Table Supplementary S1

Table S1. Rock-Eval pyrolysis data and vitrinite reflectance data

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | Depth  （m） | FM | Lithology | TOC  (*wt*%) | Tmax  (℃) | S1＋S2  (mg/g) | HI  (mg/g) | Ro(%) |
| 1 | 3319.85 | Ed3 | Cutting | 0.70 | 433 | 0.80 | 90 | 0.59 |
| 2 | 3509.83 | Ed3 | Cutting | 1.09 | 436 | 2.42 | 206 | 0.60 |
| 3 | 3616.81 | Ed3 | Cutting | 1.12 | 439 | 2.87 | 241 | 0.61 |
| 4 | 3814.77 | Ed3 | Cutting | 1.19 | 432 | 3.49 | 264 | 0.63 |
| 5 | 3310.25 | Ed3 | Cutting | 1.01 | 430 | 4.76 | 383 | 0.49 |
| 6 | 3390.15 | Ed3 | Cutting | 0.81 | 435 | 2.99 | 267 | 0.50 |
| 7 | 3420.09 | Ed3 | Cutting | 0.77 | 433 | 2.68 | 262 | 0.54 |
| 8 | 3460.06 | Ed3 | Cutting | 0.47 | 435 | 0.93 | 121 | 0.60 |
| 9 | 3514.01 | Ed3 | Cutting | 0.44 | 435 | 0.67 | 91 | 0.63 |
| 10 | 3553.93 | Ed3 | Cutting | 0.82 | 432 | 1.61 | 107 | 0.75 |
| 11 | 3607.82 | Ed3 | Cutting | 1.16 | 437 | 5.92 | 410 | 0.60 |
| 12 | 3671.6 | Ed3 | Cutting | 0.97 | 434 | 3.95 | 327 | 0.62 |
| 13 | 3735.49 | Ed3 | Cutting | 1.16 | 434 | 5.04 | 341 | 0.65 |
| 14 | 3647 | Ed3 | Mudstone | 1.53 | 439 | 5.75 | 359 | 0.54 |
| 15 | 3150 | Ed3 | Mudstone | 0.34 | 445 | 1.82 | 500 | 0.58 |
| 16 | 3220 | Ed3 | Mudstone | 0.56 | 441 | 2.31 | 379 | 0.55 |
| 17 | 3300 | Ed3 | Mudstone | 0.57 | 453 | 1.96 | 319 | 0.57 |
| 18 | 3312 | Ed3 | Mudstone | 0.96 | 434 | 2.56 | 261 | 0.55 |
| 19 | 3330 | Ed3 | Mudstone | 0.41 | 435 | 2.43 | 553 | 0.58 |
| 20 | 3380 | Ed3 | Mudstone | 0.45 | 440 | 1.86 | 384 | 0.60 |
| 21 | 3402 | Ed3 | Mudstone | 1.00 | 433 | 3.65 | 357 | 0.57 |
| 22 | 3460 | Ed3 | Mudstone | 0.96 | 437 | 3.94 | 401 | 0.61 |
| 23 | 3480 | Ed3 | Mudstone | 0.50 | 432 | 3.43 | 645 | 0.64 |
| 24 | 3530 | Ed3 | Mudstone | 0.87 | 439 | 3.55 | 400 | 0.64 |
| 25 | 3596 | Ed3 | Mudstone | 1.20 | 435 | 4.05 | 331 | 0.70 |
| 26 | 3660 | Ed3 | Mudstone | 0.49 | 441 | 2.01 | 373 | 0.65 |
| 27 | 3666 | Ed3 | Mudstone | 0.98 | 437 | 2.38 | 238 | 0.68 |
| 28 | 3230 | Ed3 | Cutting | 0.67 | 404 | 1.32 | 190 | 0.60 |
| 29 | 3465 | Ed3 | Cutting | 1.19 | 435 | 3.12 | 253 | 0.66 |
| 30 | 3802 | Ed3 | Cutting | 1.03 | 436 | 4.70 | 429 | 0.71 |
| 31 | 2964.60 | Ed3 | Mudstone | 0.69 | 444 | 0.80 | 104 | 0.56 |
| 32 | 3029.58 | Ed3 | Mudstone | 1.01 | 449 | 2.05 | 194 | 0.58 |
| 33 | 3069.57 | Ed3 | Mudstone | 1.61 | 452 | 6.33 | 357 | 0.54 |
| 34 | 3124.53 | Ed3 | Mudstone | 1.39 | 448 | 4.03 | 250 | 0.60 |
| 35 | 3279.37 | Ed3 | Mudstone | 1.67 | 446 | 3.90 | 179 | 0.67 |
| 36 | 3304.33 | Ed3 | Mudstone | 1.42 | 448 | 4.92 | 325 | 0.62 |
| 37 | 3354.22 | Ed3 | Mudstone | 1.61 | 451 | 5.55 | 310 | 0.58 |
| 38 | 3235 | Ed3 | Mudstone | - | - | - | - | 0.58 |
| 39 | 3370 | Ed3 | Mudstone | - | - | - | - | 0.72 |
| 40 | 3450 | Ed3 | Mudstone | - | - | - | - | 0.67 |
| 41 | 3575 | Ed3 | Mudstone | 0.55 | 445 | 0.57 | 90 | 0.63 |
| 42 | 3614.06 | Ed3 | Mudstone | 1.24 | 442 | 3.68 | 285 | 0.52 |
| 43 | 3481.29 | Ed3 | Mudstone | 0.75 | - | 0.40 | 37 | 1.66 |
| 44 | 3481.43 | Ed3 | Cutting | - | - | - | - | 0.64 |
| 45 | 3488.03 | Ed3 | Cutting | 1.03 | 444 | 1.31 | 113 | 0.70 |
| 46 | 3509.36 | Ed3 | Cutting | 1.33 | 407 | 1.21 | 73 | 0.65 |
| 47 | 3397.95 | Ed3 | Cutting | 1.24 | 448 | 1.73 | 118 | 0.70 |
| 48 | 3343.28 | Ed3 | Mudstone | 0.71 | 465 | 0.46 | 41 | 1.19 |
| 49 | 3096.64 | Ed3 | Mudstone | 2.42 | 446 | 13.82 | 543 | 0.49 |
| 50 | 3096.7 | Ed3 | Mudstone | 2.09 | 442 | 6.43 | 273 | 0.61 |
| 51 | 3098.65 | Ed3 | Mudstone | 2.00 | 441 | 10.95 | 520 | 0.52 |
| 52 | 3223.15 | Ed3 | Mudstone | 1.46 | 451 | 4.29 | 288 | 0.44 |
| 53 | 3224.1 | Ed3 | Mudstone | 1.41 | 447 | 4.63 | 318 | 0.59 |
| 54 | 3218.64 | Ed3 | Mudstone | 0.97 | 433 | 2.08 | 151 | 0.58 |
| 55 | 3290.87 | Ed3 | Mudstone | 0.79 | 438 | 1.77 | 174 | 0.60 |
| 56 | 3320.90 | Ed3 | Mudstone | 0.49 | 432 | 0.64 | 123 | 0.59 |
| 57 | 3439.90 | Ed3 | Mudstone | 1.06 | 440 | 2.23 | 155 | 0.58 |
| 58 | 3667.66 | Ed3 | Mudstone | 1.56 | 440 | 6.55 | 361 | 0.63 |
| 59 | 3816.22 | Ed3 | Mudstone | 1.00 | 443 | 2.38 | 167 | 0.63 |
| 60 | 3351.53 | Ed3 | Mudstone | 1.53 | 440 | 5.94 | 376 | 0.46 |
| 61 | 3353.61 | Ed3 | Mudstone | 0.95 | 435 | 2.03 | 202 | 0.77 |
| 62 | 3354.66 | Ed3 | Mudstone | 1.73 | 434 | 6.31 | 353 | 0.47 |
| 63 | 3356.01 | Ed3 | Mudstone | 1.35 | 435 | 4.22 | 300 | 0.57 |
| 64 | 3357.58 | Ed3 | Mudstone | 0.96 | 435 | 1.97 | 196 | 0.67 |
| 65 | 3414.35 | Ed3 | Mudstone | 1.25 | 439 | 2.86 | 214 | 0.69 |
