**On-line Supplementary Table 1 Physical parameters of the soil-water extraction of the modern and ancient aeolian sediments from the Taklamakan and Badanjilin deserts in northwestern China.**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample name | pH | Eh (mV) | EC (μS/cm) | TDS (mg/L) | Salinity (‰) | Sample name | pH | Eh (mV) | EC (μS/cm) | TDS (mg/L) | Salinity (‰) |
| The dune-surface sand samples collected from the Badanjilin Desert | | | | | | | | | | | |
| B1 | 9.20 | -141 | 73.6 | 39.1 | 0.197 | B2 | 9.10 | -145 | 49.4 | 26.3 | 0.134 |
| B3 | 9.01 | -140 | 39.2 | 20.8 | 0.104 | B4 | 9.23 | -143 | 35.0 | 18.6 | 0.096 |
| B5-1 | 9.13 | -139 | 33.0 | 17.6 | 0.088 | B5-2 | 8.97 | -131 | 51.6 | 27.5 | 0.137 |
| B5-3 | 9.13 | -139 | 36.9 | 19.6 | 0.098 | B5-4 | 9.21 | -143 | 43.7 | 23.3 | 0.117 |
| B5-5 | 8.82 | -129 | 42.9 | 22.9 | 0.114 | B6-1 | 9.11 | -145 | 42.7 | 22.7 | 0.116 |
| B6-2 | 8.94 | -129 | 29.7 | 15.8 | 0.079 | B6-3 | 9.30 | -148 | 48.0 | 25.5 | 0.128 |
| B6-4 | 9.35 | -151 | 55.0 | 29.3 | 0.146 | B6-5 | 8.99 | -138 | 157 | 83.0 | 0.414 |
| B7-1 | 8.82 | -123 | 22.0 | 11.7 | 0.059 | B7-2 | 9.17 | -141 | 33.9 | 18.1 | 0.091 |
| B7-3 | 9.35 | -151 | 62.5 | 33.2 | 0.167 | B8-1 | 8.85 | -122 | 21.9 | 11.6 | 0.059 |
| B8-2 | 9.05 | -132 | 26.1 | 13.9 | 0.070 | B8-3 | 9.42 | -154 | 48.9 | 26.0 | 0.131 |
| B9 | 8.98 | -137 | 37.8 | 20.3 | 0.102 | B10 | 9.05 | -140 | 43.8 | 23.5 | 0.117 |
| B11 | 9.05 | -141 | 42.9 | 22.8 | 0.115 | B12 | 9.00 | -132 | 80.2 | 42.6 | 0.213 |
| B13-1 | 9.00 | -138 | 32.3 | 17.2 | 0.086 | B13-2 | 9.10 | -143 | 72.9 | 38.8 | 0.194 |
| B13-3 | 8.91 | -134 | 33.1 | 17.6 | 0.088 | B14-1 | 8.84 | -128 | 36.5 | 19.4 | 0.098 |
| B14-2 | 9.20 | -148 | 41.6 | 22.2 | 0.112 | B14-3 | 9.22 | -150 | 49.1 | 26.1 | 0.132 |
| B14-4 | 9.22 | -151 | 159 | 84.0 | 0.421 | B14-5 | 9.37 | -159 | 93.1 | 49.6 | 0.248 |
| B14-6 | 9.13 | -146 | 76.0 | 40.4 | 0.203 | B14-7 | 9.21 | -149 | 97.4 | 51.7 | 0.261 |
| B14-8 | 9.17 | -150 | 76.7 | 40.7 | 0.206 | B14-9 | 9.26 | -153 | 57.0 | 30.3 | 0.152 |
| B14-10 | 9.36 | -160 | 126 | 67.0 | 0.336 | B14-11 | 9.26 | -154 | 52.7 | 28.0 | 0.140 |
| The dune-surface sand samples collected from the Taklamakan Desert | | | | | | | | | | | |
| T1-1 | 9.33 | -157 | 215 | 114 | 0.575 | T1-2 | 9.42 | -163 | 177 | 94 | 0.472 |
| T2-1 | 9.37 | -158 | 115 | 61 | 0.311 | T2-2 | 9.28 | -155 | 122 | 65 | 0.329 |
| T2-3 | 9.44 | -163 | 118 | 62 | 0.310 | T2-4 | 9.26 | -154 | 104 | 55 | 0.277 |
| T2-5 | 9.21 | -151 | 255 | 135 | 0.682 | T3 | 9.14 | -148 | 643 | 342 | 1.712 |
