**Supplementary Table S1** Database of study location information and measured and calculated dune morphology parameters of Early Cretaceous paleo-deserts in the Ordos Basin.

| **Ancient dunes** | **Measured dune morphology parameters** | **Calculated dune morphology parameters** |
| --- | --- | --- |
| **Desert** | **Locality** | **No.** | **GPS** | **DW** | **WA** | **λ** | **Փ** | **t-（N)** | **DW** | **H** |
| Central paleo-desert | Guanjiadong | 1 | 108°24'18"E | 35°11'4"N | 363 | 　 | 　 | 　 | 　 | 　 | 43.56  |
| 387 | 　 | 　 | 　 | 　 | 　 | 46.44  |
| 　 | 193 | 　 | 　 | 　 | 　 | 17.09  |
| Zhaojiadong | 1 | 108°23'47"E | 35°10'20"N | 　 | 313 | 　 | 　 | 　 | 　 | 27.72  |
| 　 | 194 | 　 | 　 | 　 | 　 | 17.18  |
| 　 | 224 | 　 | 　 | 7 (15) | 　 | 19.84  |
| Luohe | 1 | 108°49'39"E | 36°36'2"N | 1154 | 　 | 　 | 　 | 　 | 　 | 138.48  |
| 1159 | 　 | 　 | 　 | 　 | 　 | 139.08  |
| 2 | 108°41'34"E | 36°34'46"N | 1250 | 　 | 　 | 　 | 　 | 　 | 150.00  |
| 3 | 108°44'38"E | 36°34'6"N | 1968 | 　 | 　 | 　 | 　 | 　 | 236.16  |
| Dafosi | 1 | 107°59'32"E | 35°4'21"N | 397.6 | 　 | 　 | 　 | 　 | 　 | 47.71  |
| 284 | 　 | 　 | 　 | 　 | 　 | 34.08  |
| 145 | 　 | 　 | 　 | 　 | 　 | 17.40  |
| 377 | 　 | 　 | 　 | 　 | 　 | 45.24  |
| 1140 | 　 | 　 | 　 | 　 | 　 | 136.80  |
| 150.1 | 　 | 　 | 　 | 　 | 　 | 18.01  |
| 177 | 　 | 　 | 　 | 　 | 　 | 21.24  |
| 404 | 　 | 　 | 　 | 　 | 　 | 48.48  |
| 　 | 385 | 　 | 　 | 　 | 　 | 34.10  |
| Zhidan Town | 1 | 108°45'14"E | 36°50'10"E | 　 | 374 | 　 | 　 | 　 | 　 | 33.13  |
| Bolang Valley | 1 | 109°0'10"E | 37°30'51"N | 580 | 　 | 　 | 　 | 　 | 　 | 69.60  |
| 260 | 　 | 　 | 　 | 　 | 　 | 31.20  |
| 750 | 　 | 　 | 　 | 　 | 　 | 90.00  |
| 613 | 　 | 　 | 　 | 　 | 　 | 73.56  |
| 456 | 　 | 　 | 　 | 　 | 　 | 54.72  |
| 435 | 　 | 　 | 　 | 　 | 　 | 52.20  |
| 768 | 　 | 　 | 　 | 　 | 　 | 92.16  |
| 766 | 　 | 　 | 　 | 　 | 　 | 91.92  |
| 566 | 　 | 　 | 　 | 　 | 　 | 67.92  |
| 245 | 　 | 　 | 　 | 　 | 　 | 29.40  |
