Ak-Terek | 42.13 | 76.59 | 1935 |
| 41 | 2017/5/23 | Tuura-Suu | 42.25 | 76.35 | 1850 |
| 42 | 2017/5/23 | Tuura-Suu | 42.32 | 76.39 | 1664 |
| 43 | 2017/5/24 | Temir | 42.72 | 77.42 | 1793 |
| 44 | 2017/5/25 | Chon-Kemin | 42.76 | 76.22 | 1703 |
| 45 | 2017/5/25 | Chon-Kemin | 42.69 | 75.98 | 1401 |
| 46 | 2017/5/27 | Ak-Tuz | 42.89 | 76.16 | 2310 |
| 47 | 2017/5/27 | Ak-Tuz | 42.83 | 76.02 | 1664 |
| 48 | 2017/5/28 | Isik-Ata | 42.60 | 74.91 | 1862 |
| 49 | 2017/5/28 | Isik-Ata | 42.69 | 75.05 | 1161 |
| 50 | 2017/5/7 | Kozu-Baglan | 39.81 | 70.06 | 1237 |
| 51 | 2017/5/7 | Kozu-Baglan | 39.90 | 69.91 | 1009 |
| 52 | 2017/5/8 | Soh | 39.84 | 71.10 | 1275 |
| 53 | 2017/5/8 | Soh | 40.28 | 71.04 | 723 |
| 54 | 2017/5/9 | Ak-Suu | 40.01 | 71.79 | 1318 |
| 55 | 2017/5/9 | Ak-Suu | 40.14 | 71.73 | 990 |
| 56 | 2017/5/10 | Isfairam-Sai | 40.02 | 72.09 | 1285 |
| 57 | 2017/5/10 | Isfairam-Sai | 40.24 | 72.04 | 913 |
| 58 | 2017/5/11 | Aravan-Sai | 40.26 | 72.74 | 1323 |
| 59 | 2017/5/11 | Aravan-Sai | 40.52 | 72.50 | 730 |
| 60 | 2017/5/12 | Ak-Buura | 40.42 | 72.87 | 1122 |
| 61 | 2017/5/12 | Ak-Buura | 40.58 | 72.76 | 888 |
| 62 | 2017/5/13 | Kurshab | 40.17 | 73.50 | 1705 |
| 63 | 2017/5/13 | Kurshab | 40.66 | 73.13 | 944 |
| 64 | 2017/5/14 | Tar | 40.54 | 73.76 | 1429 |
| 65 | 2017/5/14 | Tar | 40.76 | 73.28 | 968 |
| 66 | 2017/5/15 | Jazy | 40.85 | 73.66 | 1298 |
| 67 | 2017/5/15 | Jazy | 40.82 | 73.22 | 901 |
| 68 | 2017/5/16 | Kok-Art | 41.15 | 73.29 | 1203 |
| 69 | 2017/5/16 | Kok-Art | 40.90 | 72.92 | 709 |
| 70 | 2017/5/16 | Achuu-Sai | 40.95 | 72.86 | 787 |
| 71 | 2017/5/17 | Tentek-Sai | 41.29 | 73.08 | 1071 |
| 72 | 2017/5/17 | Tentek-Sai | 41.03 | 72.73 | 707 |
| 73 | 2017/5/18 | Mailuu-Suu | 41.29 | 72.48 | 997 |
| 74 | 2017/5/18 | Mailuu-Suu | 41.08 | 72.35 | 666 |
| 75 | 2017/5/19 | Naryn | 41.77 | 73.29 | 895 |
| 76 | 2017/5/19 | Naryn | 41.30 | 72.20 | 533 |
| 77 | 2017/5/20 | Torken | 41.89 | 73.22 | 1074 |
| 78 | 2017/5/20 | Torken | 41.83 | 73.15 | 907 |
| 79 | 2017/5/21 | Talas | 42.73 | 71.59 | 772 |
| 80 | 2017/5/22 | Kurkuroo | 42.42 | 71.07 | 1637 |
| 81 | 2017/5/22 | Kurkuroo | 42.51 | 71.12 | 1215 |
| 82 | 2017/5/23 | Kara-Buura | 42.46 | 71.54 | 1247 |
| 83 | 2017/5/23 | Kara-Buura | 42.60 | 71.63 | 928 |