| 66 | 3414.61 | Ed3 | Mudstone | 1.48 | 437 | 6.26 | 409 | 0.50 |
| 67 | 3415.13 | Ed3 | Mudstone | 1.41 | 442 | 5.87 | 399 | 0.55 |
| 68 | 3514.82 | Ed3 | Mudstone | 0.74 | 438 | 0.58 | 74 | 0.71 |
| 69 | 3528.71 | Ed3 | Mudstone | 1.07 | 439 | 1.32 | 119 | 0.83 |
| 70 | 3537.08 | Ed3 | Mudstone | 0.69 | 436 | 0.58 | 83 | 0.68 |
| 71 | 3563.85 | Ed3 | Mudstone | 0.92 | 435 | 0.81 | 86 | 0.68 |
| 72 | 3572.74 | Ed3 | Mudstone | 1.03 | 441 | 1.04 | 96 | 0.70 |
| 73 | 3608.33 | Ed3 | Mudstone | 0.94 | 436 | 0.97 | 100 | 0.55 |
| 74 | 3630.63 | Ed3 | Mudstone | 1.66 | 440 | 4.14 | 240 | 0.68 |
| 75 | 3721.81 | Ed3 | Mudstone | 1.58 | 440 | 4.77 | 290 | 0.73 |
| 76 | 3733.46 | Ed3 | Mudstone | 1.39 | 438 | 4.11 | 281 | 0.76 |
| 77 | 3769.38 | Ed3 | Mudstone | 1.40 | 439 | 4.32 | 295 | 0.73 |
| 78 | 3896.44 | Ed3 | Mudstone | 1.31 | 441 | 2.89 | 218 | 0.68 |
| 79 | 3905.57 | Ed3 | Mudstone | 1.71 | 440 | 4.26 | 233 | 0.75 |
| 80 | 3917.44 | Ed3 | Mudstone | 1.86 | 442 | 5.84 | 295 | 0.75 |
| 81 | 3924.07 | Ed3 | Mudstone | 1.83 | 442 | 7.67 | 377 | 0.89 |
| 82 | 3926.10 | Ed3 | Mudstone | 2.41 | 446 | 11.41 | 424 | 0.80 |
| 83 | 3932.85 | Ed3 | Mudstone | 1.67 | 444 | 5.54 | 306 | 0.75 |
| 84 | 3950.86 | Ed3 | Mudstone | 1.51 | 441 | 4.05 | 251 | 0.75 |
| 85 | 3995.02 | Ed3 | Mudstone | 2.66 | 442 | 4.81 | 163 | 0.80 |
| 86 | 4035.29 | Ed3 | Mudstone | 0.64 | 444 | 1.49 | 213 | 0.85 |
| 87 | 4036.00 | Ed3 | Mudstone | 1.38 | 448 | 4.40 | 273 | 0.87 |
| 88 | 4038.06 | Ed3 | Mudstone | 0.82 | 448 | 1.41 | 156 | 1.12 |
| 89 | 4038.77 | Ed3 | Mudstone | 1.05 | 448 | 2.28 | 196 | 1.14 |
| 90 | 3732 | Es1 | Mudstone | 0.97 | 441 | 3.06 | 304 | 0.71 |
| 91 | 3740 | Es1 | Mudstone | 0.34 | 437 | 1.63 | 433 | 0.63 |
| 92 | 3784 | Es1 | Mudstone | 1.00 | 443 | 4.43 | 432 | 0.68 |
| 93 | 3840 | Es1 | Mudstone | 0.42 | 422 | 2.19 | 467 | 0.47 |
| 94 | 3856 | Es1 | Mudstone | 2.18 | 446 | 9.96 | 420 | 0.68 |
| 95 | 3926 | Es1 | Mudstone | 1.31 | 439 | 3.87 | 283 | 0.69 |
| 96 | 3986 | Es1 | Mudstone | 1.09 | 443 | 3.80 | 316 | 0.68 |
| 97 | 3990 | Es1 | Mudstone | 0.52 | 438 | 2.79 | 465 | 0.68 |
| 98 | 4050 | Es1 | Mudstone | 0.81 | 445 | 5.78 | 648 | 0.74 |
| 99 | 4080 | Es1 | Mudstone | 0.36 | 432 | 2.63 | 605 | 0.51 |
| 100 | 4120 | Es1 | Mudstone | 1.12 | 443 | 4.01 | 324 | 0.74 |
| 101 | 4213.00 | Es1 | Mudstone | 0.48 | 469 | 0.64 | 120 | 1.10 |
| 102 | 4213.25 | Es1 | Mudstone | 0.20 | 446 | 0.90 | 278 | 0.83 |
| 103 | 4222.67 | Es1 | Mudstone | 0.39 | 463 | 0.54 | 126 | 1.16 |
| 104 | 4223.11 | Es1 | Mudstone | 0.11 |  | 0.35 | 280 | 0.83 |
| 105 | 4231.10 | Es1 | Mudstone | 0.28 | 448 | 0.67 | 212 | 0.79 |
| 106 | 4238.20 | Es1 | Mudstone | 0.57 | 475 | 0.50 | 75 | 1.26 |
| 107 | 4239.82 | Es1 | Mudstone | 0.24 | - | 0.48 | 174 | 0.81 |
| 108 | 4240.20 | Es1 | Mudstone | 0.11 | 460 | 0.14 | 67 | 0.86 |
| 109 | 4263.19 | Es1 | Mudstone | 0.32 | 445 | 0.99 | 264 | 0.88 |
| 110 | 4266.10 | Es1 | Mudstone | 0.33 | 468 | 0.61 | 167 | 1.27 |
| 111 | 4271.10 | Es1 | Mudstone | 0.32 | 452 | 1.06 | 280 | 0.79 |
| 112 | 4435 | Es1 | Mudstone | 0.61 | 467 | 0.85 | 117 | 1.17 |
| 113 | 4440 | Es1 | Mudstone | 0.40 | 447 | 2.83 | 559 | 0.83 |
| 114 | 4530 | Es1 | Mudstone | 0.36 | 450 | 1.82 | 419 | 0.93 |
| 115 | 4547.46 | Es1 | Mudstone | 0.36 | 468 | 0.65 | 154 | 0.95 |
| 116 | 4548.40 | Es1 | Mudstone | 1.23 | 460 | 3.01 | 199 | 1.28 |
| 117 | 4660 | Es1 | Mudstone | 0.60 | 445 | 2.92 | 393 | 1.17 |
| 118 | 4665 | Es1 | Mudstone | 0.20 | 462 | 0.26 | 104 | 1.28 |
| 119 | 4740 | Es1 | Mudstone | 2.37 | 466 | 3.26 | 110 | 1.37 |
| 120 | 4785 | Es1 | Mudstone | 0.30 | 455 | 0.96 | 257 | 1.38 |
| 121 | 4845 | Es1 | Mudstone | 1.40 | 461 | 0.83 | 43 | 1.78 |
| 122 | 4920 | Es1 | Mudstone | 0.28 | 467 | 0.67 | 180 | 1.40 |
| 123 | 4995 | Es1 | Mudstone | 0.86 | 466 | 0.90 | 87 | 1.83 |
| 124 | 5050 | Es1 | Mudstone | 0.20 | 457 | 0.85 | 336 | 1.40 |
| 125 | 5064.40 | Es1 | Mudstone | 0.16 | - | 0.32 | 119 | 0.96 |
| 126 | 5066.40 | Es1 | Mudstone | 7.95 | 473 | 10.02 | 118 | 1.55 |
| 127 | 5070.80 | Es1 | Mudstone | 0.41 | 470 | 0.32 | 64 | 1.67 |
| 128 | 5071.65 | Es1 | Mudstone | 0.52 | - | - | - | 0.89 |
| 129 | 5150 | Es1 | Mudstone | 0.16 | 468 | 0.53 | 303 | 1.41 |
| 130 | 5240 | Es1 | Mudstone | 0.20 | 445 | 1.67 | 739 | 1.43 |
| 131 | 3665.46 | Es1 | Mudstone | 1.12 | 447 | 3.30 | 277 | 0.56 |
| 132 | 4043.36 | Es1 | Mudstone | 0.91 | 465 | 3.27 | 276 | 0.89 |
| 133 | 4085.59 | Es1 | Mudstone | 0.42 | 444 | 3.97 | 772 | 0.67 |
