**Supplementary information**



Figure S1. Map of ANC (Anthracite North China) underground coal mine with the specific location of samples.



Figure S2. Map of BSC (Bituminous South China) underground coal mine with the specific location of samples.



Figure S3. Map of BWC (Bituminous South-West China) underground coal mine with the specific location of samples. SD, suspended dust.



Figure S4. Map of SSC (Subbituminous South China) underground coal mine with the specific location of samples.



Figure S5. Scanning electron microscopy images showing the mode of occurrence of pyrite in SSC D3 (Subbituminous South China) and BWC (Bituminous South-West China) #7 coals. In the first case the framboidal pyrite aggregates are embedded into a kaolinite matrix while in the second these are into the maceral matrix.

Table S1. Mineral contents in deposited dust finer than 500 µm and respirable deposited dust (DD and RDD samples, respectively) from the four underground coal mines. Values in %wt. Carbonate mineral (Cb), Feldspar mineral (Fsp), Pyrite (Py), SO42- (sulphate mineral), Qtz (Quartz), Ant (Anatase). Calcite (Cal), Ankerite (Ank), Dolomite (Dol), Siderite (Sd), Microcline (Mc), Albite/Anorthite (Ab/An), Szomolnokite (Szo), Jarosite/Alunite (Jrs/Alu), Gp (Gypsum), Illite/Muscovite (Ilt/Ms), Kaolinite/Clinochlore (Kln/Clc). WF, Working front; GW, Gunited walls; FTW, Floor of train wagons. BWC, Bituminous South-West China; SSC, Subbituminous South China; BSC, Bituminous South China; and ANC, Anthracite North China. Top, mineral groups,; Bottom, specific minerals.

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| **Mine** | **Location** | **Sample** | **Cb** | **Fsp** | **Py** | **SO42-** | **Qtz** | **Ant** | **Clay** |
| BWC | GW #7 | DD | 82.3 | <0.1 | 1.1 | <0.1 | 1.8 | 0.4 | 2.4 |
| BWC | GW #7 | DD | 46.4 | <0.1 | 0.9 | 3.4 | 9.6 | 5.6 | 7.5 |
| BWC | GW #11 | DD | 40.7 | <0.1 | 0.4 | 0.6 | 3.1 | 0.8 | 7.3 |
| BWC | GW #11 | DD | 77.7 | <0.1 | 1.3 | 0.6 | 2.5 | 0.3 | 4.2 |
| BWC | 1000 m WF #7 | DD | 3 | <0.1 | 2.7 | 10.1 | 30.2 | 2.7 | 24.2 |
| BWC | 900 m WF #7 | DD | 51.8 | <0.1 | 0.8 | 3 | 13.3 | 2.3 | 6.6 |
| BWC | 300 m WF #7 | DD | 12.9 | <0.1 | 3.9 | 0.8 | 25.2 | 4.4 | 16.4 |
| BWC | 200 m WF #7 | DD | 1 | <0.1 | 2.4 | 19.5 | 27 | 4.5 | 7.6 |
| BWC | 100 m WF #7 | DD | 0.8 | <0.1 | 2.7 | 11.1 | 34.3 | 2.5 | 7.8 |
| BWC | 50 m WF #7 | DD | 1.8 | <0.1 | 1.8 | 7.2 | 18.4 | 2.5 | 14.5 |
| BWC | 15 m WF #7 | DD | 11.5 | <0.1 | 4.2 | 0.7 | 19.8 | 3.4 | 20.2 |
| BWC | Workers rest #7 | DD | 10.3 | <0.1 | 2.9 | 1 | 24.3 | 3.3 | 16.7 |
| BWC | WF #7 | DD | 9.3 | <0.1 | 2.6 | 0.1 | 18.2 | 2.8 | 19.3 |
| BWC | WF #7 | DD | 14.9 | <0.1 | 3.5 | <0.1 | 23.5 | 4.7 | 23.3 |
| BWC | WF #11 | DD | 3.4 | <0.1 | <0.1 | <0.1 | 0.6 | <0.1 | 11.2 |
| BWC | WF #11 | DD | 4.1 | <0.1 | 0.1 | <0.1 | 1.2 | 0.2 | 12.9 |
| BWC | Wall drilling front #11 | DD | 1.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 18.1 |
| BWC | Wall drilling front #11 | DD | 2.3 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 17.8 |
| BWC | FTW | DD | 35.3 | <0.1 | 0.7 | 0.2 | 8.5 | 1.5 | 17.3 |
| BWC | Coal mill | DD | 5.4 | <0.1 | 2.2 | 0.2 | 8.5 | 1.7 | 17.1 |
| BWC | Coal mill | DD | 3.1 | <0.1 | 1.1 | <0.1 | 8.1 | 2 | 20.8 |
| BWC | Coal gangue | DD | 15 | <0.1 | 3.2 | 0.5 | 18.5 | 7.9 | 37.4 |
| BWC | Coal gangue | DD | 40.2 | 0.8 | 0.6 | <0.1 | 11 | 4.8 | 27.3 |
| BWC | Production coal | DD | 23.4 | <0.1 | 0.7 | <0.1 | 18.6 | 4.5 | 26.2 |
| BWC | GW #7 | RDD | 68.5 | <0.1 | 0.5 | <0.1 | 1.4 | 0.8 | 3.1 |
| BWC | 300 m WF #7 | RDD | 6.3 | <0.1 | 1.4 | 0.3 | 4.0 | 1.6 | 12.2 |
| BWC | 100 m WF #7 | RDD | <0.1 | <0.1 | 1.4 | 12.6 | 4.6 | 2 | 3.9 |
| BWC | 50 m WF #7 | RDD | 0.6 | <0.1 | 0.9 | 1.7 | 4.7 | 1.1 | 14.1 |
| BWC | WF #7 | RDD | 2.6 | <0.1 | 0.7 | 0.1 | 4.6 | 0.8 | 14.3 |
| BWC | WF #11 | RDD | 1.5 | <0.1 | 0.2 | <0.1 | 0.1 | 0.1 | 11.7 |
| BWC | FTW | RDD | 38.7 | <0.1 | 0.3 | 0.5 | 3.3 | 2.9 | 25.3 |

