**Supplementary Information**

Correlation between the rock mass properties and maximum horizontal stress: A case study of overcoring stress measurements

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**Data availability**

Data can be provided upon request, for collaboration purposes.

**Table S1.** Overcoring stress measurements in the nine mines in China

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mine name | No. | Depth(m) | *E*(GPa) | *v* | RQD(%) | Maximum principal stress (*σ*1) | Intermediate principal stress (*σ*2) | Minimum principal stress (*σ*3) |
| Value(MPa) | Direction(°) | Dip(°) | Value(MPa) | Direction(°) | Dip(°) | Value(MPa) | Direction(°) | Dip(°) |
| Sanshandao gold mine | 1 | 75 | 48.36 | 0.25 | 56.75 | 6.01 | 288.50 | -6.30 | 3.81 | 198.00 | -4.90 | 2.56 | 250.40 | 82.00 |
| 2 | 150 | 45.20 | 0.25 | 82.14 | 7.73 | 280.90 | -5.20 | 5.48 | 9.40 | 16.60 | 4.50 | 27.70 | 72.50 |
| 3 | 420 | 67.66 | 0.24 | 48.35 | 19.27 | 284.10 | -21.30 | 11.05 | 18.50 | -11.10 | 10.88 | 134.40 | -65.70 |
| 4 | 420 | 47.90 | 0.24 | 27.29 | 19.39 | 120.40 | -14.90 | 10.92 | 169.20 | 68.10 | 9.44 | 34.70 | 15.80 |
| 5 | 510 | 50.00 | 0.25 | 48.50 | 24.55 | 129.00 | 4.00 | 16.35 | -138.00 | 2.00 | 14.49 | 133.00 | -85.00 |
| 6 | 510 | 52.00 | 0.22 | 64.20 | 24.64 | -111.00 | 3.00 | 15.68 | 155.00 | 82.00 | 15.02 | 161.00 | -10.00 |
| 7 | 555 | 56.00 | 0.28 | 81.20 | 25.71 | -45.00 | -13.00 | 14.00 | 14.00 | 73.00 | 13.00 | 50.00 | -20.00 |
| 8 | 600 | 60.00 | 0.21 | 61.30 | 28.88 | 103.00 | 1.00 | 16.54 | 10.00 | 76.00 | 14.77 | 13.00 | -8.00 |
| 9 | 600 | 55.00 | 0.25 | 88.40 | 30.17 | 110.00 | -16.00 | 18.83 | 24.00 | -11.00 | 16.94 | 236.00 | -70.00 |
| 10 | 645 | 55.00 | 0.20 | 47.40 | 29.57 | 112.00 | -3.00 | 19.56 | -177.00 | -80.00 | 15.48 | -156.00 | -9.00 |
| 11 | 690 | 50.00 | 0.36 | 75.30 | 31.50 | -80.00 | 2.00 | 19.08 | 230.00 | -79.00 | 17.54 | 10.00 | -10.00 |
| 12 | 690 | 56.00 | 0.28 | 82.70 | 29.77 | -83.00 | 4.00 | 20.84 | -8.00 | -74.00 | 19.63 | 8.00 | 15.00 |
| 13 | 750 | 51.00 | 0.35 | 66.50 | 33.22 | 119.00 | -10.00 | 19.93 | -89.00 | -82.00 | 17.10 | 208.00 | -8.00 |
| 14 | 750 | 56.00 | 0.28 | 81.20 | 32.78 | 105.60 | -0.59 | 19.60 | 18.70 | 79.20 | 16.68 | 15.50 | -10.80 |
| Xincheng gold mine | 1 | 205 | 76.52 | 0.28 | 52.00 | 11.45 | 307.10 | -17.60 | 5.69 | 286.30 | 71.30 | 4.03 | 35.10 | 6.20 |
| 2 | 205 | 46.94 | 0.33 | 78.00 | 11.54 | 270.00 | 4.30 | 6.77 | 181.50 | -19.00 | 5.72 | 347.80 | -70.04 |
| 3 | 205 | 64.62 | 0.26 | 66.00 | 11.27 | 218.90 | 10.20 | 5.68 | 220.20 | -79.80 | 3.98 | 129.00 | -0.20 |