| T4 | 9.37 | -159 | 406 | 216 | 1.090 | T5-1 | 9.33 | -158 | 826 | 439 | 2.214 |
| T5-2 | 9.38 | -160 | 160 | 85 | 0.429 | T5-3 | 9.17 | -149 | 950 | 500 | 2.531 |
| T6-1 | 9.47 | -166 | 699 | 372 | 1.864 | T9 | 9.47 | -164 | 326 | 173 | 0.868 |
| T10 | 9.51 | -160 | 151 | 80 | 0.400 | T11 | 9.26 | -152 | 290 | 154 | 0.775 |
| T12 | 9.33 | -158 | 192 | 103 | 0.519 | T13 | 8.77 | -125 | 645 | 347 | 1.754 |
| T14 | 9.25 | -153 | 257 | 136 | 0.681 | T15 | 9.29 | -154 | 259 | 138 | 0.695 |
| T16 | 9.22 | -151 | 409 | 218 | 1.094 | T17 | 9.10 | -148 | 318 | 169 | 0.846 |
| T18 | 9.23 | -144 | 554 | 295 | 1.474 | T19 | 8.99 | -141 | 307 | 163 | 0.815 |
| T20 | 9.01 | -143 | 237 | 126 | 0.631 | T21 | 9.25 | -153 | 398 | 212 | 1.063 |
| T22 | 9.07 | -143 | 403 | 214 | 1.074 | T23 | 9.16 | -150 | 186 | 99 | 0.497 |
| T24 | 9.24 | -152 | 351 | 189 | 0.948 | T25 | 8.91 | -137 | 311 | 165 | 0.831 |
| T26 | 8.87 | -135 | 323 | 174 | 0.877 | T27 | 8.89 | -135 | 223 | 119 | 0.598 |
| T28 | 8.66 | -108 | 310 | 163 | 0.826 | T29 | 9.11 | -149 | 385 | 205 | 1.024 |
| T30 | 9.32 | -160 | 172 | 91 | 0.455 | T31 | 9.33 | -161 | 210 | 112 | 0.562 |
| T32 | 9.38 | -160 | 127 | 67 | 0.339 | T33 | 9.54 | -170 | 164 | 87 | 0.437 |
| The buried sand (palaeo-sand) samples in the Taklamakan Desert | | | | | | | | | | | |
| T1-3 | 9.53 | -168 | 150 | 80 | 0.400 | T1-4 | 9.55 | -170 | 333 | 176 | 0.880 |
| T2-6 | 9.33 | -158 | 406 | 216 | 1.086 | T5-4 | 9.19 | -150 | 667 | 355 | 1.779 |
| T5-5 | 9.04 | -142 | 1130 | 600 | 3.019 | T5-6 | 9.24 | -150 | 581 | 309 | 1.563 |
| T5-7 | 9.61 | -173 | 112 | 59 | 0.297 | T5-8 | 8.97 | -137 | 1210 | 640 | 3.215 |
| T5-9 | 9.02 | -139 | 1010 | 540 | 2.721 | T6-2 | 9.21 | -151 | 2290 | 1230 | 6.171 |
| T6-3 | 8.75 | -124 | 1240 | 660 | 3.317 | T8-1 | 8.82 | -128 | 1390 | 740 | 3.737 |
| T8-2 | 8.65 | -118 | 2800 | 1500 | 7.542 | T7-1 | 8.54 | -112 | 6300 | 3420 | 17.15 |
| T7-2 | 8.50 | -109 | 75300 | 49000 | 403.5 | T7-3 | 8.19 | -92 | 94400 | 63100 | 383.6 |
| T7-4 | 8.52 | -109 | 6840 | 3710 | 18.63 | T7-5 | 8.70 | -121 | 4120 | 2240 | 11.29 |
| T7-6 | 8.74 | -122 | 4580 | 2500 | 12.62 |  |  |  |  |  |  |
| the Arerjilin-I section in the Badanjilin Desert | | | | | | | | | | | |
| Ar1 | 9.09 | -135 | 428 | 228 | 1.156 | Ar2 | 9.73 | -174 | 492 | 262 | 1.313 |
| Ar3 | 9.83 | -180 | 267 | 142 | 0.711 | Ar4 | 9.64 | -169 | 526 | 280 | 1.410 |
| Ar5 | 9.46 | -157 | 678 | 361 | 1.811 | Ar6 | 9.31 | -149 | 684 | 364 | 1.827 |
| Ar7 | 7.62 | -53 | 833 | 443 | 2.213 | Ar8 | 7.68 | -55 | 496 | 264 | 1.321 |