| 134 | 4086.00 | Es1 | Mudstone | 0.65 | 445 | 3.94 | 532 | 0.68 |
| 135 | 4093.35 | Es1 | Mudstone | 1.44 | 443 | 5.45 | 307 | 0.68 |
| 136 | 4097.96 | Es1 | Mudstone | 0.39 | 463 | 1.73 | 390 | 0.73 |
| 137 | 4098.25 | Es1 | Mudstone | 0.16 | 443 | 1.01 | 504 | 0.68 |
| 138 | 4260.55 | Es1 | Mudstone | 0.81 | 469 | 0.97 | 100 | 1.07 |
| 139 | 4263.50 | Es1 | Mudstone | 0.47 | 468 | 0.61 | 113 | 1.10 |
| 140 | 4319.48 | Es1 | Mudstone | 0.16 | 457 | 0.68 | 336 | 0.66 |
| 141 | 4320.84 | Es1 | Mudstone | 0.81 | 445 | 1.43 | 146 | 1.28 |
| 142 | 4321.78 | Es1 | Mudstone | 1.45 | 450 | 3.08 | 172 | 0.78 |
| 143 | 4324.57 | Es1 | Mudstone | 0.71 | 465 | 1.20 | 145 | 1.03 |
| 144 | 4326.11 | Es1 | Mudstone | 0.91 | 467 | 0.57 | 53 | 1.08 |
| 145 | 3404.09 | Es1 | Mudstone | 1.80 | 455 | 7.22 | 368 | 0.60 |
| 146 | 3478.87 | Es1 | Mudstone | 1.65 | 449 | 4.82 | 270 | 0.62 |
| 147 | 3675 | Es1 | Mudstone | 0.54 | 449 | 0.35 | 53 | 0.63 |
| 148 | 3761.90 | Es1 | Mudstone | 0.97 | 441 | 2.01 | 197 | 0.55 |
| 149 | 3843.60 | Es1 | Mudstone | 1.23 | 443 | 3.23 | 246 | 0.62 |
| 150 | 3557.83 | Es1 | Cutting | 1.18 | 443 | 0.59 | 25 | 0.84 |
| 151 | 3594.24 | Es1 | Cutting | 0.61 | 440 | 0.22 | 23 | 1.74 |
| 152 | 3621.55 | Es1 | Cutting | 0.84 | 405 | 0.35 | 24 | 1.62 |
| 153 | 3632.48 | Es1 | Cutting | 0.80 | 429 | 0.46 | 43 | 1.69 |
| 154 | 3647.13 | Es1 | Cutting | 0.97 | 427 | 0.87 | 67 | 1.48 |
| 155 | 3858.45 | Es1 | Cutting | 0.79 | 448 | 0.23 | 16 | 1.85 |
| 156 | 3506.35 | Es1 | Cutting | 1.32 | 447 | 2.98 | 215 | 0.68 |
| 157 | 3514.43 | Es1 | Cutting | 2.01 | 442 | 7.08 | 325 | 0.68 |
| 158 | 3541.02 | Es1 | Cutting | 1.62 | 439 | 4.48 | 249 | 0.70 |
| 159 | 3556.27 | Es1 | Cutting | 1.61 | 442 | 5.45 | 319 | 0.58 |
| 160 | 3809.53 | Es1 | Cutting | 1.08 | 445 | 2.04 | 168 | 0.84 |
| 161 | 3681.52 | Es1 | Cutting | 1.31 | 433 | 0.98 | 53 | 1.70 |
| 162 | 3730.37 | Es1 | Cutting | 1.71 | 442 | 4.75 | 237 | 0.68 |
| 163 | 3763.29 | Es1 | Cutting | 1.76 | 441 | 5.28 | 270 | 0.65 |
| 164 | 3827.13 | Es1 | Cutting | 1.19 | 443 | 2.40 | 178 | 0.67 |
| 165 | 3888.63 | Es1 | Mudstone | 1.60 | 442 | 4.69 | 228 | 0.63 |
| 166 | 4009.81 | Es1 | Mudstone | 1.47 | 439 | 4.48 | 251 | 0.62 |
| 167 | 3898.8 | Es1 | Mudstone | 1.17 | 444 | 2.1 | 157 | 0.65 |
| 168 | 3900.55 | Es1 | Mudstone | 1.34 | 442 | 3.02 | 184 | 0.65 |
| 169 | 3902.5 | Es1 | Mudstone | 1.16 | 448 | 3.66 | 269 | 0.67 |
| 170 | 3271.37 | Es1 | Mudstone | 0.51 | 443 | 0.82 | 149 | 0.92 |
| 171 | 4335.97 | Es1 | Mudstone | 1.62 | 442 | 3.22 | 163 | 1.04 |
| 172 | 4367.67 | Es1 | Mudstone | 2.51 | 442 | 4.96 | 155 | 1.17 |
| 173 | 4399.47 | Es1 | Mudstone | 2.22 | 443 | 4.10 | 147 | 0.98 |
| 174 | 4417.71 | Es1 | Mudstone | 2.71 | 443 | 4.85 | 137 | 1.02 |
| 175 | 4440.77 | Es1 | Mudstone | 1.95 | 462 | 2.62 | 110 | 1.21 |
| 176 | 4440.82 | Es1 | Mudstone | 2.00 | 463 | 2.74 | 112 | 1.19 |
| 177 | 4441.32 | Es1 | Mudstone | 2.11 | 461 | 2.89 | 113 | 1.05 |
| 178 | 4441.56 | Es1 | Mudstone | 1.63 | 463 | 2.32 | 109 | 1.26 |
| 179 | 4442.06 | Es1 | Mudstone | 1.74 | 459 | 2.45 | 112 | 1.13 |
| 180 | 4442.14 | Es1 | Mudstone | 1.95 | 464 | 2.54 | 106 | 1.16 |
| 181 | 4442.98 | Es1 | Mudstone | 1.54 | 466 | 2.03 | 102 | 1.23 |
| 182 | 4463.28 | Es1 | Mudstone | 2.57 | 445 | 3.77 | 117 | 1.12 |
| 183 | 4499.64 | Es1 | Mudstone | 4.02 | 423 | 3.94 | 72 | 1.04 |
| 184 | 4513.23 | Es1 | Mudstone | 2.26 | 440 | 2.63 | 91 | 1.07 |
| 185 | 4567.61 | Es1 | Mudstone | 1.91 | 432 | 2.31 | 90 | 1.21 |
| 186 | 4590.34 | Es1 | Mudstone | 1.63 | 435 | 1.73 | 83 | 1.33 |
| 187 | 4311.59 | Es1 | Mudstone | 1.52 | 445 | 5.62 | 305 | 0.61 |
| 188 | 4311.89 | Es1 | Mudstone | 1.48 | 441 | 5.69 | 312 | - |
| 189 | 4020.90 | Es1 | Cutting | 1.55 | 449 | 3.55 | 205 | 0.68 |
| 190 | 4036.89 | Es1 | Cutting | 1.38 | 446 | 2.98 | 189 | 0.64 |
| 191 | 4055.87 | Es1 | Cutting | 1.35 | 443 | 2.46 | 155 | 0.78 |
| 192 | 4518.8 | Es3 | Mudstone | 0.76 | 454 | 0.68 | 76 | 0.85 |
| 193 | 3788.86 | Es3 | Cutting | 1.55 | 444 | 4.06 | 254 | 0.78 |
| 194 | 3850.77 | Es3 | Cutting | 1.68 | 445 | 1.00 | 39 | 0.86 |
| 195 | 4429.70 | Es3 | Cutting | 1.51 | 541 | 2.00 | 119 | 0.92 |
| 196 | 4629.97 | Es3 | Cutting | 1.09 | 443 | 0.61 | 39 | 0.91 |
| 197 | 4747.93 | Es3 | Cutting | 6.98 | - | 1.45 | 18 | 2.00 |
| 198 | 4777.98 | Es3 | Cutting | 1.12 | - | 0.58 | 40 | - |
| 199 | 3938.41 | Es3 | Mudstone | 1.43 | 444 | 2.42 | 126 | 1.06 |
| 200 | 3981.84 | Es3 | Cutting | 0.97 | 449 | 1.87 | 160 | 1.03 |