| 4 | 235 | 68.00 | 0.24 | 78.00 | 14.62 | 237.60 | 9.20 | 10.17 | 329.90 | 13.90 | 5.63 | 295.10 | -73.20 |
| 5 | 235 | 63.00 | 0.18 | 46.00 | 13.69 | 128.70 | -7.80 | 6.83 | 131.30 | 82.20 | 5.06 | 38.80 | 0.30 |
| 6 | 235 | 50.00 | 0.2 | 95.00 | 12.99 | 301.90 | -0.60 | 6.14 | 208.20 | -81.30 | 5.00 | 212.00 | 8.70 |
| 7 | 235 | 58.79 | 0.25 | 88.00 | 13.60 | 311.00 | -1.40 | 8.93 | 220.70 | -10.40 | 6.85 | 228.80 | 79.50 |
| 8 | 235 | 42.00 | 0.25 | 58.00 | 12.58 | 280.00 | -13.20 | 7.85 | 187.3 | -11.10 | 6.92 | 238.50 | 72.60 |
| 9 | 235 | 64.29 | 0.19 | 56.00 | 12.80 | 127.10 | -7.20 | 7.41 | 35.90 | -9.70 | 5.89 | 72.40 | 78.00 |
| 10 | 310 | 68.55 | 0.21 | 53.00 | 18.39 | 123.10 | -1.60 | 11.65 | 213.20 | -3.30 | 10.73 | 187.70 | 86.40 |
| 11 | 310 | 62.28 | 0.22 | 59.00 | 18.50 | 285.50 | -17.70 | 8.89 | 80.80 | -70.60 | 7.05 | 13.00 | 7.60 |
| 12 | 310 | 45.98 | 0.21 | 79.00 | 20.73 | 109.90 | -0.40 | 9.00 | 201.90 | -79.10 | 7.01 | 199.80 | 10.90 |
| 13 | 310 | 30.14 | 0.25 | 43.00 | 16.32 | 82.90 | 3.20 | 9.19 | 13.00 | -80.70 | 7.99 | 172.40 | -8.70 |
| 14 | 410 | 88.47 | 0.33 | 34.00 | 29.62 | 308.90 | -5.30 | 13.77 | 193.20 | -78.00 | 11.98 | 219.90 | 10.70 |
| 15 | 410 | 84.12 | 0.35 | 40.00 | 31.49 | 148.40 | -6.90 | 14.13 | 267.70 | -76.00 | 11.08 | 236.90 | 12.00 |
| 16 | 410 | 80.88 | 0.35 | 29.00 | 31.55 | 327.20 | 11.77 | 13.89 | 219.00 | -79.10 | 11.77 | 237.80 | 10.30 |
| 17 | 410 | 90.75 | 0.28 | 42.00 | 25.98 | 90.70 | -4.50 | 11.54 | 106.70 | 85.30 | 5.78 | 0.80 | 1.30 |
| 18 | 610 | 63.33 | 0.25 | 65.00 | 30.21 | 300.00 | -22.00 | 17.12 | 357.00 | -72.00 | 13.09 | 28.00 | 15.00 |
| 19 | 660 | 59.02 | 0.27 | 75.00 | 33.35 | 280.00 | -9.00 | 21.46 | 322.00 | -78.00 | 20.08 | 11.00 | 8.00 |
| 20 | 660 | 68.46 | 0.22 | 45.00 | 31.68 | 276.00 | -10.00 | 19.04 | 252.00 | -80.00 | 16.55 | 9.00 | 6.00 |
| Linglong gold mine | 1 | 250 | 65.40 | 0.29 | 90.00 | 17.63 | 52.60 | 4.70 | 8.62 | 321.90 | 7.70 | 7.58 | 353.60 | -81.00 |
| 2 | 250 | 46.00 | 0.29 | 87.00 | 14.06 | 287.70 | -14.40 | 7.63 | 19.40 | -6.60 | 6.63 | 133.50 | -74.10 |
| 3 | 290 | 71.50 | 0.30 | 52.00 | 15.58 | 141.40 | -3.00 | 8.28 | 24.50 | -83.30 | 6.84 | 51.80 | 5.90 |
| 4 | 290 | 51.50 | 0.29 | 64.00 | 17.51 | 294.80 | -0.10 | 9.37 | 26.30 | -84.30 | 7.26 | 24.80 | 5.70 |
| 5 | 290 | 50.00 | 0.25 | 67.00 | 17.68 | 280.30 | -13.50 | 9.25 | 322.80 | 72.00 | 6.61 | 193.20 | 11.70 |
| 6 | 290 | 55.00 | 0.28 | 70.00 | 20.45 | 343.50 | -6.40 | 8.36 | 75.30 | -15.10 | 7.75 | 51.20 | 73.50 |
| 7 | 290 | 53.40 | 0.30 | 56.00 | 19.74 | 91.30 | -2.10 | 10.09 | 171.90 | 77.10 | 8.58 | 1.80 | 12.70 |
| 8 | 370 | 52.00 | 0.25 | 78.00 | 23.43 | 138.20 | -9.30 | 12.69 | 12.70 | -74.20 | 10.13 | 50.30 | 12.60 |