| 380 | 　 | 　 | 　 | 　 | 　 | 45.60  |
| 　 | 180 | 　 | 　 | 　 | 　 | 15.94  |
| 　 | 290 | 　 | 　 | 8.5 (15) | 　 | 25.69  |
| 　 | 398 | 　 | 　 | 　 | 　 | 35.25  |
| 　 | 　 | 17.8 | 3 | 　 | 342.52  | 41.10  |
| 　 | 　 | 23.7 | 3 | 　 | 456.69  | 54.80  |
| 　 | 　 | 17.8 | 3 | 　 | 342.52  | 41.10  |
| 　 | 　 | 11.1 | 3 | 　 | 212.37  | 25.48  |
| 　 | 　 | 7 | 3 | 　 | 133.30  | 16.00  |
| 　 | 　 | 5.4 | 3 | 　 | 104.66  | 12.56  |
| 　 | 　 | 6 | 3 | 　 | 114.49  | 13.74  |
| 　 | 　 | 7.7 | 3 | 　 | 148.23  | 17.79  |
| 　 | 　 | 6 | 3 | 　 | 114.49  | 13.74  |
| 　 | 　 | 10.5 | 3 | 　 | 190.81  | 22.90  |
| 　 | 　 | 7.4 | 3 | 　 | 143.11  | 17.17  |
| 　 | 　 | 17.1 | 3 | 　 | 328.29  | 39.39  |
| 　 | 　 | 13.9 | 3 | 　 | 267.14  | 32.06  |
| 　 | 　 | 6 | 3 | 　 | 114.49  | 13.74  |
| 　 | 　 | 7 | 3 | 　 | 133.57  | 16.03  |
| 　 | 　 | 9 | 3 | 　 | 171.73  | 20.61  |
| 　 | 　 | 29.8 | 3 | 　 | 572.43  | 68.69  |
| 　 | 　 | 7.6 | 3 | 　 | 145.79  | 17.50  |
| 　 | 　 | 9.3 | 3 | 　 | 179.36  | 21.52  |
| 　 | 　 | 12.5 | 3 | 　 | 241.19  | 28.94  |
| 　 | 　 | 5.74 | 3 | 　 | 110.29  | 13.23  |
| Xiaoshi Cliff | 1 | 108°48'21"E | 35°37'52"N | 1238.1 | 　 | 　 | 　 | 　 | 　 | 148.57  |
| Gan-Zhi Road | 1 | 108°43'26"E | 36°34'35"N | 1812 | 　 | 　 | 　 | 　 | 　 | 217.44  |
| Yongning Road | 1 | 108°41'48"E | 36°34'52"N | 2252 | 　 | 　 | 　 | 　 | 　 | 270.24  |
| 730 | 　 | 　 | 　 | 　 | 　 | 87.60  |
| 542 | 　 | 　 | 　 | 　 | 　 | 65.04  |
| 456 | 　 | 　 | 　 | 　 | 　 | 54.72  |
| 　 | 523 | 　 | 　 | 　 | 　 | 46.32  |
| 2 | 108°39'14"E | 36°35'4"N | 1340 | 　 | 　 | 　 | 　 | 　 | 160.80  |
| Huaziping | 1 | 109°7'43"E | 37°5"7"N | 950 | 　 | 　 | 　 | 　 | 　 | 114.00  |
| 1410 | 　 | 　 | 　 | 　 | 　 | 169.20  |
| 　 | 387 | 　 | 　 | 　 | 　 | 34.28  |
| 2 | 109°7'59"E | 37°6'18"N | 170 | 　 | 　 | 　 | 　 | 　 | 20.40  |
| 846 | 　 | 　 | 　 | 　 | 　 | 101.52  |
| 　 | 497 | 　 | 　 | 　 | 　 | 44.02  |
| Tiansheng Bridge | 1 | 109°1'44"E | 37°4'56"N | 650 | 　 | 　 | 　 | 　 | 　 | 78.00  |