| 201 | 4067.24 | Es3 | Cutting | 1.87 | 449 | 2.71 | 121 | 0.94 |
| 202 | 4094.08 | Es3 | Cutting | 1.17 | 445 | 1.99 | 137 | 0.96 |
| 203 | 4121.84 | Es3 | Cutting | 1.12 | 446 | 2.20 | 151 | 0.97 |
| 204 | 4148.72 | Es3 | Cutting | 1.18 | 445 | 2.65 | 168 | 0.99 |
| 205 | 4218.64 | Es3 | Cutting | 2.33 | 447 | 2.84 | 100 | 1.03 |
| 206 | 3941.79 | Es3 | Cutting | 1.66 | 445 | 3.51 | 179 | 0.79 |
| 207 | 3990.07 | Es3 | Cutting | 2.13 | 454 | 4.06 | 169 | 0.92 |
| 208 | 3997.87 | Es3 | Cutting | 2.14 | 445 | 4.69 | 164 | 0.94 |
| 209 | 4010.91 | Es3 | Cutting | 2.21 | 443 | 4.91 | 179 | 0.98 |
| 210 | 4032.83 | Es3 | Cutting | 1.95 | 447 | 3.74 | 126 | 0.97 |
| 211 | 4050.44 | Es3 | Cutting | 1.67 | 444 | 2.86 | 144 | 0.96 |
| 212 | 4068.98 | Es3 | Cutting | 1.99 | 448 | 3.95 | 131 | 0.96 |
| 213 | 4098.44 | Es3 | Cutting | 1.31 | 450 | 1.74 | 113 | 1.00 |
| 214 | 4135.81 | Es3 | Cutting | 1.37 | 445 | 2.63 | 153 | 0.97 |
| 215 | 4141.30 | Es3 | Cutting | 2.61 | 438 | 4.95 | 141 | 0.88 |
| 216 | 4339.88 | Es3 | Cutting | 1.58 | 455 | 1.34 | 65 | 0.91 |
| 217 | 4388.39 | Es3 | Cutting | 2.33 | 450 | 3.47 | 109 | 0.94 |
| 218 | 4459.54 | Es3 | Cutting | 1.89 | 444 | 2.12 | 84 | 0.95 |
| 219 | 4555.70 | Es3 | Cutting | 1.25 | 443 | 1.95 | 128 | 1.23 |
| 220 | 4637.40 | Es3 | Cutting | - | 469 | 11.79 | 91 | 1.28 |
| 221 | 4759.20 | Es3 | Cutting | 1.71 | 446 | 2.01 | 97 | 1.29 |
| 222 | 4602.9 | Es3 | Mudstone | 0.56 | 457 | 0.31 | 41 | 0.78 |
| 223 | 4603.76 | Es3 | Mudstone | 0.36 | 449 | 0.23 | 47 | 0.97 |
| 224 | 4606.01 | Es3 | Mudstone | 0.51 | 461 | 0.24 | 41 | 0.80 |
| 225 | 4738.95 | Es3 | Mudstone | 0.41 | 495 | 0.12 | 22 | 1.39 |
| 226 | 4740.87 | Es3 | Mudstone | 1.42 | 577 | 0.51 | 17 | 1.90 |
| 227 | 4883.57 | Es3 | Mudstone | 0.61 | 527 | 0.18 | 26 | 1.36 |
| 228 | 4884.82 | Es3 | Mudstone | 11.73 | 541 | 3.2 | 22 | 1.41 |
| 229 | 5191 | Es3 | Cutting | 0.61 | 462 | 0.58 | 57 | 1.03 |
| 230 | 5220 | Es3 | Cutting | 0.77 | 463 | 0.68 | 48 | 1.09 |
| 231 | 5282 | Es3 | Cutting | 0.80 | 473 | 0.79 | 66 | 1.12 |
| 232 | 5310 | Es3 | Cutting | 0.95 | 459 | 0.78 | 59 | 1.12 |
| 233 | 4703.91 | Es3 | Mudstone | 0.95 | 482 | 0.56 | 54 | 1.53 |
| 234 | 4603.98 | Es3 | Mudstone | 1.75 | 433 | 2.60 | 113 | 1.22 |
| 235 | 4640.17 | Es3 | Mudstone | 1.60 | 434 | 1.84 | 82 | 1.42 |
| 236 | 4662.78 | Es3 | Mudstone | 1.70 | 410 | 1.89 | 81 | 1.46 |
| 237 | 4786.90 | Es3 | Mudstone | 1.60 | 415 | 1.69 | 80 | 1.32 |
| 238 | 4821.84 | Es3 | Mudstone | 1.93 | 420 | 1.61 | 64 | 1.37 |
| 239 | 4830.59 | Es3 | Mudstone | 2.15 | 414 | 2.16 | 77 | 1.41 |
| 240 | 4647.74 | Es3 | Cutting | 0.90 | 440 | 1.00 | 80 | 1.06 |
| 241 | 4620 | Es3 | Cutting | 0.62 | 445 | 1.78 | 239 | 0.95 |
| 242 | 4686 | Es3 | Cutting | 0.39 | 463 | 0.67 | 156 | 1.14 |
| 243 | 4802 | Es3 | Cutting | 0.61 | 458 | 1.65 | 235 | 1.12 |
| 244 | 3745.47 | Es3 | Mudstone | 1.37 | 446 | 3.62 | 192 | 0.72 |
| 245 | 3793.54 | Es3 | Mudstone | 1.43 | 455 | 3.81 | 220 | 0.85 |
| 246 | 3822.27 | Es3 | Mudstone | 1.77 | 447 | 4.69 | 201 | 0.83 |
| 247 | 3893.80 | Es3 | Mudstone | 1.52 | 449 | 3.71 | 191 | 0.90 |
| 248 | 3917.58 | Es3 | Mudstone | 2.14 | 454 | 4.96 | 173 | 1.27 |
| 249 | 4171.39 | Es3 | Mudstone | 0.25 | 466 | 0.24 | 84 | 0.80 |
| 250 | 4171.87 | Es3 | Mudstone | 0.34 | 459 | 0.29 | 70 | 1.09 |
| 251 | 4246.23 | Es3 | Mudstone | 0.37 | 475 | 0.27 | 61 | 1.23 |
| 252 | 4247.63 | Es3 | Mudstone | 0.27 | 477 | 0.16 | 45 | 1.22 |
| 253 | 4485 | Es3 | Mudstone | 0.80 | 442 | 0.50 | 47 | 0.70 |
| 254 | 4535 | Es3 | Mudstone | 0.55 | 441 | 0.31 | 45 | 0.86 |
| 255 | 4625 | Es3 | Mudstone | 1.54 | 426 | 1.39 | 49 | 1.01 |
| 256 | 4770 | Es3 | Mudstone | 1.47 | 427 | 0.43 | 23 | 1.14 |
| 257 | 4855 | Es3 | Mudstone | 0.68 | 439 | 0.60 | 67 | 1.02 |
| 258 | 4232.53 | Es3 | Mudstone | 1.10 | 447 | 3.30 | 230 | 0.66 |
| 259 | 4389.66 | Es3 | Mudstone | 5.31 | 448 | 10.59 | 162 | 0.88 |
| 260 | 4467.72 | Es3 | Mudstone | 1.29 | 445 | 2.98 | 118 | 0.93 |
| 261 | 4703.92 | Es3 | Mudstone | 1.36 | 454 | 2.19 | 90 | 0.96 |

FM=formation; TOC= total organic matter (wt,%); Tmax= temperature with maximum hydrocarbon generation; S1= free hydrocarbons (mg/g); S2= pyrolytic hydrocarbon yield (mg/g); HI= hydrogen index; Ro= Vitrinite reflectance (%); - =no dataTable Supplementary 2 Biomarker analysis data

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | FM | TAR | nC15-20 | nC27-31 | Pr/n-C17 | Ph/n-C18 | Pr/Ph | C27Dia/(Dia+Reg) | G/H | C27/C29 | C27% | C28% | C29% | S/H | C19/C23 TT | C24Tet/C23T | Tri/C30H | Ts/Tm | C29 S/(S+R) | C29 BB/(BB+AA) | HH/C30H | C31R/H | C31 S/(S+R) |