| 84 | 2017/5/24 | Urmaral | 42.39 | 72.98 | 1304 |
| 85 | 2017/5/24 | Urmaral | 42.56 | 71.94 | 1036 |
| 86 | 2017/5/25 | Talas | 42.54 | 72.21 | 1195 |
| 87 | 2017/5/26 | Besh-Tash | 42.39 | 72.28 | 1558 |
| 88 | 2017/5/26 | Besh-Tash | 42.45 | 72.29 | 1411 |
| 89 | 2017/5/27 | Talas | 42.48 | 72.96 | 1958 |
| 90 | 2017/5/27 | Uch-Koshoi | 42.45 | 72.75 | 1716 |
| 91 | 2017/5/29 | Kara-Balta | 42.41 | 73.79 | 2070 |
| 92 | 2017/5/29 | Kara-Balta | 42.84 | 73.88 | 742 |

**Table S3. Geographic information for sampling points of Kyrgyzstan in 2018**

| No. | Sampling date | Sample place | Latitude | Longitude | Elavation |
| --- | --- | --- | --- | --- | --- |
| 1 | 2018/3/12 | Ak-Suu (Ch) | 42.60 | 74.01 | 1349 |
| 2 | 2018/3/12 | Ak-Suu (Ch) | 42.83 | 74.08 | 749 |
| 3 | 2018/3/13 | Sokuluk | 42.61 | 74.23 | 1487 |
| 4 | 2018/3/13 | Sokuluk | 42.86 | 74.28 | 729 |
| 5 | 2018/3/14 | Alamedin | 42.62 | 74.67 | 1680 |
| 6 | 2018/3/14 | Alamedin | 42.79 | 74.65 | 1004 |
| 7 | 2018/3/14 | Ala-Archa | 42.57 | 74.48 | 2119 |
| 8 | 2018/3/14 | Ala-Archa | 42.76 | 74.57 | 1084 |
| 9 | 2018/3/16 | Isik-Ata | 42.60 | 74.91 | 1858 |
| 10 | 2018/3/16 | Isik-Ata | 42.69 | 75.05 | 1158 |
| 11 | 2018/3/19 | Chon Ak-Suu | 42.76 | 77.48 | 1860 |
| 12 | 2018/3/19 | Chon Ak-Suu | 42.72 | 77.47 | 1741 |
| 13 | 2018/3/20 | Tyup | 42.72 | 78.77 | 1789 |
| 14 | 2018/3/20 | Tyup | 42.74 | 78.35 | 1624 |
| 15 | 2018/3/21 | Jurgalan | 42.65 | 78.88 | 1894 |
| 16 | 2018/3/21 | Jurgalan | 42.59 | 78.39 | 1630 |
| 17 | 2018/3/21 | Ak-Suu | 42.45 | 78.55 | 1967 |
| 18 | 2018/3/21 | Ak-Suu | 42.51 | 78.53 | 1773 |
| 19 | 2018/3/22 | Karakol | 42.43 | 78.43 | 1955 |
| 20 | 2018/3/22 | Karakol | 42.50 | 78.37 | 1721 |
| 21 | 2018/3/22 | Borubash | 42.54 | 78.35 | 1652 |
| 22 | 2018/3/22 | Borubash | 42.54 | 78.35 | 1650 |
| 23 | 2018/3/22 | Borubash | 42.54 | 78.35 | 1653 |
| 24 | 2018/3/23 | Chon Kuzul-Suu | 42.29 | 78.11 | 2015 |
| 25 | 2018/3/23 | Chon Kuzul-Suu | 42.35 | 78.00 | 1730 |
| 26 | 2018/3/23 | Juuku | 42.23 | 77.96 | 1946 |
| 27 | 2018/3/23 | Juuku | 42.32 | 77.90 | 1717 |
| 28 | 2018/3/24 | Barskoon | 42.03 | 77.60 | 2225 |
| 29 | 2018/3/24 | Barskoon | 42.12 | 77.60 | 1784 |
| 30 | 2018/3/26 | Tuura-Suu | 42.25 | 76.35 | 1853 |