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| **Mine** | **Location** | **Sample** | **Cal** | **Ank** | **Dol** | **Sd** | **Mc** | **Ab/An** | **Py** | **Szo** | **Gp** | **Jrs/Alu** | **Qtz** | **Ilt/Ms** | **Kln/Clc** | **Ant** |
| BWC | GW #7 | DD | 82.3 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 1.1 | <0.1 | <0.1 | <0.1 | 1.8 | 1.1 | 1.3 | 0.4 |
| BWC | GW #7 | DD | 46.4 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.9 | <0.1 | 2.8 | 0.6 | 9.6 | <0.1 | 7.5 | 5.6 |
| BWC | GW #11 | DD | 39.7 | <0.1 | 0.2 | 0.7 | <0.1 | <0.1 | 0.4 | <0.1 | 0.6 | <0.1 | 3.1 | <0.1 | 7.3 | 0.8 |
| BWC | GW #11 | DD | 77.1 | <0.1 | 0.3 | 0.3 | <0.1 | <0.1 | 1.3 | <0.1 | 0.6 | <0.1 | 2.5 | <0.1 | 4.2 | 0.3 |
| BWC | 1000 m WF #7 | DD | 3 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 2.7 | <0.1 | 7 | 3 | 30.2 | <0.1 | 24.2 | 2.7 |
| BWC | 900 m WF #7 | DD | 51.5 | <0.1 | <0.1 | 0.3 | <0.1 | <0.1 | 0.8 | <0.1 | 3 | <0.1 | 13.3 | <0.1 | 6.6 | 2.3 |
| BWC | 300 m WF #7 | DD | 9.9 | 0.4 | <0.1 | 2.6 | <0.1 | <0.1 | 3.9 | <0.1 | 0.8 | <0.1 | 25.2 | <0.1 | 16.4 | 4.4 |
| BWC | 200 m WF #7 | DD | <0.1 | <0.1 | <0.1 | 1 | <0.1 | <0.1 | 2.4 | <0.1 | 13.3 | 6.2 | 27 | <0.1 | 7.6 | 4.5 |
| BWC | 100 m WF #7 | DD | 0.3 | <0.1 | <0.1 | 0.5 | <0.1 | <0.1 | 2.7 | <0.1 | 6.2 | 5 | 34.3 | 1.4 | 6.5 | 2.5 |
| BWC | 50 m WF #7 | DD | 1 | <0.1 | <0.1 | 0.8 | <0.1 | <0.1 | 1.8 | <0.1 | 4.1 | 3.1 | 18.4 | <0.1 | 14.5 | 2.5 |
| BWC | 15 m WF #7 | DD | 10.1 | 0.5 | <0.1 | 0.9 | <0.1 | <0.1 | 4.2 | <0.1 | 0.7 | <0.1 | 19.8 | 1.4 | 18.8 | 3.4 |
| BWC | Workers rest #7 | DD | 10.3 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 2.9 | <0.1 | 1 | <0.1 | 24.3 | 0.8 | 15.8 | 3.3 |
| BWC | WF #7 | DD | 8.7 | 0.2 | <0.1 | 0.4 | <0.1 | <0.1 | 2.6 | <0.1 | 0.1 | <0.1 | 18.2 | 1.1 | 18.2 | 2.8 |
| BWC | WF #7 | DD | 11.8 | 1.2 | <0.1 | 1.9 | <0.1 | <0.1 | 3.5 | <0.1 | <0.1 | <0.1 | 23.5 | 1.7 | 21.6 | 4.7 |
| BWC | WF #11 | DD | 3.4 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.6 | 3.6 | 7.6 | <0.1 |
| BWC | WF #11 | DD | 3.9 | <0.1 | <0.1 | 0.2 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | 1.2 | 2.7 | 10.2 | 0.2 |
| BWC | Wall drilling front #11 | DD | 1.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 6.5 | 11.6 | <0.1 |
| BWC | Wall drilling front #11 | DD | 2.3 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.9 | 16.9 | <0.1 |
| BWC | FTW | DD | 34.2 | <0.1 | 0.4 | 0.8 | <0.1 | <0.1 | 0.7 | <0.1 | 0.2 | <0.1 | 8.5 | <0.1 | 17.3 | 1.5 |
| BWC | Coal mill | DD | 4.4 | <0.1 | <0.1 | 1 | <0.1 | <0.1 | 2.2 | 0.2 | <0.1 | <0.1 | 8.5 | 0.9 | 16.2 | 1.7 |
| BWC | Coal mill | DD | 3 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | 1.1 | <0.1 | <0.1 | <0.1 | 8.1 | <0.1 | 20.8 | 2 |
| BWC | Coal gangue | DD | 10.3 | 1.7 | <0.1 | 3 | <0.1 | <0.1 | 3.2 | 0.5 | <0.1 | <0.1 | 18.5 | <0.1 | 37.4 | 7.9 |
| BWC | Coal gangue | DD | 38.2 | <0.1 | <0.1 | 2 | <0.1 | 0.8 | 0.6 | <0.1 | <0.1 | <0.1 | 11 | <0.1 | 27.3 | 4.8 |
| BWC | Production coal | DD | 5.3 | 0.8 | <0.1 | 17.3 | <0.1 | <0.1 | 0.7 | <0.1 | <0.1 | <0.1 | 18.6 | <0.1 | 26.2 | 4.5 |
| BWC | GW #7 | RDD | 68.5 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.5 | <0.1 | <0.1 | <0.1 | 1.6 | 0.4 | 2.7 | 0.8 |
| BWC | 300 m WF #7 | RDD | 4.9 | <0.1 | <0.1 | 1.4 | <0.1 | <0.1 | 1.4 | <0.1 | 0.3 | <0.1 | 8.4 | <0.1 | 12.2 | 1.6 |
| BWC | 100 m WF #7 | RDD | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 1.4 | <0.1 | 4 | 8.6 | 10.2 | <0.1 | 3.9 | 2 |
| BWC | 50 m WF #7 | RDD | 0.5 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | 0.9 | <0.1 | 0.6 | 1 | 6.7 | <0.1 | 14.1 | 1.1 |
| BWC | WF #7 | RDD | 2.4 | 0.1 | <0.1 | 0.1 | <0.1 | <0.1 | 0.7 | <0.1 | 0.1 | <0.1 | 5.2 | 0.6 | 13.7 | 0.8 |
| BWC | WF #11 | RDD | 1.3 | <0.1 | <0.1 | 0.2 | <0.1 | <0.1 | 0.2 | <0.1 | <0.1 | <0.1 | 0.2 | 3.2 | 8.5 | 0.1 |
| BWC | FTW | RDD | 38.2 | <0.1 | 0.2 | 0.2 | <0.1 | <0.1 | 0.3 | <0.1 | 0.5 | <0.1 | 7.7 | <0.1 | 25.3 | 2.9 |

Table S1. (Continuation). Cb (carbonate mineral), Fsp (Feldspar mineral), Pyrite (Py), SO42- (sulphate mineral), Qtz (Quartz), Ant (Anatase). Calcite (Cal), Ankerite (Ank), Dolomite (Dol), Siderite (Sd), Microcline (Mc), Albite/Anorthite (Ab/An), Szomolnokite (Szo), Jarosite/Alunite (Jrs/Alu), Gp (Gypsum), Illite/Muscovite (Ilt/Ms), Kaolinite/Clinochlore (Kln/Clc). WF, Working front; GW, Gunited walls; FTW, Floor of train wagons. BWC, Bituminous South-West China; SSC, Subbituminous South China; BSC, Bituminous South China; and ANC, Anthracite North China. Top, mineral groups,; Bottom, specific minerals.