| 350 | 　 | 　 | 　 | 　 | 　 | 42.00  |
| 　 | 288 | 　 | 　 | 　 | 　 | 25.51  |
| 　 | 370 | 　 | 　 | 　 | 　 | 32.77  |
| Ganquan Canyon | 1 | 108°58'8"E | 36°35'9"N | 550 | 　 | 　 | 　 | 　 | 　 | 66.00  |
| 　 | 270 | 　 | 　 | 　 | 　 | 23.91  |
| 　 | 374 | 　 | 　 | 　 | 　 | 33.13  |
| 2 | 109°0'9"E | 36°33'54"N | 505 | 　 | 　 | 　 | 　 | 　 | 60.60  |
| 415 | 　 | 　 | 　 | 　 | 　 | 49.80  |
| 　 | 206.12 | 　 | 　 | 　 | 　 | 18.26  |
| Maoxiang Canyon | 1 | 108°47'32"E | 36°48'1"N | 329 | 　 | 　 | 　 | 　 | 　 | 39.48  |
| 226 | 　 | 　 | 　 | 　 | 　 | 27.12  |
| 261 | 　 | 　 | 　 | 　 | 　 | 31.32  |
| 323 | 　 | 　 | 　 | 　 | 　 | 38.76  |
| 455 | 　 | 　 | 　 | 　 | 　 | 54.60  |
| 441 | 　 | 　 | 　 | 　 | 　 | 52.92  |
| 2 | 108°47'32"E | 36°48'1"N | 1223 | 　 | 　 | 　 | 　 | 　 | 146.76  |
| 298 | 　 | 　 | 　 | 　 | 　 | 35.76  |
| 1014.9 | 　 | 　 | 　 | 　 | 　 | 121.79  |
| 2201.3 | 　 | 　 | 　 | 　 | 　 | 264.16  |
| 1329.8 | 　 | 　 | 　 | 　 | 　 | 159.58  |
| 3 | 108°47'44"E | 36°47'28"N | 198.9 | 　 | 　 | 　 | 8.1 (25) | 　 | 23.87  |
| 1219.08 | 　 | 　 | 　 | 　 | 　 | 146.29  |
| 228.6 | 　 | 　 | 　 | 　 | 　 | 27.43  |
| 1117.1 | 　 | 　 | 　 | 　 | 　 | 134.05  |
| 　 | 135 | 　 | 　 | 　 | 　 | 11.96  |
| 　 | 401 | 　 | 　 | 　 | 　 | 35.52  |
| 　 | 492 | 　 | 　 | 　 | 　 | 43.58  |
| 　 | 415 | 　 | 　 | 　 | 　 | 36.76  |
| 4 | 108°48'8"E | 36°47'21"N | 　 | 272 | 　 | 　 | 　 | 　 | 24.09  |
| Zhu'erwan | 1 | 108°5'21"E | 35°3'9"N | 487.2 | 　 | 　 | 　 | 　 | 　 | 58.46  |
| 　 | 154 | 　 | 　 | 　 | 　 | 13.64  |
| 　 | 192 | 　 | 　 | 　 | 　 | 17.01  |
| 　 | 168.88 | 　 | 　 | 　 | 　 | 14.96  |
| Liushi Village | 1 | 108°23'3"E | 35°10'N | 277 | 　 | 　 | 　 | 　 | 　 | 33.24  |
| 126 | 　 | 　 | 　 | 6.1 (15) | 　 | 15.12  |
| 286 | 　 | 　 | 　 | 　 | 　 | 34.32  |
| 306.5 | 　 | 　 | 　 | 　 | 　 | 36.78  |
| 314.3 | 　 | 　 | 　 | 　 | 　 | 37.72  |
| Total | 62 | 25 | 21 | 21 | 4 (70) | 21.00  | 108.00  |