| 1 | Ed3 | 0.18 | 0.57 | 0.07 | 1.16 | 1.24 | 1.48 | 0.08 | 0.07 | 1.01 | 38.26 | 23.73 | 38.02 | 0.85 | 0.31 | 2.20 | 0.01 | 0.55 | 0.09 | 0.26 | 0.70 | 0.20 | 0.53 |
| 2 | Ed3 | 0.31 | 0.43 | 0.09 | 0.83 | 0.36 | 2.12 | 0.37 | 0.07 | 1.18 | 38.16 | 29.39 | 32.45 | 0.28 | 3.79 | 10.49 | 0.02 | 0.87 | 0.36 | 0.33 | 0.86 | 0.19 | 0.60 |
| 3 | Ed3 | 0.29 | 0.42 | 0.08 | 0.70 | 0.31 | 2.19 | 0.33 | 0.08 | 1.17 | 39.44 | 26.95 | 33.61 | 0.22 | 3.98 | 14.22 | 0.02 | 1.01 | 0.38 | 0.35 | 0.88 | 0.19 | 0.60 |
| 4 | Ed3 | 0.32 | 0.43 | 0.10 | 0.75 | 0.43 | 1.75 | 0.26 | 0.06 | 1.90 | 48.34 | 26.22 | 25.44 | 0.30 | 0.47 | 1.36 | 0.02 | 1.05 | 0.35 | 0.33 | 0.93 | 0.19 | 0.60 |
| 5 | Ed3 | 0.81 | 0.35 | 0.19 | 1.08 | 0.32 | 3.14 | 0.25 | 0.06 | 1.28 | 44.41 | 20.97 | 34.62 | 0.22 | 0.83 | 2.03 | 0.02 | 0.81 | 0.36 | 0.29 | 1.20 | 0.23 | 0.59 |
| 6 | Ed3 | 0.47 | 0.41 | 0.13 | 0.90 | 0.48 | 2.37 | 0.17 | 0.04 | 1.31 | 44.06 | 22.36 | 33.59 | 0.15 | 0.47 | 1.71 | 0.02 | 0.84 | 0.29 | 0.29 | 0.81 | 0.19 | 0.60 |
| 7 | Ed3 | 0.79 | 0.32 | 0.16 | 1.25 | 0.50 | 2.58 | 0.20 | 0.05 | 1.25 | 43.75 | 21.26 | 34.99 | 0.14 | 0.54 | 1.53 | 0.01 | 0.76 | 0.28 | 0.25 | 0.81 | 0.18 | 0.60 |
| 8 | Ed3 | 0.56 | 0.40 | 0.14 | 2.08 | 0.58 | 3.67 | 0.21 | 0.06 | 0.71 | 33.92 | 18.30 | 47.77 | 0.12 | 0.90 | 1.82 | 0.02 | 0.24 | 0.31 | 0.22 | 1.05 | 0.24 | 0.59 |
| 9 | Ed3 | 0.16 | 0.75 | 0.08 | 1.10 | 0.89 | 2.31 | 0.18 | 0.07 | 0.53 | 24.76 | 28.57 | 46.67 | 0.94 | 0.58 | 1.51 | 0.02 | 0.43 | 0.07 | 0.32 | 0.54 | 0.16 | 0.51 |
| 10 | Ed3 | 0.56 | 0.43 | 0.17 | 1.42 | 0.48 | 2.60 | 0.31 | 0.07 | 1.16 | 42.70 | 20.51 | 36.79 | 0.09 | 0.87 | 1.28 | 0.04 | 0.49 | 0.41 | 0.28 | 0.82 | 0.17 | 0.61 |
| 11 | Ed3 | 0.62 | 0.42 | 0.21 | 0.49 | 0.41 | 1.63 | 0.16 | 0.04 | 0.94 | 35.79 | 26.06 | 38.15 | 0.28 | 0.45 | 1.28 | 0.02 | 0.78 | 0.34 | 0.28 | 1.56 | 0.25 | 0.58 |
| 12 | Ed3 | 0.34 | 0.38 | 0.09 | 0.71 | 0.38 | 1.78 | 0.26 | 0.07 | 1.72 | 46.70 | 26.14 | 27.16 | 0.26 | 2.83 | 12.21 | 0.02 | 1.15 | 0.40 | 0.37 | 0.75 | 0.16 | 0.60 |
| 13 | Ed3 | 0.32 | 0.39 | 0.08 | 0.60 | 0.32 | 1.70 | 0.22 | 0.09 | 1.59 | 45.74 | 25.40 | 28.85 | 0.30 | 0.45 | 1.72 | 0.02 | 1.23 | 0.40 | 0.36 | 0.87 | 0.18 | 0.59 |
| 14 | Ed3 | 0.07 | 0.80 | 0.03 | 0.39 | 0.51 | 1.37 | 0.19 | - | 1.33 | 41.81 | 26.85 | 31.35 | 0.21 | - | - | 0.25 | 1.76 | 0.35 | 0.39 | 0.90 | 0.18 | 0.58 |
| 15 | Ed3 | 0.40 | 0.45 | 0.13 | 0.51 | 0.31 | 1.43 | 0.12 | 0.07 | 1.16 | 39.27 | 27.01 | 33.72 | 0.11 | - | - | 0.13 | 0.51 | 0.38 | 0.26 | 0.65 | 0.18 | 0.59 |
| 16 | Ed3 | 0.22 | 0.60 | 0.11 | 0.43 | 0.34 | 1.64 | 0.14 | - | 0.85 | 33.78 | 26.35 | 39.87 | 0.34 | - | - | 0.18 | 0.87 | 0.43 | 0.38 | 1.02 | 0.19 | 0.58 |
| 17 | Ed3 | 2.12 | 0.23 | 0.29 | 1.10 | 0.54 | 2.33 | 0.27 | 0.05 | 0.61 | 26.83 | 29.38 | 43.78 | 0.12 | 0.63 | 1.45 | 0.02 | 1.06 | 0.34 | 0.50 | 0.70 | 0.12 | 0.65 |
| 18 | Ed3 | 0.44 | 0.56 | 0.18 | 0.53 | 0.74 | 1.34 | 0.25 | 0.08 | 0.69 | 32.87 | 19.40 | 47.73 | 0.11 | 0.52 | 0.98 | 0.04 | 1.18 | 0.33 | 0.53 | 0.91 | 0.16 | 0.59 |
| 19 | Ed3 | 0.56 | 0.39 | 0.16 | 0.39 | 0.28 | 1.36 | 0.29 | - | 0.92 | 35.21 | 26.43 | 38.36 | 0.14 | 0.71 | 1.37 | 0.04 | 3.24 | 0.45 | 0.37 | 1.26 | 0.23 | 0.58 |
| 20 | Ed3 | 0.64 | 0.38 | 0.18 | 0.90 | 0.40 | 2.26 | 0.28 | 0.06 | 1.24 | 41.77 | 24.53 | 33.69 | 0.14 | 0.47 | 1.03 | 0.04 | 1.56 | 0.45 | 0.44 | 0.76 | 0.15 | 0.62 |
| 21 | Ed3 | 1.39 | 0.28 | 0.28 | 0.19 | 0.14 | 1.34 | 0.36 | - | 2.41 | 54.73 | 22.59 | 22.67 | 0.88 | 5.47 | 1.12 | 0.94 | 0.58 | 0.44 | 0.58 | 0.97 | 0.23 | 0.52 |
| 22 | Ed3 | 0.21 | 0.57 | 0.09 | 0.89 | 1.00 | 2.18 | 0.13 | - | 0.47 | 25.88 | 18.68 | 55.44 | 0.33 | 0.93 | 1.94 | 0.07 | 0.09 | 0.39 | 0.27 | 0.85 | 0.23 | 0.58 |
| 23 | Ed3 | 1.46 | 0.25 | 0.22 | 0.46 | 0.50 | 0.91 | 0.09 | 0.07 | 0.95 | 32.47 | 33.45 | 34.08 | 0.10 | 0.26 | 2.06 | 0.01 | 0.61 | 0.34 | 0.28 | 0.74 | 0.14 | 0.60 |
| 24 | Ed3 | 0.24 | 0.45 | 0.08 | 0.28 | 0.21 | 1.58 | 0.16 | 0.09 | 1.03 | 37.97 | 25.06 | 36.97 | 0.29 | 1.02 | - | 0.23 | 0.64 | 0.39 | 0.42 | 0.76 | 0.17 | 0.56 |
| 25 | Ed3 | 0.58 | 0.40 | 0.18 | 0.40 | 0.25 | 1.75 | 0.21 | 0.06 | 0.68 | 31.86 | 20.98 | 47.17 | 0.19 | 0.78 | 0.94 | 0.06 | 1.66 | 0.53 | 0.45 | 1.07 | 0.20 | 0.57 |
| 26 | Ed3 | 0.02 | 0.77 | 0.02 | 0.20 | 0.10 | 2.32 | 0.19 | - | 1.02 | 38.06 | 24.77 | 37.17 | 0.38 | 0.52 | - | 0.25 | 0.85 | 0.30 | 0.42 | 0.76 | 0.18 | 0.56 |