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| **Mine** | **Location** | **Sample** | **Cb** | **Fsp** | **Py** | **SO42-** | **Qtz** | **Ant** | **Clay** |
| SSC | 2000 m WF D-3 | DD | 0.2 | 0.5 | 1.4 | 0.8 | 19.0 | 0.2 | 29.1 |
| SSC | 100 m WF D-3 | DD | 0.2 | 0.5 | 1.0 | <0.1 | 29.9 | 0.3 | 40.7 |
| SSC | 50 m WF D-3 | DD | <0.1 | 0.3 | 0.9 | 0.3 | 38.1 | 0.3 | 32.3 |
| SSC | 25 m WF D-3 | DD | <0.1 | 0.8 | 1.8 | 0.5 | 38.4 | 0.5 | 27.5 |
| SSC | WF D-3 | DD | 0.2 | 0.3 | 0.8 | 0.3 | 33.9 | 0.4 | 37 |
| SSC | Coal belts D-3 | DD | 0.4 | 0.3 | 1.2 | 0.3 | 40.3 | 0.3 | 17.3 |
| SSC | Coal mill D-3 | DD | 0.1 | 0.2 | 2.1 | 0.2 | 14.1 | 0.5 | 24.9 |
| SSC | 2000 m WF D-3 | RDD | <0.1 | 0.4 | 2.0 | 1.0 | 9.6 | 0.2 | 33.5 |
| SSC | 100 m WF D-3 | RDD | <0.1 | 0.6 | 0.8 | 0.3 | 16.9 | 0.2 | 39.7 |
| SSC | WF D-3 | RDD | <0.1 | 0.2 | 1.1 | 0.1 | 24.8 | 0.4 | 40.6 |
| SSC | Coal mill D-3 | RDD | 0.2 | 0.4 | 6.2 | 0.2 | 14.6 | 0.2 | 23.6 |
| BSC | 100 m #4-1 | DD | 0.8 | 0.3 | 0.6 | 3.1 | 5.8 | 0.2 | 32.9 |
| BSC | 50 m #4-1 | DD | 4.3 | 0.3 | 0.7 | 2.8 | 4.7 | 0.1 | 30.4 |
| BSC | 100 m #4-1 | RDD | 0.4 | <0.1 | 0.5 | 2.4 | 7.5 | 0.2 | 27.6 |
| BSC | 50 m #4-1 | RDD | 4.4 | 0.1 | 0.1 | 3.3 | 3.2 | 0.4 | 24.1 |
| ANC | Air shaft #2-1 | DD | 26.6 | <0.1 | 0.4 | 0.3 | 6.6 | <0.1 | 8.9 |
| ANC | Air shaft #2-1 | RDD | 16.9 | <0.1 | 0.2 | 0.1 | 3.2 | <0.1 | 12.9 |
| ANC | Air shaft #2-1 | RDD | 17.5 | <0.1 | 0.2 | 0.1 | 3.2 | <0.1 | 11.8 |

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| **Mine** | **Location** | **Sample** | **Cal** | **Ank** | **Dol** | **Sd** | **Mc** | **Ab/An** | **Py** | **Szo** | **Gp** | **Jrs/Alu** | **Qtz** | **Ilt/Ms** | **Kln/Clc** | **Ant** |
| SSC | 2000 m WF D-3 | DD | 0.2 | <0.1 | <0.1 | <0.1 | 0.2 | 0.3 | 1.4 | <0.1 | 0.8 | <0.1 | 19 | 11.3 | 17.8 | 0.2 |
| SSC | 100 m WF D-3 | DD | 0.2 | <0.1 | <0.1 | <0.1 | 0.2 | 0.2 | 1 | <0.1 | <0.1 | <0.1 | 29.9 | 20.2 | 20.4 | 0.3 |
| SSC | 50 m WF D-3 | DD | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.3 | 0.9 | <0.1 | 0.3 | <0.1 | 38.1 | 8.1 | 24.2 | 0.3 |
| SSC | 25 m WF D-3 | DD | <0.1 | <0.1 | <0.1 | <0.1 | 0.7 | 0.2 | 1.8 | <0.1 | 0.5 | <0.1 | 38.4 | 5.5 | 22 | 0.5 |
| SSC | WF D-3 | DD | 0.2 | <0.1 | <0.1 | <0.1 | 0.1 | 0.2 | 0.8 | <0.1 | 0.3 | <0.1 | 33.9 | 13.6 | 23.4 | 0.4 |
| SSC | Coal belts D-3 | DD | 0.4 | <0.1 | <0.1 | <0.1 | 0.1 | 0.2 | 1.2 | <0.1 | 0.3 | <0.1 | 40.3 | 3.6 | 13.7 | 0.3 |
| SSC | Coal mill D-3 | DD | 0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | 2.1 | <0.1 | 0.2 | <0.1 | 14.1 | 8.3 | 16.5 | 0.5 |
| SSC | 2000 m WF D-3 | RDD | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.4 | 2 | <0.1 | 1 | <0.1 | 13.8 | 12.3 | 21.2 | 0.2 |
| SSC | 100 m WF D-3 | RDD | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.6 | 0.8 | <0.1 | 0.3 | <0.1 | 27.6 | 16.8 | 22.9 | 0.2 |
| SSC | WF D-3 | RDD | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 | 1.1 | <0.1 | 0.1 | <0.1 | 31 | 14.3 | 26.3 | 0.4 |
| SSC | Coal mill D-3 | RDD | 0.2 | <0.1 | <0.1 | <0.1 | <0.1 | 0.4 | 6.2 | <0.1 | 0.2 | <0.1 | 23.1 | 5.4 | 18.2 | 0.2 |
| BSC | 100 m #4-1 | DD | 0.8 | <0.1 | <0.1 | <0.1 | 0.3 | <0.1 | 0.6 | <0.1 | 3.1 | <0.1 | 5.8 | 0.6 | 32.2 | 0.2 |
| BSC | 50 m #4-1 | DD | 4.3 | <0.1 | <0.1 | <0.1 | 0.1 | 0.2 | 0.7 | <0.1 | 2.8 | <0.1 | 4.7 | 0.1 | 30.3 | 0.1 |
| BSC | 100 m #4-1 | RDD | 0.4 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.5 | <0.1 | 2.4 | <0.1 | 12.6 | <0.1 | 27.6 | 0.2 |
| BSC | 50 m #4-1 | RDD | 4.4 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | 0.1 | <0.1 | 3.3 | <0.1 | 10.8 | <0.1 | 24.1 | 0.4 |
| ANC | Air shaft #2-1 | DD | 25.7 | 0.6 | <0.1 | 0.3 | <0.1 | <0.1 | 0.4 | <0.1 | 0.3 | <0.1 | 6.6 | 4.9 | 4 | <0.1 |
| ANC | Air shaft #2-1 | RDD | 16.5 | 0.2 | <0.1 | 0.2 | <0.1 | <0.1 | 0.2 | <0.1 | 0.1 | <0.1 | 2.5 | 5.2 | 7.7 | <0.1 |
| ANC | Air shaft #2-1 | RDD | 17 | 0.2 | <0.1 | 0.3 | <0.1 | <0.1 | 0.2 | <0.1 | 0.1 | <0.1 | 2.5 | 5.1 | 6.7 | <0.1 |

Table S2. Mineral contents in channel profiles (CP) from the four underground coal mines. Values in %wt. Cb (carbonate mineral), Fsp (Feldspar mineral), Pyrite (Py), SO42- (sulphate mineral), Qtz (Quartz), Ant (Anatase). Calcite (Cal), Ankerite (Ank), Dolomite (Dol), Siderite (Sd), Albite/Anorthite (Ab/An), Jarosite/Alunite (Jrs/Alu), Gp (Gypsum), Illite/Muscovite (Ilt/Ms), Kaolinite/Clinochlore (Kln/Clc).