| Ar9 | 7.42 | -41 | 1780 | 950 | 4.788 | Ar10 | 8.84 | -124 | 900 | 480 | 2.396 |
| Ar11 | 7.60 | -51 | 264 | 140 | 0.699 | Ar12 | 7.74 | -60 | 291 | 155 | 0.772 |
| Ar13 | 8.24 | -88 | 137 | 73.0 | 0.365 |  |  |  |  |  |  |
| the Tazhong-XIII section in the Taklamakan Desert | | | | | | | | | | | |
| Ta1 | 9.14 | -151 | 217 | 115 | 0.577 | Ta2 | 8.21 | -92 | 5550 | 3010 | 15.09 |
| Ta3 | 8.47 | -111 | 906 | 482 | 2.424 | Ta4 | 8.04 | -84 | 5340 | 2890 | 14.58 |
| Ta5 | 9.02 | -141 | 523 | 278 | 1.392 | Ta6 | 8.75 | -123 | 980 | 520 | 2.609 |
| the Yaogan-VIII section in the Taklamakan Desert | | | | | | | | | | | |
| Ya1 | 8.28 | -96 | 16200 | 9100 | 46.29 | Ya2 | 8.68 | -119 | 4350 | 2350 | 11.71 |
| Ya3 | 8.77 | -126 | 2840 | 1520 | 7.576 | Ya4 | 8.83 | -128 | 4080 | 2200 | 11.14 |
| Ya5 | 9.07 | -141 | 2070 | 1110 | 5.617 | Ya6 | 8.58 | -114 | 6830 | 3700 | 18.67 |
| Ya7 | 8.24 | -94 | 41200 | 25000 | 125.27 | Ya8 | 8.71 | -121 | 29200 | 17100 | 86.53 |
| Ya9 | 8.30 | -97 | 59800 | 37900 | 191.01 | Ya10 | 8.49 | -109 | 6390 | 3460 | 17.39 |
| Ya11 | 8.80 | -127 | 6270 | 3400 | 17.19 | Ya12 | 9.06 | -141 | 768 | 409 | 2.062 |
| Ya13 | 9.39 | -161 | 294 | 156 | 0.786 |  |  |  |  |  |  |
| the Tumiya-II section in the Taklamakan Desert | | | | | | | | | | | |
| Tu1 | 8.64 | -117 | 2860 | 1540 | 7.754 | Tu2 | 9.18 | -148 | 1010 | 530 | 2.669 |
| Tu3 | 8.63 | -118 | 2880 | 1540 | 7.747 | Tu4 | 8.71 | -122 | 3920 | 2110 | 10.64 |
| Tu5 | 8.77 | -125 | 4250 | 2310 | 11.87 | Tu6 | 8.51 | -109 | 1080 | 590 | 2.963 |
| Tu7 | 9.56 | -170 | 1410 | 750 | 3.797 | Tu8 | 9.53 | -170 | 2000 | 1070 | 5.422 |
| Tu9 | 9.18 | -149 | 8490 | 4640 | 23.23 | Tu10 | 9.35 | -157 | 3250 | 1750 | 8.740 |
| Tu11 | 9.45 | -165 | 3570 | 1920 | 9.911 | Tu12 | 9.52 | -168 | 1330 | 710 | 3.562 |
| Tu13 | 9.48 | -164 | 1410 | 750 | 3.836 | Tu14 | 9.52 | -169 | 1740 | 930 | 4.670 |
| Tu15 | 9.62 | -174 | 723 | 384 | 1.947 | Tu16 | 9.50 | -168 | 805 | 428 | 2.154 |
| Tu17 | 9.72 | -180 | 446 | 238 | 1.207 | Tu18 | 9.66 | -176 | 413 | 220 | 1.108 |
| Tu19 | 9.66 | -175 | 842 | 447 | 2.245 | Tu20 | 9.94 | -192 | 221 | 117 | 0.591 |
| Tu21 | 9.65 | -174 | 960 | 510 | 2.573 | Tu22 | 9.46 | -166 | 663 | 353 | 1.786 |
| Tu23 | 8.64 | -116 | 1570 | 840 | 4.225 | Tu24 | 9.68 | -178 | 608 | 322 | 1.628 |
| Tu25 | 9.18 | -149 | 1440 | 770 | 3.866 | Tu26 | 9.12 | -145 | 2010 | 1080 | 5.401 |
| Tu27 | 9.73 | -180 | 573 | 305 | 1.535 | Tu28 | 8.69 | -119 | 2380 | 1270 | 6.471 |
| Tu29 | 9.66 | -175 | 840 | 447 | 2.261 |  |  |  |  |  |  |