| 27 | Ed3 | 0.29 | 0.45 | 0.10 | 0.76 | 0.57 | 1.62 | 0.16 | 0.04 | 1.54 | 44.56 | 26.41 | 29.02 | 0.44 | 0.40 | 1.99 | 0.02 | 0.49 | 0.19 | 0.27 | 0.91 | 0.20 | 0.58 |
| 28 | Ed3 | 0.83 | 0.35 | 0.22 | 0.98 | 0.70 | 1.65 | 0.16 | 0.03 | 0.98 | 36.55 | 25.97 | 37.48 | 0.39 | 0.53 | 1.62 | 0.02 | 0.47 | 0.23 | 0.21 | 1.36 | 0.27 | 0.56 |
| 29 | Ed3 | 1.15 | 0.36 | 0.30 | 1.71 | 0.85 | 3.13 | 0.09 | 0.05 | 0.69 | 29.78 | 27.23 | 42.99 | 0.59 | 0.69 | 2.10 | 0.02 | 0.49 | 0.17 | 0.03 | 0.95 | 0.25 | 0.53 |
| 30 | Ed3 | 0.35 | 0.46 | 0.11 | 1.00 | 0.70 | 2.13 | 0.18 | 0.07 | 1.38 | 45.98 | 20.61 | 33.41 | 0.45 | 3.44 | 11.50 | 0.02 | 0.64 | 0.15 | 0.27 | 0.74 | 0.20 | 0.59 |
| 31 | Ed3 | 0.54 | 0.37 | 0.13 | 1.21 | 0.68 | 2.16 | 0.18 | 0.06 | 1.46 | 45.79 | 22.93 | 31.28 | 0.45 | 0.40 | 1.67 | 0.03 | 0.67 | 0.14 | 0.27 | 0.69 | 0.19 | 0.59 |
| 32 | Ed3 | 1.80 | 0.28 | 0.32 | 1.89 | 1.01 | 2.53 | 0.20 | 0.05 | 0.83 | 35.65 | 21.43 | 42.91 | 0.22 | 0.73 | 1.29 | 0.02 | 0.49 | 0.17 | 0.23 | 1.00 | 0.25 | 0.57 |
| 33 | Ed3 | 0.09 | 0.54 | 0.03 | 0.98 | 0.62 | 1.93 | 0.19 | 0.07 | 1.73 | 47.66 | 24.78 | 27.56 | 0.50 | 0.33 | 1.32 | 0.03 | 0.71 | 0.26 | 0.29 | 0.97 | 0.21 | 0.59 |
| 34 | Ed3 | 1.37 | 0.28 | 0.26 | 0.29 | 0.22 | 1.14 | 0.29 | 0.07 | 1.54 | 42.68 | 29.67 | 27.65 | 0.12 | 0.92 | 2.38 | 0.03 | 1.53 | 0.41 | 0.50 | 1.16 | 0.16 | 0.67 |
| 35 | Ed3 | 0.97 | 0.33 | 0.21 | 0.42 | 0.15 | 2.29 | 0.46 | - | 1.03 | 36.23 | 28.75 | 35.02 | 0.08 | 0.61 | - | 0.10 | 2.69 | 0.40 | 0.45 | 1.21 | 0.15 | 0.62 |
| 36 | Es1 | 0.01 | 0.94 | 0.01 | 0.49 | 0.46 | 1.82 | 0.17 | 0.17 | 0.92 | 35.55 | 25.94 | 38.52 | 0.38 | 0.70 | 0.20 | 0.71 | 0.96 | 0.44 | 0.39 | 0.96 | 0.18 | 0.57 |
| 37 | Es1 | 0.12 | 0.68 | 0.06 | 0.45 | 0.39 | 1.45 | 0.16 | 0.14 | 0.92 | 34.77 | 27.51 | 37.72 | 0.30 | 0.23 | 0.27 | 0.31 | 0.91 | 0.42 | 0.36 | 0.96 | 0.19 | 0.57 |
| 38 | Es1 | 0.46 | 0.46 | 0.17 | 0.74 | 0.40 | 1.94 | 0.14 | 0.09 | 0.95 | 35.32 | 27.47 | 37.22 | 0.31 | 0.40 | 0.30 | 0.22 | 0.78 | 0.37 | 0.45 | 1.21 | 0.19 | 0.61 |
| 39 | Es1 | 0.63 | 0.37 | 0.17 | 0.95 | 0.48 | 2.00 | 0.23 | 0.06 | 1.47 | 45.43 | 23.72 | 30.85 | 0.16 | 0.40 | 0.93 | 0.04 | 1.52 | 0.42 | 0.44 | 0.92 | 0.18 | 0.64 |
| 40 | Es1 | 0.94 | 0.32 | 0.22 | 0.93 | 0.49 | 1.93 | 0.24 | 0.08 | 1.14 | 40.13 | 24.68 | 35.19 | 0.19 | 0.43 | 0.90 | 0.04 | 1.44 | 0.42 | 0.36 | 1.44 | 0.25 | 0.58 |
| 41 | Es1 | 0.66 | 0.38 | 0.19 | 0.97 | 0.45 | 2.12 | 0.25 | 0.06 | 1.31 | 41.82 | 26.32 | 31.85 | 0.15 | 0.42 | 0.81 | 0.05 | 1.52 | 0.42 | 0.43 | 0.86 | 0.19 | 0.60 |
| 42 | Es1 | 0.46 | 0.44 | 0.15 | 0.47 | 0.27 | 1.78 | 0.30 | 0.03 | 0.89 | 37.81 | 19.60 | 42.59 | 0.10 | 0.96 | 1.79 | 0.03 | 1.54 | 0.53 | 0.42 | 1.32 | 0.21 | 0.57 |
| 43 | Es1 | 0.44 | 0.44 | 0.15 | 0.53 | 0.33 | 1.71 | 0.17 | 0.04 | 0.94 | 37.16 | 23.45 | 39.39 | 0.12 | 0.43 | 0.65 | 0.10 | 1.03 | 0.38 | 0.34 | 0.69 | 0.16 | 0.62 |
| 44 | Es1 | 0.34 | 0.46 | 0.12 | 0.47 | 0.32 | 1.53 | 0.26 | 0.07 | 1.06 | 39.80 | 22.50 | 37.70 | 0.17 | 0.60 | 0.34 | 0.36 | 2.22 | 0.46 | 0.51 | 0.62 | 0.14 | 0.60 |
| 45 | Es1 | 0.32 | 0.44 | 0.10 | 0.62 | 0.31 | 2.14 | 0.46 | 0.03 | 1.23 | 40.60 | 26.39 | 33.01 | 0.21 | 0.97 | 2.02 | 0.05 | 2.90 | 0.46 | 0.52 | 0.91 | 0.19 | 0.59 |
| 46 | Es1 | 0.35 | 0.43 | 0.11 | 0.62 | 0.40 | 1.60 | 0.28 | 0.08 | 1.90 | 46.88 | 28.45 | 24.67 | 0.39 | 0.75 |  | 0.04 | 1.05 | 0.46 | 0.50 | 1.14 | 0.22 | 0.59 |
| 47 | Es1 | 0.36 | 0.42 | 0.11 | - | - | - | 0.36 | 0.06 | 0.94 | 37.00 | 23.45 | 39.55 | 0.21 | 1.30 | 2.51 | 0.03 | 2.71 | 0.44 | 0.56 | 0.79 | 0.17 | 0.58 |
| 48 | Es1 | 0.24 | 0.49 | 0.09 | - | - | - | 0.37 | 0.24 | 0.78 | 34.54 | 20.96 | 44.51 | 0.33 | 1.38 | 1.15 | 0.17 | 4.07 | 0.33 | 0.52 | 0.94 | 0.23 | 0.52 |
| 49 | Es1 | 0.28 | 0.48 | 0.10 | - | - | - | 0.49 | 0.28 | 0.76 | 32.86 | 24.00 | 43.14 | 0.24 | 1.50 | 1.02 | 0.23 | 4.94 | 0.43 | 0.59 | 0.90 | 0.24 | 0.49 |
| 50 | Es1 | 0.15 | 0.56 | 0.07 | - | - | - | 0.27 | 0.30 | 0.67 | 31.30 | 22.09 | 46.61 | 0.45 | 2.32 | 1.33 | 0.55 | 1.64 | 0.36 | 0.48 | 0.80 | 0.17 | 0.57 |
| 51 | Es1 | 0.37 | 0.46 | 0.13 | - | - | - | 0.24 | 0.06 | 0.70 | 30.30 | 26.18 | 43.52 | 0.17 | 1.26 | 1.78 | 0.04 | 1.59 | 0.49 | 0.48 | 1.04 | 0.19 | 0.58 |
| 52 | Es1 | 0.34 | 0.50 | 0.13 | - | - | - | 0.31 | 0.31 | 1.08 | 42.31 | 18.60 | 39.09 | 0.19 | 1.56 | 1.00 | 0.19 | 1.91 | 0.46 | 0.47 | 1.43 | 0.22 | 0.58 |
| 53 | Es3 | 0.19 | 0.58 | 0.09 | 0.22 | 0.16 | 1.49 | 0.17 | 0.28 | 0.78 | 32.02 | 26.81 | 41.17 | 0.42 | 0.07 | 0.17 | 0.95 | 1.26 | 0.44 | 0.39 | 1.18 | 0.20 | 0.58 |