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| **Mine** | **Seam** | **Cb** | **Fsp** | **Py** | **SO42-** | **Qtz** | **Ant** | **Clay** | **Cal** | **Ank** | **Dol** | **Sd** | **Ab/An** | **Py** | **Jrs/Alu** | **Gp** | **Qtz** | **Ilt/Ms** | **Kln/Clc** | **Ant** |
| Bituminous South-West | #7 | 4.2 | 0.1 | 2.0 | <0.1 | 12.5 | 2.0 | 10.1 | 4.0 | 0.1 | <0.1 | <0.1 | 0.1 | 2.0 | <0.1 | <0.1 | 12.5 | <0.1 | 10.1 | 2.0 |
| Bituminous South-West | #11 | 3.4 | <0.1 | 0.1 | <0.1 | <0.1 | 0.1 | 11.7 | 3.3 | <0.1 | <0.1 | 0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 11.7 | 0.1 |
| Subbituminous South | #2-1 | 3.7 | <0.1 | <0.1 | <0.1 | 0.1 | 0.1 | 9.3 | 3.6 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | 4.2 | 5.1 | 0.1 |
| Bituminous South | D-3 | <0.1 | <0.1 | 1.5 | 0.2 | 12.2 | 0.2 | 48.3 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 1.5 | 0.2 | <0.1 | 12.2 | 22.2 | 26.1 | 0.2 |
| Anthracite North | #4-1 | 0.4 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 45.5 | 0.3 | <0.1 | 0.1 | <0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 1.6 | 44.0 | 0.2 |

Table S3. Composition of PM10 obtained from the CIP sampling and comparison with the one obtained from the respirable deposited dust (RDD, closest to PM4) samples taking into account the time spent in the different zones of the way to working front (WF) #7 and working front (WF) #11.

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|  | **CIP PM10** | **Composition RDD** | **CIP PM10** | **Composition RDD** |
|  | **Way to WF #7** | **Way to WF #7** | **Way to WF #11** | **Way to WF #11** |
| **%wt** |  |  |  |  |
| **Al** | 1.8 | 2.2 | 1.6 | 2.0 |
| **Fe** | 0.5 | 1.7 | 1.5 | 1.7 |
| **S** | 1.1 | 1.1 | 1.0 | 1.2 |
| **Ca** | 1.4 | 2.7 | 1.1 | 3.7 |
| **K** | 0.2 | 0.2 | 0.2 | 0.2 |
| **Mg** | 0.1 | 0.2 | 0.2 | 0.2 |
| **Na** | <0.1 | 0.1 | 0.4 | 0.1 |
| **mg/kg** |  |  |  |  |
| **P** | 234 | 225 | 211 | 319 |
| **Li** | 29 | 21 | 16 | 18 |
| **Sc** | 6 | 6 | 5 | 6 |
| **V** | 81 | 127 | 109 | 118 |
| **Cr** | 15 | 36 | 29 | 36 |
| **Mn** | 59 | 229 | 247 | 189 |
| **Co** | 11 | 11 | 9 | 11 |
| **Ni** | 9 | 22 | 17 | 20 |
| **Cu** | 90 | 68 | 46 | 49 |
| **Ti** | 1509 | 3090 | 3066 | 2972 |
| **Ga** | 10 | 8 | 7 | 8 |
| **Rb** | 5 | 10 | 10 | 9 |
| **Sr** | 147 | 202 | 114 | 196 |
| **Y** | 21 | 14 | 12 | 14 |
| **Zr** | 71 | 102 | 77 | 95 |
| **Ba** | 64 | 135 | 88 | 121 |
| **As** | 5 | 14 | 15 | 18 |
| **Nb** | 5 | 10 | 7 | 9 |
| **REEY** | 140 | 115 | 102 | 115 |