| 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| Marginal paleo-desert | Yijinhuoluoqi | 1 | 109°47'42"E | 39°27'56"N | 72.8 | 　 | 　 | 　 | 　 | 　 | 11.14  |
| 87.6 | 　 | 　 | 　 | 　 | 　 | 10.51  |
| 76.17 | 　 | 　 | 　 | 　 | 　 | 9.14  |
| 187 | 　 | 　 | 　 | 　 | 　 | 22.44  |
| 58.9 | 　 | 　 | 　 | 　 | 　 | 19.07  |
| 86.8 | 　 | 　 | 　 | 　 | 　 | 10.42  |
| 89.8 | 　 | 　 | 　 | 　 | 　 | 10.78  |
| 52.8 | 　 | 　 | 　 | 　 | 　 | 18.34  |
| 82 | 　 | 　 | 　 | 　 | 　 | 14.64  |
| 66.17 | 　 | 　 | 　 | 　 | 　 | 19.94  |
| 89.3 | 　 | 　 | 　 | 　 | 　 | 22.72  |
| 106.3 | 　 | 　 | 　 | 　 | 　 | 12.76  |
| 2 | 109°53'39"E | 39°46'40"N | 72.1 | 　 | 　 | 　 | 3.9（25） | 　 | 8.65  |
| 86 | 　 | 　 | 　 | 　 | 　 | 10.32  |
| 90 | 　 | 　 | 　 | 　 | 　 | 10.80  |
| 　 | 152.6 | 　 | 　 | 　 | 　 | 13.52  |
| Shenmu | 1 | 110°3'21"E | 39°9'56"N | 153.8 | 　 | 　 | 　 | 　 | 　 | 18.46  |
| 207.8 | 　 | 　 | 　 | 　 | 　 | 24.94  |
| 180 | 　 | 　 | 　 | 　 | 　 | 21.60  |
| 190 | 　 | 　 | 　 | 　 | 　 | 22.80  |
| 267.5 | 　 | 　 | 　 | 　 | 　 | 32.10  |
| 270 | 　 | 　 | 　 | 　 | 　 | 32.40  |
| 　 | 170.4 | 　 | 　 | 5.9（25） | 　 | 15.09  |
| 　 | 200.4 | 　 | 　 | 　 | 　 | 17.75  |
| Dongsheng West station | 1 | 109°53'51"E | 39°46'40"N | 85 | 　 | 　 | 　 | 　 | 　 | 10.20  |
| 104 | 　 | 　 | 　 | 　 | 　 | 12.48  |
| 91 | 　 | 　 | 　 | 　 | 　 | 10.92  |
| 94 | 　 | 　 | 　 | 　 | 　 | 11.28  |
| 2 | 109°34'42"E | 39°52'N | 56 | 　 | 　 | 　 | 　 | 　 | 6.72  |
| 94 | 　 | 　 | 　 | 　 | 　 | 11.28  |
| 50 | 　 | 　 | 　 | 3.1（25） | 　 | 6.00  |
| 90.8 | 　 | 　 | 　 | 　 | 　 | 10.90  |
| 70.8 | 　 | 　 | 　 | 　 | 　 | 8.50  |
| 60.7 | 　 | 　 | 　 | 　 | 　 | 7.28  |
| 141.7 | 　 | 　 | 　 | 　 | 　 | 17.00  |
| 3 | 109°36'13"E | 39°51'53"N | 79.1 | 　 | 　 | 　 | 　 | 　 | 9.49  |
| 65.8 | 　 | 　 | 　 | 　 | 　 | 7.90  |
| 51.5 | 　 | 　 | 　 | 　 | 　 | 6.18  |
| 61.5 | 　 | 　 | 　 | 　 | 　 | 7.38  |
| 55.5 | 　 | 　 | 　 | 　 | 　 | 6.66  |
| 　 | 82 | 　 | 　 | 　 | 　 | 7.26  |
| 4 | 109°38'8"E | 39°51'42"N | 77.09 | 　 | 　 | 　 | 　 | 　 | 9.25  |
| 84 | 　 | 　 | 　 | 　 | 　 | 10.08  |