| 54 | Es3 | 0.09 | 0.75 | 0.06 | 0.59 | 0.51 | 1.78 | 0.19 | 0.27 | 0.83 | 33.04 | 26.95 | 40.02 | 0.46 | 0.21 | 0.24 | 0.70 | 1.36 | 0.45 | 0.39 | 0.99 | 0.18 | 0.59 |
| 55 | Es3 | 0.78 | 0.35 | 0.20 | 0.54 | 0.35 | 1.56 | 0.31 | 0.13 | 0.70 | 32.92 | 20.32 | 46.77 | 0.27 | 0.50 | 0.29 | 0.29 | 4.47 | 0.45 | 0.49 | 1.35 | 0.26 | 0.54 |
| 56 | Es3 | 0.17 | 0.58 | 0.08 | 0.57 | 0.41 | 1.54 | 0.20 | 0.16 | 1.06 | 38.78 | 24.54 | 36.68 | 0.32 | 0.20 | 0.36 | 0.54 | 1.36 | 0.46 | 0.46 | 0.66 | 0.16 | 0.59 |
| 57 | Es3 | 0.34 | 0.48 | 0.12 | 0.49 | 0.30 | 1.57 | 0.21 | 0.10 | 1.08 | 42.19 | 18.79 | 39.02 | 0.20 | 0.45 | 0.17 | 0.92 | 0.96 | 0.40 | 0.46 | 0.66 | 0.15 | 0.60 |
| 58 | Es3 | 0.29 | 0.47 | 0.10 | 0.50 | 0.36 | 1.08 | 0.16 | 0.12 | 1.13 | 40.11 | 24.45 | 35.44 | 0.28 | 0.11 | 0.30 | 0.36 | 1.26 | 0.42 | 0.45 | 0.61 | 0.14 | 0.61 |
| 59 | Es3 | 0.12 | 0.63 | 0.06 | 0.31 | 0.11 | 3.05 | 0.14 | 0.24 | 0.83 | 32.36 | 28.59 | 39.05 | 0.48 | 0.25 | 0.31 | 0.27 | 0.94 | 0.44 | 0.37 | 0.96 | 0.18 | 0.58 |
| 60 | Es3 | 0.32 | 0.50 | 0.12 | 0.53 | 0.38 | 1.52 | 0.26 | 0.17 | 1.04 | 37.97 | 25.60 | 36.43 | 0.47 | 0.07 | 0.13 | 4.20 | 1.18 | 0.45 | 0.48 | 0.87 | 0.17 | 0.59 |
| 61 | Es3 | 0.46 | 0.44 | 0.16 | 0.45 | 0.42 | 1.13 | 0.38 | 0.20 | 0.79 | 36.43 | 17.45 | 46.12 | 0.75 | 0.27 | 0.16 | 0.73 | 9.45 | 0.55 | 0.54 | 1.58 | - | 0.54 |
| 62 | Es3 | 0.51 | 0.42 | 0.17 | 0.42 | 0.33 | 1.34 | 0.31 | 0.09 | 0.76 | 33.89 | 21.31 | 44.80 | 0.21 | 0.35 | 0.36 | 0.15 | 3.02 | 0.50 | 0.45 | 1.30 | 0.24 | 0.57 |
| 63 | Es3 | 0.39 | 0.49 | 0.16 | 0.34 | 0.33 | 1.41 | 0.19 | 0.36 | 0.63 | 29.12 | 24.78 | 46.10 | 0.19 | 0.60 | 0.35 | 0.09 | 1.08 | 0.48 | 0.42 | 1.06 | 0.19 | 0.58 |
| 64 | Es3 | 0.29 | 0.54 | 0.13 | 0.35 | 0.30 | 1.82 | 0.23 | 0.13 | 0.82 | 34.13 | 24.47 | 41.39 | 0.17 | 0.83 | 0.62 | 0.11 | 1.35 | 0.53 | 0.44 | 1.07 | 0.20 | 0.58 |
| 65 | Es3 | 0.73 | 0.38 | 0.20 | 0.21 | 0.19 | 1.08 | 0.42 | 0.25 | 1.68 | 38.41 | 38.69 | 22.89 | 2.84 | 0.90 | 0.39 | 1.01 | 4.60 | 0.47 | 0.49 | 0.30 | 0.14 | 0.33 |
| 66 | Es3 | 0.09 | 0.63 | 0.04 | 0.26 | 0.11 | 2.47 | 0.15 | 0.17 | 1.05 | 38.03 | 25.63 | 36.34 | 0.43 | 0.42 | 0.61 | 0.23 | 0.87 | 0.35 | 0.37 | 0.90 | 0.20 | 0.57 |
| 67 | Es3 | 0.16 | 0.57 | 0.07 | 0.32 | 0.14 | 2.37 | 0.12 | 0.23 | 1.00 | 37.19 | 25.61 | 37.20 | 0.55 | 0.33 | 0.70 | 0.30 | 0.68 | 0.40 | 0.40 | 0.87 | 0.20 | 0.54 |
| 68 | Es3 | 0.26 | 0.56 | 0.10 | 0.39 | 0.62 | 1.03 | 0.16 | 0.15 | 1.10 | 39.00 | 25.66 | 35.34 | 0.60 | 0.21 | 0.66 | 0.23 | 0.83 | 0.38 | 0.37 | 0.83 | 0.18 | 0.57 |
| 69 | Es3 | - | 0.94 | - | 0.47 | 0.70 | 1.05 | 0.17 | 0.23 | 1.09 | 38.63 | 25.90 | 35.47 | 0.42 | 0.19 | 0.60 | 0.33 | 1.01 | 0.37 | 0.40 | 0.82 | 0.18 | 0.56 |
| 70 | Es3 | - | 0.96 | - | 0.41 | 0.70 | 1.37 | 0.17 | 0.19 | 1.07 | 37.62 | 27.37 | 35.01 | 0.43 | 0.23 | 0.62 | 0.27 | 0.88 | 0.33 | 0.37 | 0.85 | 0.20 | 0.56 |

FM=formation; TAR= terrigenous/aquatic ratio; nC= normal alkane; Pr=Pristane; Ph=Phytane; Dia=Diasterane; Reg=Regular sterane; G/H=Gammacerane/Hopane; C27/C29=C27 setranes/C29 steranes; C27=C27 steranes; C28=C28 steranes; C29=C29 steranes; S/H=Steranes/Hopanes; C19/C23 TT= C19/C23 terpanes; C24 TeT/C23 TT= C24 tetraterpanes/C23 terpanes; Tri/C30H= Tricyclic terpanes/C30 Hopanes; Ts/Tm= C27 18α(H)-trisnornehopane/ C27 17α(H)-trisnorhopane; C29 S/(S+R)= C29 20S/( 20S+20R) ;- =no data

Table Supplementary 3 Major oxides and trace elements of Ed3, Es1, and Es3 source rocks

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | Fm | Major oxide elements (wt, %) | | | | | | | | | Trace elements (ppm) | | | | | | | | | | | | | | |
| Paleoclimate parameters | | | | | | | | | DE parameters | | | | PRC parameters | | | | Salinity parameters | | | | Paleoclimate parameters | | |
| SiO2 | Al2O3 | Fe2O3 | MgO | CaO | Na2O | K2O | P2O5 | CIA | V | Ni | V/(V+Ni) | Cu | | Zn | Cu/Zn | Sr | | Ba | Sr/Ba | Rb | | Sr/Cu | CaO/MgO\*Al2O3 |
| 1 | Ed3 | 58.71 | 16.95 | 3.64 | 2.79 | 2.63 | 1.41 | 3.61 | 0.22 | 60.58 | 103.00 | 37.30 | 0.73 | 32.90 | | 110.00 | 0.30 | 291.00 | | 812.00 | 0.36 | 141.00 | | 8.84 | 0.13 |
| 2 | Ed3 | 62.21 | 15.74 | 4.98 | 2.72 | 2.09 | 2.34 | 3.53 | 0.22 | 57.81 | 107.00 | 37.60 | 0.74 | 34.10 | | 113.00 | 0.30 | 287.00 | | 1086.00 | 0.26 | 143.00 | | 8.42 | 0.11 |
| 3 | Ed3 | 52.84 | 15.64 | 5.40 | 2.55 | 7.05 | 2.23 | 2.79 | 0.16 | 44.46 | 133.00 | 46.10 | 0.74 | 39.50 | | 95.00 | 0.42 | 397.00 | | 953.00 | 0.42 | 144.00 | | 10.05 | 0.40 |