Table S4. Major elements content in deposited dust finer than 500 µm and respirable deposited dust (DD and RDD samples, respectively) from the four underground coal mines. Values in %wt. WF, Working front; GW, Gunited walls; FTW, Floor of train wagons. BWC, Bituminous South-West China; SSC, Subbituminous South China; BSC, Bituminous South China; and ANC, Anthracite North China.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mine** | **Location** | **Sample** | **Al** | **Si** | **Ca** | **Fe** | **K** | **Mg** | **Na** | **P** | **S** | **Ti** |
| BWC | GW #7 | DD | 2.53 | 5.39 | 25.1 | 1.94 | 0.39 | 0.65 | 0.39 | 0.04 | 0.45 | 0.48 |
| BWC | GW #7 | DD | 3.15 | - | 10.34 | 7.63 | 0.48 | 0.67 | 0.29 | 0.06 | 2.45 | 0.69 |
| BWC | GW #11 | DD | 3.36 | - | 8.94 | 1.79 | 0.27 | 0.35 | 0.16 | 0.05 | 0.87 | 0.58 |
| BWC | GW #11 | DD | 2.7 | - | 23.28 | 2.81 | 0.32 | 0.63 | 0.19 | 0.04 | 0.68 | 0.5 |
| BWC | 1000 m WF #7 | DD | 2.36 | - | 1.17 | 17.46 | 0.3 | 0.29 | 0.11 | 0.03 | 2.36 | 0.45 |
| BWC | 900 m WF #7 | DD | 3.71 | - | 11.43 | 5.58 | 0.52 | 0.62 | 0.18 | 0.05 | 1.72 | 0.8 |
| BWC | 300 m WF #7 | DD | 3.09 | 6.72 | 1.18 | 9.37 | 0.41 | 0.4 | 0.19 | 0.04 | 1.2 | 0.61 |
| BWC | 200 m WF #7 | DD | 3.34 | - | 1.22 | 9.54 | 0.46 | 0.33 | 0.22 | 0.03 | 3.69 | 0.71 |
| BWC | 100 m WF #7 | DD | 2.25 | 5.91 | 1.55 | 9.75 | 0.3 | 0.29 | 0.11 | 0.03 | 4.39 | 0.43 |
| BWC | 50 m WF #7 | DD | 3.03 | 7.12 | 1.52 | 4.15 | 0.37 | 0.35 | 0.1 | 0.03 | 2.93 | 0.53 |
| BWC | 15 m WF #7 | DD | 4.43 | - | 1.78 | 4.43 | 0.76 | 0.72 | 0.17 | 0.07 | 1.49 | 0.95 |
| BWC | Workers rest #7 | DD | 4.04 | - | 1.77 | 4.81 | 0.58 | 0.6 | 0.16 | 0.06 | 1.73 | 0.82 |
| BWC | WF #7 | DD | 4.03 | 8.91 | 1.65 | 3.39 | 0.59 | 0.52 | 0.12 | 0.05 | 1.64 | 0.78 |
| BWC | WF #7 | DD | 5.39 | - | 2.37 | 4.86 | 0.93 | 0.91 | 0.17 | 0.09 | 1.55 | 1.04 |
| BWC | WF #11 | DD | 1.74 | - | 0.67 | 0.53 | 0.06 | 0.06 | 0.04 | 0.03 | 0.5 | 0.18 |
| BWC | WF #11 | DD | 2.06 | 2.66 | 0.78 | 0.6 | 0.08 | 0.08 | 0.04 | 0.04 | 0.53 | 0.22 |
| BWC | Wall drilling front #11 | DD | 2.58 | - | 0.26 | 0.6 | 0.04 | 0.03 | 0.03 | 0 | 0.73 | 0.1 |
| BWC | Wall drilling front #11 | DD | 2.62 | - | 0.26 | 0.82 | 0.02 | 0.04 | 0.02 | 0.04 | 0.75 | 0.09 |
| BWC | FTW | DD | 4.13 | 7.05 | 7.26 | 4.65 | 0.47 | 0.47 | 0.26 | 0.05 | 1.23 | 0.83 |
| BWC | Coal mill | DD | 4.16 | - | 1.16 | 2.67 | 0.41 | 0.3 | 0.13 | 0.04 | 1.19 | 0.72 |
| BWC | Coal mill | DD | 10.87 | - | 1.46 | 4.93 | 1.37 | 0.85 | 0.34 | 0.08 | 2.02 | 2.3 |
| BWC | Coal gangue | DD | 9.09 | - | 7.16 | 7.39 | 0.9 | 0.77 | 0.56 | 0.05 | 0.06 | 0.24 |
| BWC | Coal gangue | DD | 5.32 | - | 1.69 | 15.66 | 0.77 | 1.32 | 0.21 | 0.08 | 0.82 | 1.19 |
| BWC | Production coal | DD | 4.81 | - | 0.65 | 2.03 | 0.5 | 0.29 | 0.12 | 0.04 | 1.33 | 0.87 |
| BWC | GW #7 | RDD | 2.88 | 5.07 | 18.79 | 1.48 | 0.53 | 0.47 | 0.44 | 0.05 | 0.39 | 0.5 |
| BWC | 300 m WF #7 | RDD | 2.36 | 4.27 | 0.96 | 2.14 | 0.26 | 0.23 | 0.1 | 0.03 | 0.84 | 0.36 |
| BWC | 100 m WF #7 | RDD | 1.93 | 3.87 | 1.01 | 4.01 | 0.22 | 0.19 | 0.11 | 0.02 | 3.62 | 0.31 |
| BWC | 50 m WF #7 | RDD | 2.07 | 3.63 | 0.47 | 1.71 | 0.18 | 0.17 | 0.06 | 0.02 | 1.23 | 0.28 |
| BWC | WF #7 | RDD | 2.05 | 3.48 | 0.54 | 1.22 | 0.17 | 0.15 | 0.06 | 0.02 | 0.85 | 0.24 |
| BWC | WF #11 | RDD | 1.39 | 1.62 | 0.33 | 0.3 | 0.04 | 0.04 | 0.04 | 0.03 | 0.43 | 0.11 |
| BWC | FTW | RDD | 5.68 | 9.19 | 6.57 | 3.15 | 0.74 | 0.5 | 0.38 | 0.07 | 0.78 | 1.08 |
| SSC | 2000 m WF D-3 | DD | 6.21 | 10.53 | 0.57 | 6.28 | 1.05 | 0.24 | 0.25 | 0.04 | 1.21 | 0.18 |
| SSC | 100 m WF D-3 | DD | 7.89 | 15.96 | 0.47 | 9.41 | 1.29 | 0.34 | 0.26 | 0.03 | 0.79 | 0.29 |
| SSC | 50 m WF D-3 | DD | 8.32 | - | 0.55 | 6.53 | 1.35 | 0.36 | 0.27 | 0.04 | 0.85 | 0.32 |
| SSC | 25 m WF D-3 | DD | 8.53 | - | 0.56 | 3.87 | 1.39 | 0.35 | 0.28 | 0.04 | 0.97 | 0.33 |
| SSC | WF D-3 | DD | 8.7 | 18.4 | 0.45 | 3.46 | 1.5 | 0.37 | 0.24 | 0.04 | 0.8 | 0.38 |
| SSC | Coal belts D-3 | DD | 8.02 | - | 0.34 | 1.86 | 1.29 | 0.31 | 0.26 | 0.03 | 1.01 | 0.26 |
| SSC | Coal mill D-3 | DD | 6.07 | 10.05 | 0.3 | 1.63 | 1.03 | 0.24 | 0.19 | 0.05 | 1.49 | 0.18 |
| SSC | 2000 m WF D-3 | RDD | 7.63 | 11.18 | 0.55 | 2.1 | 1.24 | 0.26 | 0.26 | 0.05 | 1.51 | 0.19 |
| SSC | 100 m WF D-3 | RDD | 9.64 | 16.81 | 0.4 | 2.44 | 1.55 | 0.42 | 0.32 | 0.03 | 0.86 | 0.32 |
| SSC | WF D-3 | RDD | 10.16 | 17.8 | 0.38 | 2.61 | 1.63 | 0.42 | 0.26 | 0.04 | 0.84 | 0.34 |
| SSC | Coal mill D-3 | RDD | 7.91 | 12.51 | 0.31 | 2.06 | 1.27 | 0.28 | 0.2 | 0.06 | 1.71 | 0.21 |
| BSC | 100 m #4-1 | DD | 6.13 | 8.76 | 1.82 | 1.94 | 0.53 | 0.25 | 0.1 | 0.05 | 4.96 | 0.24 |
| BSC | 50 m #4-1 | DD | 6.14 | 8.64 | 2.37 | 1.73 | 0.51 | 0.27 | 0.11 | 0.03 | 4.93 | 0.24 |
| BSC | 100 m #4-1 | RDD | 4.9 | 7.41 | 1.49 | 1.08 | 0.51 | 0.25 | 0.07 | 0.07 | 4.52 | 0.22 |
| BSC | 50 m #4-1 | RDD | 5.04 | 7.43 | 2.84 | 1.03 | 0.52 | 0.28 | 0.08 | 0.04 | 5.11 | 0.23 |
| ANC | Air shaft #2-1 | DD | 4.51 | 8.15 | 7.08 | 1.53 | 0.75 | 0.45 | 0.5 | 0.04 | 0.35 | 0.21 |
| ANC | Air shaft #2-1 | RDD | 4.21 | 6.41 | 5.92 | 1.4 | 0.62 | 0.39 | 0.45 | 0.04 | 0.36 | 0.18 |
| ANC | Air shaft #2-1 | RDD | 3.79 | 5.77 | 5.68 | 1.32 | 0.58 | 0.36 | 0.42 | 0.04 | 0.34 | 0.17 |