| 9 | 370 | 73.00 | 0.25 | 78.00 | 21.32 | 103.60 | -12.00 | 10.68 | 237.40 | -72.90 | 8.20 | 103.60 | -12.00 |
| 10 | 410 | 54.50 | 0.29 | 87.00 | 25.77 | 255.70 | 2.60 | 10.73 | 155.40 | 75.60 | 10.18 | 166.40 | -14.10 |
| 11 | 410 | 54.50 | 0.28 | 48.00 | 25.55 | 218.00 | 2.10 | 11.51 | 118.80 | 77.10 | 8.64 | 128.50 | -12.70 |
| 12 | 570 | 59.20 | 0.27 | 80.00 | 32.53 | 92.20 | -3.80 | 15.54 | 199.00 | -77.00 | 13.21 | 181.40 | 12.40 |
| 13 | 920 | 46.20 | 0.24 | 90.70 | 53.13 | 134.70 | -5.30 | 27.72 | 81.40 | 81.20 | 25.51 | 44.10 | -7.00 |
| 14 | 920 | 50.30 | 0.25 | 70.00 | 55.88 | 128.10 | -3.80 | 30.12 | 229.20 | -71.20 | 28.41 | 216.00 | 10.70 |
| 15 | 920 | 43.10 | 0.25 | 78.20 | 50.17 | 273.30 | -15.80 | 27.72 | 314.10 | 70.20 | 24.89 | 187.00 | 13.10 |
| 16 | 970 | 45.80 | 0.20 | 87.20 | 60.26 | 335.00 | 11.00 | 34.52 | 34.00 | 72.20 | 27.93 | 246.00 | -13.10 |
| 17 | 970 | 42.60 | 0.24 | 44.00 | 57.92 | 136.10 | -0.50 | 30.24 | 227.10 | -70.00 | 26.96 | 226.00 | 15.00 |
| 18 | 970 | 44.00 | 0.21 | 76.40 | 57.22 | 295.20 | 10.40 | 28.90 | 205.10 | 3.50 | 28.52 | 36.30 | 80.00 |
| Shuichang iron mine | 1 | 56 | 30.60 | 0.36 | 47.00 | 3.68 | 98.90 | -7.20 | 2.33 | 189.70 | -6.20 | 2.03 | 319.80 | 80.50 |
| 2 | 81 | 49.88 | 0.20 | 58.00 | 4.07 | 272.20 | -7.30 | 2.38 | 3.90 | -13.30 | 2.16 | 154.20 | -74.80 |
| 3 | 91.5 | 65.68 | 0.26 | 74.00 | 4.26 | 90.60 | -0.80 | 2.86 | 180.60 | -2.90 | 2.68 | 344.90 | -87.00 |
| Meishan iron mine | 1 | 342 | 26.81 | 0.27 | 55.63 | 20.19 | 107.30 | -3.10 | 9.79 | 114.70 | 86.90 | 7.48 | 17.30 | 0.40 |
| 2 | 360 | 20.25 | 0.18 | 78.21 | 16.16 | 345.50 | -0.30 | 10.28 | 211.30 | -89.50 | 7.59 | 255.50 | 0.30 |
| 3 | 350 | 42.68 | 0.23 | 70.05 | 20.32 | 195.90 | 12.60 | 11.79 | 287.30 | 6.20 | 9.57 | 43.00 | 76.00 |
| 4 | 350 | 28.20 | 0.18 | 66.42 | 18.37 | 335.10 | -4.50 | 9.57 | 307.20 | 85.20 | 6.92 | 64.90 | 2.40 |
| 5 | 210 | 18.55 | 0.13 | 38.00 | 9.46 | 228.10 | 2.00 | 4.36 | 318.50 | 11.70 | 3.04 | 308.60 | -78.10 |
| 6 | 218 | 21.85 | 0.24 | 47.33 | 11.47 | 359.50 | -4.50 | 5.61 | 270.30 | 9.90 | 4.80 | 65.20 | 79.10 |
| 7 | 210 | 10.90 | 0.16 | 50.18 | 11.79 | 140.20 | -5.70 | 5.86 | 48.90 | -13.10 | 5.03 | 73.20 | 75.70 |
| 8 | 418 | 24.68 | 0.22 | 44.64 | 21.50 | 313.70 | -3.30 | 12.32 | 193.3 | -83.5 | 11.56 | 224.10 | 5.60 |
| Lilou iron mine | 1 | 300 | 30.70 | 0.11 | 29.04 | 10.99 | 60.34 | 3.94 | 4.44 | 18.81 | 84.74 | 4.18 | 330.10 | 3.47 |
| 2 | 350 | 30.74 | 0.17 | 80.03 | 21.21 | 194.11 | -5.03 | 6.69 | 305.70 | -76.53 | 3.84 | 283.00 | 12.46 |