| 4 | Ed3 | 49.39 | 15.27 | 12.40 | 5.81 | 9.29 | 2.84 | 0.56 | 0.20 | 40.75 | 274.00 | 62.80 | 0.81 | 99.80 | | 128.00 | 0.78 | 326.00 | | 207.00 | - | 13.70 | | 3.27 | 0.24 |
| 5 | Ed3 | 54.60 | 15.37 | 6.11 | 3.00 | 5.13 | 5.77 | 2.94 | 0.25 | 41.10 | 118.00 | 48.00 | 0.71 | 78.90 | | 94.30 | 0.84 | 483.00 | | 1104.00 | 0.44 | 116.00 | | 6.12 | 0.25 |
| 6 | Ed3 | 63.38 | 15.44 | 4.14 | 2.63 | 1.82 | 2.11 | 3.43 | 0.20 | 59.50 | 99.20 | 33.90 | 0.75 | 89.00 | | 98.40 | 0.90 | 232.00 | | 946.00 | 0.25 | 123.00 | | 2.61 | 0.10 |
| 7 | Ed3 | 61.05 | 16.69 | 4.99 | 2.03 | 2.74 | 5.15 | 1.83 | 0.13 | 51.93 | 130.00 | 40.10 | 0.76 | 18.30 | | 73.50 | 0.25 | 315.00 | | 1133.00 | 0.28 | 58.80 | | 17.21 | 0.18 |
| 8 | Ed3 | 69.25 | 9.61 | 3.53 | 2.48 | 3.55 | 0.42 | 2.03 | 0.14 | 50.65 | 76.10 | 36.30 | 0.68 | 53.60 | | 59.50 | 0.90 | 357.00 | | 375.00 | - | 85.00 | | 6.66 | 0.33 |
| 9 | Ed3 | 52.07 | 12.41 | 4.17 | 5.13 | 7.27 | 0.23 | 3.23 | 0.10 | 42.02 | 149.00 | 33.20 | 0.82 | 74.60 | | 85.40 | 0.87 | 226.00 | | 3414.00 | 0.07 | 136.00 | | 3.03 | 0.26 |
| 10 | Ed3 | 54.34 | 14.49 | 2.07 | 4.86 | 6.13 | 0.23 | 3.86 | 0.13 | 47.95 | 163.00 | 34.50 | 0.83 | 60.40 | | 88.90 | 0.68 | 155.00 | | 266.00 | - | 153.00 | | 2.57 | 0.20 |
| 11 | Ed3 | 42.86 | 22.80 | 5.29 | 4.02 | 4.23 | 0.25 | 6.82 | 0.47 | 59.51 | 162.00 | 40.00 | 0.80 | 42.00 | | 77.60 | 0.54 | 236.00 | | 290.00 | - | 290.00 | | 5.62 | 0.10 |
| 12 | Ed3 | 57.40 | 17.37 | 5.48 | 2.36 | 1.89 | 1.55 | 3.10 | 0.46 | 64.99 | 160.00 | 35.80 | 0.82 | 64.10 | | 127.00 | 0.50 | 312.00 | | 725.00 | 0.43 | 127.00 | | 4.87 | 0.10 |
| 13 | Ed3 | 58.47 | 18.29 | 4.56 | 2.33 | 1.18 | 1.45 | 3.58 | 0.30 | 68.48 | 102.00 | 31.20 | 0.77 | 34.30 | | 117.00 | 0.29 | 294.00 | | 763.00 | 0.39 | 150.00 | | 8.57 | 0.06 |
| 14 | Ed3 | 54.66 | 17.13 | 5.29 | 2.64 | 3.69 | 1.02 | 4.19 | 0.19 | 56.96 | 106.00 | 32.60 | 0.76 | 30.10 | | 111.00 | 0.27 | 336.00 | | 982.00 | 0.34 | 162.00 | | 11.16 | 0.18 |
| 15 | Ed3 | 62.11 | 16.56 | 3.47 | 2.23 | 1.76 | 1.81 | 3.61 | 0.24 | 62.11 | 102.00 | 26.70 | 0.79 | 30.70 | | 91.50 | 0.34 | 284.00 | | 932.00 | 0.30 | 127.00 | | 9.25 | 0.11 |
| 16 | Es1 | 60.49 | 17.05 | 5.56 | 2.32 | 1.24 | 2.04 | 4.16 | 0.27 | 62.73 | 109.00 | 32.30 | 0.77 | 31.40 | | 117.00 | 0.27 | 321.00 | | 1154.00 | 0.28 | 158.00 | | 10.22 | 0.07 |
| 17 | Es1 | 58.10 | 18.69 | 3.62 | 2.64 | 2.05 | 1.17 | 4.06 | 0.24 | 65.00 | 117.00 | 28.40 | 0.80 | 28.70 | | 98.40 | 0.29 | 345.00 | | 979.00 | 0.35 | 161.00 | | 12.02 | 0.09 |
| 18 | Es1 | 57.41 | 16.84 | 5.49 | 2.83 | 2.54 | 1.03 | 3.83 | 0.23 | 61.65 | 95.70 | 51.70 | 0.65 | 30.10 | | 79.40 | 0.38 | 322.00 | | 838.00 | 0.38 | 147.00 | | 10.70 | 0.12 |
| 19 | Es1 | 57.13 | 18.25 | 4.78 | 2.64 | 1.94 | 0.90 | 4.25 | 0.22 | 65.47 | 121.00 | 29.90 | 0.80 | 29.70 | | 56.20 | 0.53 | 349.00 | | 1174.00 | 0.30 | 180.00 | | 11.75 | 0.09 |
| 20 | Es1 | 58.14 | 17.47 | 4.33 | 2.72 | 2.49 | 1.01 | 4.12 | 0.22 | 62.09 | 108.00 | 70.00 | 0.61 | 26.20 | | 53.00 | 0.49 | 327.00 | | 971.00 | 0.34 | 148.00 | | 12.48 | 0.12 |
| 21 | Es1 | 58.39 | 17.86 | 3.61 | 2.68 | 2.41 | 1.25 | 3.87 | 0.26 | 62.65 | 108.00 | 29.70 | 0.78 | 28.30 | | 80.00 | 0.35 | 336.00 | | 934.00 | 0.36 | 142.00 | | 11.87 | 0.11 |
| 22 | Es3 | 54.67 | 17.05 | 5.27 | 2.92 | 2.73 | 1.83 | 4.35 | 0.26 | 57.30 | 114.00 | 27.40 | 0.81 | 33.80 | | 88.80 | 0.38 | 321.00 | | 759.00 | 0.42 | 159.00 | | 9.50 | 0.12 |
| 23 | Es3 | 57.29 | 15.71 | 5.43 | 2.69 | 3.46 | 1.43 | 3.86 | 0.26 | 55.02 | 97.50 | 49.30 | 0.66 | 27.70 | | 83.00 | 0.33 | 385.00 | | 729.00 | 0.53 | 146.00 | | 13.90 | 0.18 |
| 24 | Es3 | 57.65 | 15.27 | 4.82 | 2.65 | 4.05 | 1.76 | 3.73 | 0.26 | 51.61 | 99.00 | 29.30 | 0.77 | 29.40 | | 88.40 | 0.33 | 407.00 | | 818.00 | 0.50 | 139.00 | | 13.84 | 0.23 |
| 25 | Es3 | 54.46 | 13.31 | 9.08 | 2.70 | 3.16 | 1.04 | 2.96 | 0.28 | 55.48 | 102.00 | 27.60 | 0.79 | 26.30 | | 73.20 | 0.36 | 363.00 | | 749.00 | 0.48 | 108.00 | | 13.80 | 0.20 |
| 26 | Es3 | 56.58 | 18.23 | 5.47 | 2.25 | 1.27 | 1.29 | 5.16 | 0.22 | 64.50 | 126.00 | 35.90 | 0.78 | 35.60 | | 131.00 | 0.27 | 343.00 | | 1003.00 | 0.34 | 196.00 | | 9.63 | 0.07 |
| 27 | Es3 | 55.55 | 18.68 | 5.83 | 2.18 | 1.30 | 1.33 | 5.12 | 0.23 | 64.88 | 87.30 | 45.20 | 0.66 | 103.00 | | 127.00 | 0.81 | 355.00 | | 1064.00 | 0.33 | 189.00 | | 3.45 | 0.07 |

FM=Formation, DE Parameters= Depositional environment parameters, PRC parameters= Paleoredox condition parameters