| 31 | 2018/3/26 | Tuura-Suu | 42.32 | 76.39 | 1671 |
| 32 | 2018/3/26 | Ak-Terek | 42.13 | 76.59 | 1929 |
| 33 | 2018/3/26 | Ak-Terek | 42.19 | 76.68 | 1706 |
| 34 | 2018/3/27 | Jumgal | 42.06 | 75.02 | 2295 |
| 35 | 2018/3/27 | Jumgal | 41.89 | 74.44 | 1571 |
| 36 | 2018/3/27 | Kochkor | 42.23 | 75.75 | 1803 |
| 37 | 2018/3/27 | Kochkor | 42.30 | 75.87 | 1758 |
| 38 | 2018/3/28 | Narun | 41.43 | 75.95 | 2023 |
| 39 | 2018/3/28 | Kuchi Narun | 41.50 | 76.43 | 2264 |
| 40 | 2018/3/28 | Chon Narun | 41.50 | 76.43 | 2264 |
| 41 | 2018/3/29 | At-Bashi | 41.23 | 76.24 | 2476 |
| 42 | 2018/3/29 | At-Bashi | 41.20 | 75.74 | 1999 |
| 43 | 2018/3/29 | On-Archa | 41.57 | 75.87 | 2110 |
| 44 | 2018/3/29 | On-Archa | 41.56 | 75.85 | 2085 |
| 45 | 2018/3/30 | Chon Kemin | 42.76 | 76.22 | 1702 |
| 46 | 2018/3/30 | Chon Kemin | 42.69 | 75.98 | - |
| 47 | 2018/3/30 | Ak-Tuz | 42.89 | 76.14 | 2219 |
| 48 | 2018/3/30 | Ak-Tuz | 42.83 | 76.02 | 1675 |
| 49 | 2018/4/2 | Dostuk | 42.91 | 74.52 | 700 |
| 50 | 2018/3/13 | Kara-Balta | 42.41 | 73.79 | 2049 |
| 51 | 2018/3/13 | Kara-Balta | 42.84 | 73.88 | 745 |
| 52 | 2018/3/14 | Talas | 42.48 | 72.96 | 1952 |
| 53 | 2018/3/14 | Uch-Koshoi | 42.45 | 72.75 | 1710 |
| 54 | 2018/3/15 | Talas | 42.54 | 72.21 | 1203 |
| 55 | 2018/3/15 | Besh-Tash | 42.39 | 72.28 | 1565 |
| 56 | 2018/3/15 | Besh-Tash | 42.45 | 72.29 | 1400 |
| 57 | 2018/3/16 | Urmaral | 42.39 | 71.98 | 1308 |
| 58 | 2018/3/16 | Urmaral | 42.56 | 71.94 | 1030 |
| 59 | 2018/3/17 | Kara-Buura | 42.46 | 71.54 | 1242 |
| 60 | 2018/3/17 | Kara-Buura | 42.60 | 71.63 | - |
| 61 | 2018/3/17 | Talas | 42.73 | 71.59 | 774 |
| 62 | 2018/3/18 | Torken | 41.89 | 73.21 | 1080 |
| 63 | 2018/3/18 | Torken | 41.83 | 73.15 | 910 |
| 64 | 2018/3/19 | Naryn | 41.77 | 73.29 | 892 |
| 65 | 2018/3/19 | Naryn | 41.30 | 72.20 | 527 |
| 66 | 2018/3/21 | Soh | 40.28 | 71.04 | 711 |
| 67 | 2018/3/21 | Ak-Suu | 40.01 | 71.79 | 1314 |
| 68 | 2018/3/21 | Ak-Suu | 40.14 | 71.73 | 995 |
| 69 | 2018/3/22 | Isfairam-Sai | 40.02 | 72.09 | 1275 |
| 70 | 2018/3/22 | Isfairam-Sai | 40.24 | 72.04 | 914 |
| 71 | 2018/3/23 | Aravan-Sai | 40.26 | 72.74 | 1327 |
| 72 | 2018/3/23 | Aravan-Sai | 40.52 | 72.50 | 730 |
| 73 | 2018/3/24 | Ak-Buura | 40.42 | 72.87 | 1116 |