| 60.1 | 　 | 　 | 　 | 　 | 　 | 7.21  |
| 76.7 | 　 | 　 | 　 | 　 | 　 | 9.20  |
| 87.2 | 　 | 　 | 　 | 　 | 　 | 10.46  |
| 65.8 | 　 | 　 | 　 | 　 | 　 | 7.90  |
| 65.06 | 　 | 　 | 　 | 　 | 　 | 7.81  |
| 77.67 | 　 | 　 | 　 | 　 | 　 | 9.32  |
| 65.73 | 　 | 　 | 　 | 　 | 　 | 7.89  |
| 99.35 | 　 | 　 | 　 | 　 | 　 | 11.92  |
| 60.8 | 　 | 　 | 　 | 　 | 　 | 7.30  |
| 72.23 | 　 | 　 | 　 | 　 | 　 | 8.67  |
| 63.1 | 　 | 　 | 　 | 　 | 　 | 7.57  |
| 76.4 | 　 | 　 | 　 | 　 | 　 | 9.17  |
| 77.2 | 　 | 　 | 　 | 　 | 　 | 9.26  |
| 97.78 | 　 | 　 | 　 | 　 | 　 | 11.73  |
| 　 | 85.6 | 　 | 　 | 　 | 　 | 7.58  |
| 　 | 89.3 | 　 | 　 | 　 | 　 | 7.91  |
| 　 | 99.6 | 　 | 　 | 　 | 　 | 8.82  |
| 5 | 109°40'25"E | 39°51'8"N | 86.31 | 　 | 　 | 　 | 　 | 　 | 10.36  |
| 82.6 | 　 | 　 | 　 | 　 | 　 | 9.91  |
| 129.4 | 　 | 　 | 　 | 　 | 　 | 15.53  |
| 133.8 | 　 | 　 | 　 | 　 | 　 | 16.06  |
| 6 | 109°45'21"E | 39°50'48”N | 87.13 | 　 | 　 | 　 | 　 | 　 | 10.46  |
| 145 | 　 | 　 | 　 | 　 | 　 | 17.40  |
| 　 | 87.3 | 　 | 　 | 　 | 　 | 7.73  |
| 　 | 52.6 | 　 | 　 | 　 | 　 | 4.66  |
| 　 | 58.4 | 　 | 　 | 　 | 　 | 5.17  |
| 　 | 73.4 | 　 | 　 | 　 | 　 | 6.50  |
| 　 | 82.4 | 　 | 　 | 　 | 　 | 7.30  |
| 7 | 110°1'59"E | 39°43'3"N | 168 | 　 | 　 | 　 | 　 | 　 | 20.16  |
| 84.8 | 　 | 　 | 　 | 　 | 　 | 10.18  |
| 54.2 | 　 | 　 | 　 | 　 | 　 | 6.50  |
| 99.37 | 　 | 　 | 　 | 　 | 　 | 11.92  |
| 94.7 | 　 | 　 | 　 | 　 | 　 | 11.36  |
| 84.17 | 　 | 　 | 　 | 　 | 　 | 10.10  |
| 96.8 | 　 | 　 | 　 | 　 | 　 | 11.62  |
| 150.15 | 　 | 　 | 　 | 　 | 　 | 18.02  |
| 97 | 　 | 　 | 　 | 　 | 　 | 11.64  |
| 　 | 　 | 192 | 3 | 　 | 36.63  | 4.39  |
| 　 | 166 | 　 | 　 | 　 | 　 | 14.70  |
| 　 | 93 | 　 | 　 | 　 | 　 | 8.24  |
| 　 | 130 | 　 | 　 | 　 | 　 | 11.51  |
| 8 | 110°6'50"E | 39°45'41"N | 80.08 | 　 | 　 | 　 | 　 | 　 | 9.61  |
| 54.5 | 　 | 　 | 　 | 　 | 　 | 6.54  |
| 159.5 | 　 | 　 | 　 | 　 | 　 | 19.14  |
| 143 | 　 | 　 | 　 | 　 | 　 | 17.16  |
| 76.7 | 　 | 　 | 　 | 　 | 　 | 9.20  |
| 93.02 | 　 | 　 | 　 | 　 | 　 | 11.16  |