Table S5. Trace elements contents in deposited dust finer than 500 µm and respirable deposited dust (DD and RDD samples, respectively) from the four underground coal mines. Values in mg/kg. WF, Working front; GW, Gunited walls; FTW, Floor of train wagons. BWC, Bituminous South-West China; SSC, Subbituminous South China; BSC, Bituminous South China; and ANC, Anthracite North China.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mine** | **Location** | **Sample** | **Li** | **Be** | **V** | **Cr** | **Mn** | **Co** | **Ni** | **Cu** | **Zn** | **Ga** | **Ge** | **As** | **Se** | **Rb** | **Sr** | **Zr** | **Nb** | **Mo** | **Cd** | **Sn** | **Sb** | **Cs** | **Ba** | **REEY** | **Hf** | **Ta** | **W** | **Tl** | **Pb** | **Bi** | **Th** | **U** |
| BWC | GW #7 | DD | 16 | 1.1 | 85 | 47 | 309 | 9.4 | 20 | 43 | 141 | 8.8 | 1.4 | 21 | 2.4 | 14 | 402 | 70 | 14 | <0.10 | <0.10 | 1.8 | 30 | <0.10 | 175 | 123 | 3.1 | <0.10 | <0.10 | <0.10 | 16 | <0.10 | 3.5 | 2.1 |
| BWC | GW #7 | DD | 19 | 1.7 | 108 | 95 | 459 | 24 | 53 | 67 | 145 | 12 | 2.6 | 45 | 2.7 | 18 | 317 | 83 | 17 | <0.10 | <0.10 | 3.6 | 6.1 | 0.94 | 156 | 153 | 3.9 | <0.10 | <0.10 | <0.10 | 23 | <0.10 | 4.7 | 2.4 |
| BWC | GW #11 | DD | 21 | 1.5 | 118 | 62 | 274 | 12 | 25 | 53 | 90 | 12 | 2.2 | 12 | 3.7 | 12 | 271 | 86 | 19 | <0.10 | <0.10 | 2.1 | 2.4 | <0.10 | 170 | 158 | 3.9 | 1.2 | 0.7 | <0.10 | 17 | <0.10 | 5.3 | 1.9 |
| BWC | GW #11 | DD | 18 | 1.2 | 97 | 60 | 498 | 12 | 24 | 48 | 115 | 9.3 | 1.7 | 20 | 2.8 | 15 | 421 | 72 | 15 | <0.10 | <0.10 | 2.3 | 10 | 1 | 201 | 129 | 3.2 | <0.10 | <0.10 | <0.10 | 12 | <0.10 | 3.6 | 2 |
| BWC | 1000 m WF #7 | DD | 20 | 1.6 | 110 | 89 | 938 | 18 | 35 | 67 | 77 | 10 | 4.5 | 32 | 2.3 | 12 | 173 | 65 | 13 | 1.6 | <0.10 | 2.4 | 4.8 | 0.66 | 161 | 118 | 2.7 | 0.34 | <0.10 | <0.10 | 13 | <0.10 | 3.8 | 1.6 |
| BWC | 900 m WF #7 | DD | 22 | 1.5 | 127 | 94 | 373 | 28 | 54 | 75 | 143 | 13 | 2.5 | 51 | 4.1 | 20 | 356 | 96 | 19 | <0.10 | <0.10 | 2.8 | 4 | 1 | 189 | 174 | 4.4 | <0.10 | <0.10 | <0.10 | 20 | <0.10 | 5 | 2.4 |
| BWC | 300 m WF #7 | DD | 24 | 1.9 | 133 | 63 | 496 | 32 | 43 | 85 | 76 | 13 | 4.6 | 41 | 3.2 | 15 | 224 | 87 | 15 | <0.10 | <0.10 | 5.1 | 4.3 | 0.79 | 177 | 156 | 3.8 | 0.39 | <0.10 | <0.10 | 17 | <0.10 | 4.9 | 1.9 |
| BWC | 200 m WF #7 | DD | 23 | 2.4 | 142 | 70 | 265 | 30 | 45 | 83 | 68 | 13 | 3.7 | 38 | 3.2 | 17 | 403 | 101 | 19 | <0.10 | <0.10 | 4.3 | 4.2 | 0.92 | 246 | 160 | 4.3 | 0.42 | 2.5 | <0.10 | 20 | <0.10 | 4.8 | 1.6 |
| BWC | 100 m WF #7 | DD | 17 | 0.65 | 122 | 50 | 516 | 15 | 27 | 55 | 57 | 8.5 | 3.1 | 15 | 2.5 | 12 | 203 | 60 | 12 | 1.3 | <0.10 | 1.9 | 2.3 | <0.10 | 143 | 111 | 2.6 | <0.10 | <0.10 | <0.10 | 12 | <0.10 | 3.3 | 1.4 |
| BWC | 50 m WF #7 | DD | 24 | 2.2 | 135 | 43 | 361 | 16 | 30 | 61 | 53 | 11 | 4.4 | 7.4 | 2.7 | 14 | 210 | 77 | 14 | <0.10 | <0.10 | 2.1 | 0.85 | 0.78 | 162 | 145 | 3.5 | 0.77 | <0.10 | <0.10 | 15 | <0.10 | 5.1 | 2.2 |
| BWC | 15 m WF #7 | DD | 30 | 3.3 | 174 | 72 | 639 | 23 | 42 | 88 | 89 | 16 | 4.5 | 6.2 | 4.1 | 26 | 415 | 126 | 24 | <0.10 | <0.10 | 2.7 | <0.10 | 1.3 | 336 | 220 | 5.5 | 0.43 | <0.10 | <0.10 | 9.8 | <0.10 | 6.7 | 2.5 |
| BWC | Workers rest #7 | DD | 30 | 2.3 | 170 | 68 | 617 | 21 | 41 | 84 | 93 | 15 | 4.5 | 6.1 | 4 | 21 | 282 | 108 | 23 | <0.10 | <0.10 | 2.5 | 1.9 | 1.1 | 231 | 201 | 4.9 | 1.5 | <0.10 | <0.10 | 13 | <0.10 | 6.2 | 2.4 |
| BWC | WF #7 | DD | 28 | 2 | 159 | 59 | 514 | 19 | 60 | 80 | 68 | 14 | 4.6 | 5.4 | 3.9 | 21 | 281 | 109 | 21 | <0.10 | <0.10 | 2.4 | <0.10 | 1.1 | 249 | 202 | 4.9 | 1 | <0.10 | <0.10 | 10 | <0.10 | 6.4 | 2.5 |
| BWC | WF #7 | DD | 30 | 2 | 184 | 78 | 890 | 24 | 48 | 90 | 90 | 19 | 4.7 | 6.7 | 5.4 | 34 | 498 | 140 | 26 | <0.10 | <0.10 | 2.6 | <0.10 | 1.7 | 469 | 254 | 6.3 | 1.2 | <0.10 | <0.10 | 9.9 | <0.10 | 7.8 | 2.6 |
| BWC | WF #11 | DD | 24 | 1.3 | 103 | 21 | 62 | 8.2 | 10 | 35 | 52 | 7.2 | 2.2 | 2.7 | 2.3 | 2.9 | 103 | 47 | 7.6 | <0.10 | <0.10 | 1.3 | <0.10 | <0.10 | 50 | 99 | 2.1 | <0.10 | <0.10 | <0.10 | 7 | <0.10 | 3.8 | 1.4 |