| 3 | 350 | 37.36 | 0.20 | 67.50 | 15.42 | 167.76 | 2.98 | 6.89 | 76.92 | 15.61 | 6.09 | 88.28 | -74.09 |
| 4 | 350 | 49.58 | 0.22 | 34.25 | 17.31 | 38.03 | -0.26 | 8.25 | 307.46 | -65.43 | 7.09 | 308.16 | 24.57 |
| 5 | 400 | 49.68 | 0.24 | 32.92 | 14.65 | 8.31 | 7.77 | 12.07 | 246.38 | 75.53 | 7.83 | 280.00 | -12.13 |
| 6 | 400 | 52.67 | 0.23 | 72.70 | 24.16 | 179.16 | 2.10 | 12.08 | 257.14 | -80.01 | 9.07 | 269.53 | 9.76 |
| Ekou iron mine | 1 | 310 | 54.46 | 0.25 | 58.46 | 23.10 | 359.90 | -2.00 | 7.64 | 89.90 | 1.10 | 9.41 | 331.40 | 87.70 |
| 2 | 310 | 84.61 | 0.29 | 55.32 | 23.11 | 170.00 | -0.50 | 8.25 | 258.10 | 74.50 | 10.72 | 260.20 | -15.50 |
| 3 | 310 | 58.53 | 0.27 | 60.17 | 22.96 | 183.20 | 0.80 | 8.85 | 93.40 | -15.60 | 10.97 | 90.50 | 74.30 |
| 4 | 310 | 47.80 | 0.22 | 52.28 | 19.34 | 153.10 | -0.30 | 8.57 | 64.60 | 78.00 | 8.99 | 63.00 | -12.00 |
| Pingmei 8th coal mine | 1 | 416.97 | 40.00 | 0.25 | 23.70 | 21.63 | 201.50 | -16.80 | 18.54 | 294.00 | -1.90 | 12.66 | 18.00 | -73.10 |
| 2 | 416.97 | 38.00 | 0.25 | 19.70 | 20.96 | 37.00 | 20.30 | 17.25 | 127.80 | -0.30 | 12.72 | 288.60 | -72.80 |
| 3 | 522.75 | 52.00 | 0.20 | 53.90 | 24.81 | 232.70 | -18.30 | 18.20 | 143.40 | -12.70 | 13.50 | 115.50 | -77.50 |
| 4 | 523.90 | 54.00 | 0.22 | 32.30 | 25.08 | 232.40 | -18.50 | 18.38 | 148.20 | -12.40 | 13.60 | 116.20 | -77.50 |
| 5 | 561.99 | 58.00 | 0.21 | 11.80 | 26.52 | 258.60 | -1.90 | 15.69 | 164.20 | -11.40 | 13.60 | 208.20 | 78.50 |
| Pingmei 10th coal mine | 1 | 1123 | 45.79 | 0.19 | 49.70 | 65.46 | 60.10 | -1.00 | 38.06 | 209.40 | -75.80 | 31.26 | 149.20 | 15.30 |
| 2 | 1061 | 41.25 | 0.23 | 77.30 | 43.06 | 228.10 | 13.30 | 26.10 | 60.50 | 76.20 | 22.36 | 137.50 | -2.50 |
| 3 | 1061 | 42.12 | 0.24 | 59.30 | 44.06 | 60.40 | -1.80 | 28.38 | 155.30 | 71.60 | 24.20 | 149.10 | 17.50 |
| 4 | 785 | 42.10 | 0.25 | 44.00 | 34.32 | 202.40 | -16.90 | 22.19 | 219.00 | 71.40 | 18.29 | 293.40 | -4.80 |
| 5 | 793 | 41.42 | 0.27 | 36.10 | 36.19 | 60.30 | 15.00 | 25.07 | 49.30 | -73.60 | 19.07 | 330.10 | 3.40 |
| 6 | 869 | 42.99 | 0.25 | 10.50 | 44.40 | 56.00 | -13.60 | 25.48 | 333.30 | -11.50 | 17.18 | 21.50 | 70.40 |
| 7 | 869 | 41.37 | 0.26 | 49.60 | 44.28 | 61.50 | -5.60 | 26.09 | 330.30 | -8.80 | 18.45 | 6.10 | 79.40 |
| 8 | 514 | 24.90 | 0.35 | 92.90 | 31.43 | 53.20 | 6.10 | 17.48 | 131.10 | -72.60 | 15.44 | 146.20 | 16.10 |
| 9 | 514 | 24.31 | 0.35 | 95.80 | 29.30 | 229.10 | -6.80 | 18.34 | 137.40 | -16.90 | 17.10 | 160.20 | 72.20 |
| 10 | 914 | 25.69 | 0.34 | 32.40 | 40.20 | 43.10 | -7.80 | 28.27 | 132.20 | 2.30 | 14.24 | 27.50 | 81.40 |
| 11 | 914 | 25.13 | 0.35 | 32.80 | 43.36 | 229.20 | 9.30 | 23.12 | 133.00 | -4.50 | 16.42 | 42.00 | 79.10 |