| 74 | 2018/3/24 | Ak-Buura | 40.58 | 72.76 | 878 |
| 75 | 2018/3/25 | Kurshab | 40.17 | 73.51 | 1706 |
| 76 | 2018/3/25 | Kurshab | 40.66 | 73.13 | 940 |
| 77 | 2018/3/26 | Tar | 40.54 | 73.76 | 1422 |
| 78 | 2018/3/26 | Tar | 40.76 | 73.28 | 967 |
| 79 | 2018/3/27 | Jazy | 40.85 | 73.66 | 1296 |
| 80 | 2018/3/27 | Jazy | 40.82 | 73.22 | 901 |
| 81 | 2018/3/28 | Kok-Art | 41.15 | 73.29 | 1204 |
| 82 | 2018/3/28 | Kok-Art | 40.90 | 72.92 | 709 |
| 83 | 2018/3/29 | Tentek-Sai | 41.29 | 73.08 | 1069 |
| 84 | 2018/3/29 | Tentek-Sai | 41.03 | 72.73 | 707 |
| 85 | 2018/3/29 | Achuu-Sai | 41.04 | 72.97 | 860 |
| 86 | 2018/3/30 | Mailuu-Suu | 41.32 | 72.50 | 1057 |
| 87 | 2018/3/30 | Mailuu-Suu | 41.08 | 72.35 | 665 |
| 88 | 2018/3/29 | Achuu-Sai (Rain) | 41.04 | 72.97 | 860 |
| 89 | 2018/4/21 | Uch-Korgon | 41.19 | 72.16 | 502 |
| 90 | 2018/4/21 | Uch-Korgon | 41.19 | 72.16 | 509 |
| 91 | 2018/4/21 | Uch-Korgon | 41.19 | 72.16 | 504 |
| 92 | 2018/4/21 | Uch-Korgon | 41.19 | 72.16 | 506 |
| 93 | 2018/4/21 | Uch-Korgon | 41.19 | 72.16 | 534 |
| 94 | 2018/4/21 | Uch-Korgon | 41.19 | 72.16 | 541 |

(a) (b) (c)

(d) (e) (f)

**Figure S1 Concentration and exceeding limits situation of fluorine and arsenic in Kyrgyz river water from 2016 to 2018**

**Table S4 Analysis and statistics of cold and hot spots of fluorine and arsenic in Kyrgyz river water from 2016 to 2018**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Contaminants | Fluorine | | | Arsenic | | |
| 2016 | 2017 | 2018 | 2016 | 2017 | 2018 |
| Cold Spot-99% Confidence | 11.11% | 0.00% | 6.45% | 0.00% | 0.00% | 0.00% |
| Cold Spot-95% Confidence | 7.41% | 2.17% | 8.60% | 0.00% | 0.00% | 0.00% |
| Cold Spot-90% Confidence | 1.23% | 7.61% | 7.53% | 3.61% | 0.00% | 0.00% |
| Cold Spot-Total | **19.75%** | **9.78%** | **22.58%** | **3.61%** | **0.00%** | **0.00%** |
| Not Significant | 64.20% | 82.61% | 54.84% | 78.31% | 83.70% | 84.95% |
| Hot Spot-99% Confidence | 0.00% | 2.17% | 3.23% | 1.20% | 1.09% | 3.23% |
| Hot Spot-95% Confidence | 0.00% | 0.00% | 3.23% | 3.61% | 4.35% | 0.00% |
| Hot Spot-90% Confidence | 16.05% | 5.43% | 16.13% | 13.25% | 10.87% | 11.83% |
| Hot Spot-Total | **16.05%** | **7.61%** | **22.58%** | **18.07%** | **16.30%** | **15.05%** |