| BWC | WF #11 | DD | 25 | <0.10 | 114 | 24 | 96 | 7.8 | 12 | 40 | 61 | 8.3 | 3.2 | 3.3 | 3 | 3.8 | 108 | 52 | 9.4 | <0.10 | <0.10 | 1.5 | <0.10 | <0.10 | 57 | 112 | 2.4 | <0.10 | <0.10 | <0.10 | 7.4 | <0.10 | 4.2 | 1.5 |
| BWC | Wall drilling front #11 | DD | 19 | 0.52 | 120 | 15 | 9.4 | 14 | 25 | 29 | 12 | 6.9 | 2 | 7 | 2.4 | 2 | 35 | 70 | 5.9 | 1.9 | <0.10 | 1.6 | <0.10 | <0.10 | 44 | 85 | 3.3 | <0.10 | <0.10 | <0.10 | 18 | <0.10 | 5.9 | 2 |
| BWC | Wall drilling front #11 | DD | 29 | 2.2 | 60 | 9 | 7.4 | 9.3 | 12 | 25 | 16 | 11 | 2.7 | 4.2 | 3.9 | 1.4 | 98 | 63 | 7.1 | <0.10 | <0.10 | 2.4 | 0.82 | <0.10 | 37 | 187 | 3.2 | <0.10 | <0.10 | <0.10 | 21 | <0.10 | 7.6 | 2.6 |
| BWC | FTW | DD | 26 | 2.3 | 152 | 79 | 504 | 18 | 39 | 80 | 109 | 15 | 3.2 | 15 | 4.3 | 18 | 278 | 111 | 26 | <0.10 | <0.10 | 2.9 | 3.4 | 0.86 | 208 | 197 | 4.9 | 1.4 | 0.42 | <0.10 | 27 | <0.10 | 6.1 | 2.2 |
| BWC | Coal mill | DD | 27 | 1.8 | 169 | 73 | 334 | 18 | 38 | 89 | 88 | 15 | 4 | 7.9 | 4.3 | 16 | 178 | 117 | 24 | <0.10 | <0.10 | 3 | 1.1 | 0.86 | 183 | 211 | 5.7 | 0.87 | <0.10 | <0.10 | 26 | <0.10 | 7.2 | 2.2 |
| BWC | Coal mill | DD | 39 | 3.4 | 319 | 197 | 650 | 39 | 93 | 156 | 119 | 39 | 5 | 17 | 9.5 | 51 | 429 | 313 | 67 | 1.4 | <0.10 | 5.3 | 1.1 | 2.2 | 381 | 531 | 15 | 1.3 | 2.1 | <0.10 | 20 | <0.10 | 15 | 3.7 |
| BWC | Coal gangue | DD | 19 | 3 | 163 | 167 | 754 | 38 | 72 | 105 | 105 | 30 | 1.8 | 4.4 | 5.3 | 38 | 437 | 173 | 3.3 | <0.10 | <0.10 | 2 | <0.10 | 1.3 | 530 | 382 | 8.2 | <0.10 | <0.10 | <0.10 | 9.7 | <0.10 | 10 | 2.7 |
| BWC | Coal gangue | DD | 24 | 2.7 | 206 | 131 | 1852 | 58 | 87 | 79 | 113 | 21 | 3.9 | 5.1 | 5.3 | 30 | 233 | 152 | 28 | <0.10 | <0.10 | 2.5 | <0.10 | 1.2 | 259 | 291 | 6.8 | <0.10 | <0.10 | <0.10 | 6.9 | <0.10 | 6.3 | 1.5 |
| BWC | Production coal | DD | 35 | 1.5 | 165 | 75 | 153 | 22 | 45 | 72 | 46 | 17 | 3.6 | 5.9 | 5.2 | 18 | 169 | 127 | 26 | <0.10 | <0.10 | 2.7 | <0.10 | 0.89 | 144 | 233 | 6.4 | 1.2 | <0.10 | <0.10 | 9.5 | <0.10 | 7.8 | 2.2 |
| BWC | GW #7 | RDD | 17 | <0.10 | 128 | 69 | 233 | 12 | 27 | 55 | 304 | 11 | 2.3 | 71 | 2.8 | 23 | 446 | 135 | 16 | <0.10 | <0.10 | 2.5 | 96 | 1.2 | 228 | 159 | 3.4 | <0.10 | <0.10 | <0.10 | 15 | <0.10 | 4.3 | 1.8 |
| BWC | 300 m WF #7 | RDD | 22 | 1.3 | 132 | 40 | 344 | 13 | 23 | 53 | 48 | 8.5 | 5 | 11 | 3 | 9.5 | 146 | 111 | 11 | <0.10 | <0.10 | 2.3 | 3.1 | <0.10 | 114 | 128 | 3 | <0.10 | <0.10 | <0.10 | 8.4 | <0.10 | 4.9 | 1.9 |
| BWC | 100 m WF #7 | RDD | 20 | <0.10 | 117 | 36 | 239 | 11 | 21 | 48 | 42 | 7.6 | 4.3 | 8.4 | 2.8 | 9.2 | 203 | 97 | 9.7 | 1.4 | <0.10 | 2.3 | 1.8 | <0.10 | 124 | 115 | 2.5 | <0.10 | <0.10 | <0.10 | 13 | <0.10 | 4 | 1.7 |
| BWC | 50 m WF #7 | RDD | 19 | 1.3 | 130 | 31 | 228 | 12 | 24 | 57 | 33 | 8 | 5.1 | 4.6 | 2.5 | 8 | 150 | 100 | 9.2 | <0.10 | <0.10 | 2.2 | 1.1 | <0.10 | 110 | 116 | 2.6 | <0.10 | <0.10 | <0.10 | 11 | <0.10 | 4.7 | 2 |
| BWC | WF #7 | RDD | 21 | <0.10 | 128 | 29 | 203 | 11 | 21 | 79 | 53 | 7.9 | 5 | 6.1 | 2.5 | 7.3 | 174 | 95 | 8.7 | <0.10 | <0.10 | 2.6 | 1.5 | <0.10 | 127 | 114 | 2.5 | <0.10 | 5.2 | <0.10 | 9.4 | <0.10 | 4.8 | 2.2 |
| BWC | WF #11 | RDD | 15 | <0.10 | 101 | 20 | 30 | 7.6 | 12 | 38 | 67 | 6.4 | 2.9 | 5.5 | 2 | 2.2 | 109 | 61 | 5 | <0.10 | <0.10 | 1.7 | <0.10 | <0.10 | 69 | 100 | 1.8 | <0.10 | <0.10 | <0.10 | 9.5 | <0.10 | 4 | 1.4 |
| BWC | FTW | RDD | 26 | 1.4 | 206 | 108 | 325 | 19 | 42 | 85 | 156 | 20 | 3.5 | 30 | 5 | 30 | 482 | 256 | 32 | 1.1 | <0.10 | 3.4 | 6.8 | 1.7 | 410 | 294 | 6.6 | 1.9 | 1.3 | <0.10 | 28 | <0.10 | 8.4 | 2.5 |
| ANC | Air shaft #2-1 | DD | 38 | 1.1 | 45 | 34 | 231 | 6.8 | 13 | 21 | 89 | 9.6 | <0.10 | 27 | 1.4 | 33 | 275 | 80 | 9.9 | 1.4 | <0.10 | 3.6 | 12 | 1.6 | 200 | 170 | 2.6 | 1 | 2.1 | <0.10 | 79 | <0.10 | 10 | 2.5 |
| ANC | Air shaft #2-1 | RDD | 42 | 1 | 46 | 32 | 192 | 6.5 | 20 | 38 | 98 | 9.3 | <0.10 | 31 | 2.5 | 27 | 282 | 77 | 8.9 | 2.1 | <0.10 | 5.3 | 11 | 1.3 | 185 | 168 | 2.4 | 1 | 2.1 | <0.10 | 94 | <0.10 | 10 | 2.5 |
| ANC | Air shaft #2-1 | RDD | 39 | 0.86 | 35 | 31 | 177 | 6 | 23 | 48 | 88 | 8.5 | <0.10 | 27 | 2.2 | 25 | 261 | 71 | 8.2 | 1.3 | <0.10 | 5.1 | 8.1 | 1.1 | 169 | 158 | 2.2 | <0.10 | 1.9 | <0.10 | 80 | <0.10 | 9.7 | 2.3 |