| 106.6 | 　 | 　 | 　 | 　 | 　 | 12.79  |
| 107 | 　 | 　 | 　 | 　 | 　 | 12.84  |
| 　 | 60.6 | 　 | 　 | 　 | 　 | 5.37  |
| 　 | 106 | 　 | 　 | 　 | 　 | 9.39  |
| 　 | 71 | 　 | 　 | 　 | 　 | 6.29  |
| 　 | 74 | 　 | 　 | 　 | 　 | 6.55  |
| 　 | 81.2 | 　 | 　 | 　 | 　 | 7.19  |
| 　 | 51.6 | 　 | 　 | 　 | 　 | 4.57  |
| 　 | 150 | 　 | 　 | 　 | 　 | 13.29  |
| 　 | 64 | 　 | 　 | 　 | 　 | 5.67  |
| 　 | 72.1 | 　 | 　 | 　 | 　 | 6.39  |
| 9 | 109°51'6"E | 39°44'56"N | 114 | 　 | 　 | 　 | 　 | 　 | 13.68  |
| 　 | 62.3 | 　 | 　 | 　 | 　 | 5.52  |
| 　 | 85.6 | 　 | 　 | 　 | 　 | 7.58  |
| 　 | 72.3 | 　 | 　 | 　 | 　 | 6.40  |
| 　 | 88.4 | 　 | 　 | 　 | 　 | 7.83  |
| 　 | 106 | 　 | 　 | 　 | 　 | 9.39  |
| 　 | 90.6 | 　 | 　 | 　 | 　 | 8.02  |
| 　 | 87.9 | 　 | 　 | 　 | 　 | 7.79  |
| 　 | 65.4 | 　 | 　 | 　 | 　 | 5.79  |
| 　 | 70.9 | 　 | 　 | 　 | 　 | 6.28  |
| 　 | 135.6 | 　 | 　 | 　 | 　 | 12.01  |
| 　 | 61.3 | 　 | 　 | 　 | 　 | 5.43  |
| 10 | 109°52'1"E | 39°43'25"N | 　 | 　 | 447 | 5.6 | 3（25） | 45.58  | 5.47  |
| 11 | 109°51'32"E | 39°44'24"N | 　 | 88 | 　 | 　 | 　 | 　 | 7.79  |
| 　 | 119 | 　 | 　 | 　 | 　 | 10.54  |
| 　 | 130 | 　 | 　 | 　 | 　 | 11.51  |
| 12 | 109°51'15"E | 39°45'N | 　 | 70 | 　 | 　 | 　 | 　 | 6.20  |
| 　 | 86 | 　 | 　 | 　 | 　 | 7.62  |
| 　 | 77 | 　 | 　 | 　 | 　 | 6.82  |
| 　 | 93.31 | 　 | 　 | 　 | 　 | 8.26  |
| 　 | 87 | 　 | 　 | 　 | 　 | 7.71  |
| 　 | 111 | 　 | 　 | 　 | 　 | 9.83  |
| Dongsheng Airport | 1 | 109°54'22"E | 39°33'9"N | 168.5 | 　 | 　 | 　 | 　 | 　 | 20.22  |
| 86 | 　 | 　 | 　 | 　 | 　 | 10.32  |
| 66 | 　 | 　 | 　 | 　 | 　 | 9.12  |
| 144 | 　 | 　 | 　 | 　 | 　 | 17.28  |
| 157 | 　 | 　 | 　 | 　 | 　 | 18.84  |
| 　 | 98 | 　 | 　 | 　 | 　 | 8.68  |
| 　 | 200.54 | 　 | 　 | 　 | 　 | 17.76  |
| 　 | 160.7 | 　 | 　 | 　 | 　 | 14.23  |
| 　 | 140.8 | 　 | 　 | 　 | 　 | 12.47  |
| 2 | 109°53'20"E | 39°46'22"N | 　 | 162.6 | 　 | 　 | 　 | 　 | 14.40  |
| Total | 82 | 49 | 2 | 2 | 4（100） | 2.00  | 133.00  |
| Total | 144 | 74 | 23 | 23 | 170 | 23.00  | 241.00  |