Table S5. (Continuation).Trace elements contents in deposited dust finer than 500 µm and respirable deposited dust (DD and RDD samples, respectively) from the four underground coal mines. Values in mg/kg. WF, Working front; GW, Gunited walls; FTW, Floor of train wagons. BWC, Bituminous South-West China; SSC, Subbituminous South China; BSC, Bituminous South China; and ANC, Anthracite North China.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mine** | **Location** | **Sample** | **Li** | **Be** | **V** | **Cr** | **Mn** | **Co** | **Ni** | **Cu** | **Zn** | **Ga** | **Ge** | **As** | **Se** | **Rb** | **Sr** | **Zr** | **Nb** | **Mo** | **Cd** | **Sn** | **Sb** | **Cs** | **Ba** | **REEY** | **Hf** | **Ta** | **W** | **Tl** | **Pb** | **Bi** | **Th** | **U** |
| SSC | 2000 m WF D-3 | DD | 40 | 2 | 82 | 65 | 285 | 9.7 | 30 | 43 | 1495 | 13 | 3.6 | 90 | 1.6 | 91 | 72 | 65 | 5.4 | 3.2 | 2.8 | 3 | 29 | 9.2 | 249 | 101 | 1.9 | 0.39 | 0.77 | 0.52 | 30 | 0.33 | 7.4 | 1.9 |
| SSC | 100 m WF D-3 | DD | 40 | 1.5 | 97 | 89 | 501 | 17 | 40 | 52 | 4893 | 17 | 3.8 | 68 | 2.5 | 106 | 77 | 74 | 8.2 | 2.2 | 0.44 | 5.3 | 162 | 10 | 374 | 154 | 2.1 | 0.59 | 1.2 | 0.62 | 46 | 0.51 | 10 | 2.3 |
| SSC | 50 m WF D-3 | DD | 43 | 1.9 | 103 | 82 | 424 | 17 | 41 | 44 | 2734 | 18 | 3.9 | 55 | 2.4 | 110 | 81 | 81 | 9.1 | 2.3 | 0.54 | 3.7 | 139 | 11 | 399 | 166 | 2.3 | 0.66 | 1.3 | 0.67 | 29 | 0.51 | 11 | 2.5 |
| SSC | 25 m WF D-3 | DD | 43 | 3 | 108 | 78 | 299 | 17 | 41 | 41 | 524 | 18 | 4.1 | 44 | 3.2 | 114 | 84 | 89 | 9.4 | 4 | 0.54 | 3.6 | 110 | 11 | 411 | 167 | 2.6 | 0.75 | 1.4 | 0.7 | 29 | 0.51 | 12 | 2.7 |
| SSC | WF D-3 | DD | 44 | 1.3 | 117 | 96 | 312 | 20 | 44 | 148 | 385 | 19 | 5.1 | 31 | 3.3 | 120 | 80 | 99 | 11 | 3.8 | 0.48 | 3.9 | 48 | 12 | 422 | 189 | 2.8 | 0.73 | 1.6 | 0.78 | 29 | 0.5 | 13 | 2.8 |
| SSC | Coal belts D-3 | DD | 49 | 3.3 | 109 | 68 | 76 | 12 | 32 | 42 | 310 | 17 | 3.1 | 88 | 3.3 | 111 | 73 | 75 | 7.3 | 1.5 | 0.53 | 2.8 | 123 | 12 | 327 | 143 | 2.2 | 0.61 | 0.81 | 0.72 | 31 | 0.49 | 10 | 2.7 |
| SSC | Coal mill D-3 | DD | 38 | 2.2 | 90 | 53 | 40 | 7.7 | 29 | 34 | 87 | 13 | 2.7 | 14 | 2.2 | 91 | 66 | 56 | 5.4 | 1.4 | 0.37 | 3.2 | 4.6 | 9.2 | 263 | 109 | 1.6 | 0.33 | 1.6 | 0.55 | 17 | 0.31 | 7.8 | 2.1 |
| SSC | 2000 m WF D-3 | RDD | 54 | <0.10 | 100 | 60 | 88 | 11 | 33 | 33 | 445 | 15 | 3 | 98 | 3.2 | 121 | 95 | 76 | 5.3 | 0.92 | <0.10 | 2.6 | 53 | 12 | 313 | 119 | 2.2 | <0.10 | 1.1 | <0.10 | 44 | <0.10 | 8.1 | 2.2 |
| SSC | 100 m WF D-3 | RDD | 58 | <0.10 | 113 | 70 | 157 | 22 | 40 | 44 | 915 | 18 | 2.5 | 123 | 4.1 | 133 | 100 | 91 | 7.9 | <0.10 | <0.10 | 3.3 | 362 | 13 | 428 | 188 | 2.7 | <0.10 | 1.7 | <0.10 | 38 | <0.10 | 11 | 2.8 |
| SSC | WF D-3 | RDD | 64 | 2.1 | 124 | 77 | 201 | 29 | 53 | 47 | 433 | 20 | 3.2 | 84 | 4.5 | 145 | 113 | 99 | 9.1 | 0.84 | <0.10 | 3.8 | 223 | 15 | 530 | 209 | 2.9 | <0.10 | 1.8 | 0.84 | 41 | <0.10 | 13 | 2.9 |
| SSC | Coal mill D-3 | RDD | 54 | 1.6 | 97 | 57 | 57 | 11 | 34 | 39 | 89 | 15 | 1.9 | 26 | 2.5 | 123 | 109 | 76 | 5.5 | <0.10 | <0.10 | 2.6 | 6 | 13 | 443 | 146 | 2.3 | <0.10 | 1.1 | <0.10 | 24 | <0.10 | 9.1 | 2.3 |
| BSC | 100 m #4-1 | DD | 57 | 2.4 | 119 | 107 | 70 | 9.2 | 18 | 39 | 10185 | 18 | 2.1 | 180 | 9.3 | 15 | 266 | 173 | 18 | 21 | 1.3 | 4.5 | 208 | 4.6 | 91 | 263 | 4.5 | 0.9 | 14 | 0.31 | 47 | 0.83 | 16 | 17 |
| BSC | 50 m #4-1 | DD | 61 | 1.5 | 119 | 105 | 71 | 6.7 | 21 | 40 | 1488 | 18 | 2.2 | 90 | 6.9 | 15 | 414 | 175 | 20 | 23 | 0.83 | 4.5 | 91 | 4.5 | 67 | 268 | 4.6 | 0.92 | 12 | 0.35 | 42 | 0.68 | 16 | 17 |
| BSC | 100 m #4-1 | RDD | 62 | 1 | 139 | 120 | 60 | 8.4 | 18 | 57 | 12398 | 17 | 1.9 | 190 | 7.3 | 18 | 222 | 181 | 17 | 19 | 2.0 | 4 | 142 | 5.7 | 58 | 253 | 4.8 | 0.88 | 19 | <0.10 | 58 | 0.81 | 14 | 17 |
| BSC | 50 m #4-1 | RDD | 65 | 1.6 | 134 | 116 | 62 | 7.6 | 22 | 45 | 1596 | 17 | 1.9 | 104 | 7.7 | 18 | 357 | 185 | 17 | 20 | 1.5 | 3.9 | 67.5 | 5.7 | 55 | 254 | 5.1 | 1 | 16 | <0.10 | 50 | <0.10 | 14 | 18 |