

## Supplementary Information

### **Lead and zinc dust depositions from ore trains characterised using lead isotopic compositions**

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**Supplementary Table S1:** Soil copper, zinc and lead concentrations and lead isotopic compositions.

**Supplementary Figure S1:** Soil lead and zinc concentration profiles across Broken Hill train line transect at Broken Hill.

**Supplementary Figure S2:** Soil lead and zinc concentration profiles across Broken Hill train line transect at The Gorge.

**Supplementary Figure S3:** Soil lead isotopic compositions at either side of the rail line at Silverton, benchmarked against Broken Hill ore.

**Supplementary Figure S4:** Soil lead isotopic compositions at either side of the rail line at Broken Hill, benchmarked against Broken Hill ore.

**Supplementary Figure S5:** Soil lead isotopic compositions at either side of the rail line at The Gorge, benchmarked against Broken Hill ore.

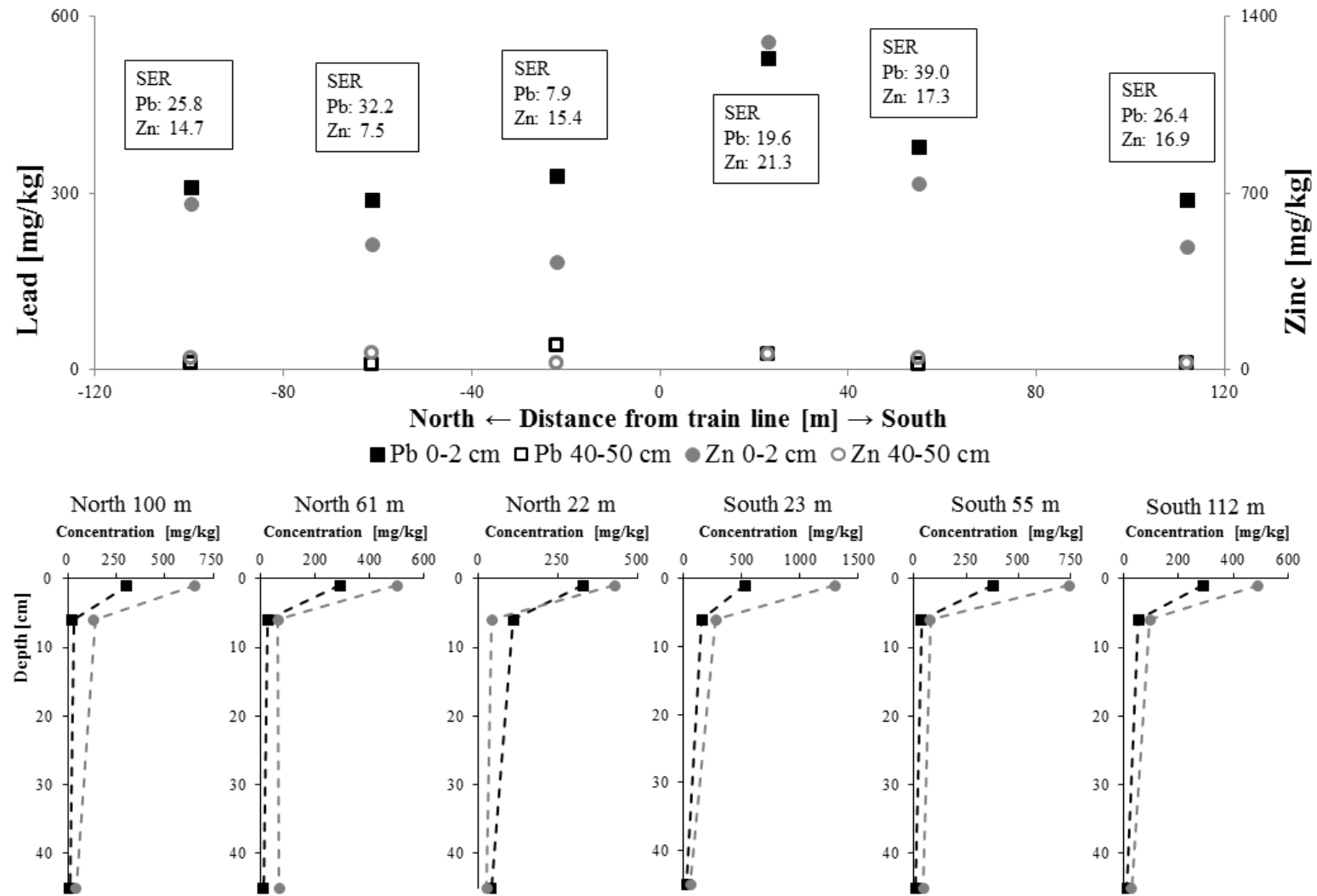
**Supplementary Figure S6:** Photograph of a train moving ballast material ~ 50 mm in size, travelling to the east of Broken Hill. Note the plumes of dust coming from the ballast on the uncovered wagons. (Photo taken by M.P. Taylor 2009)

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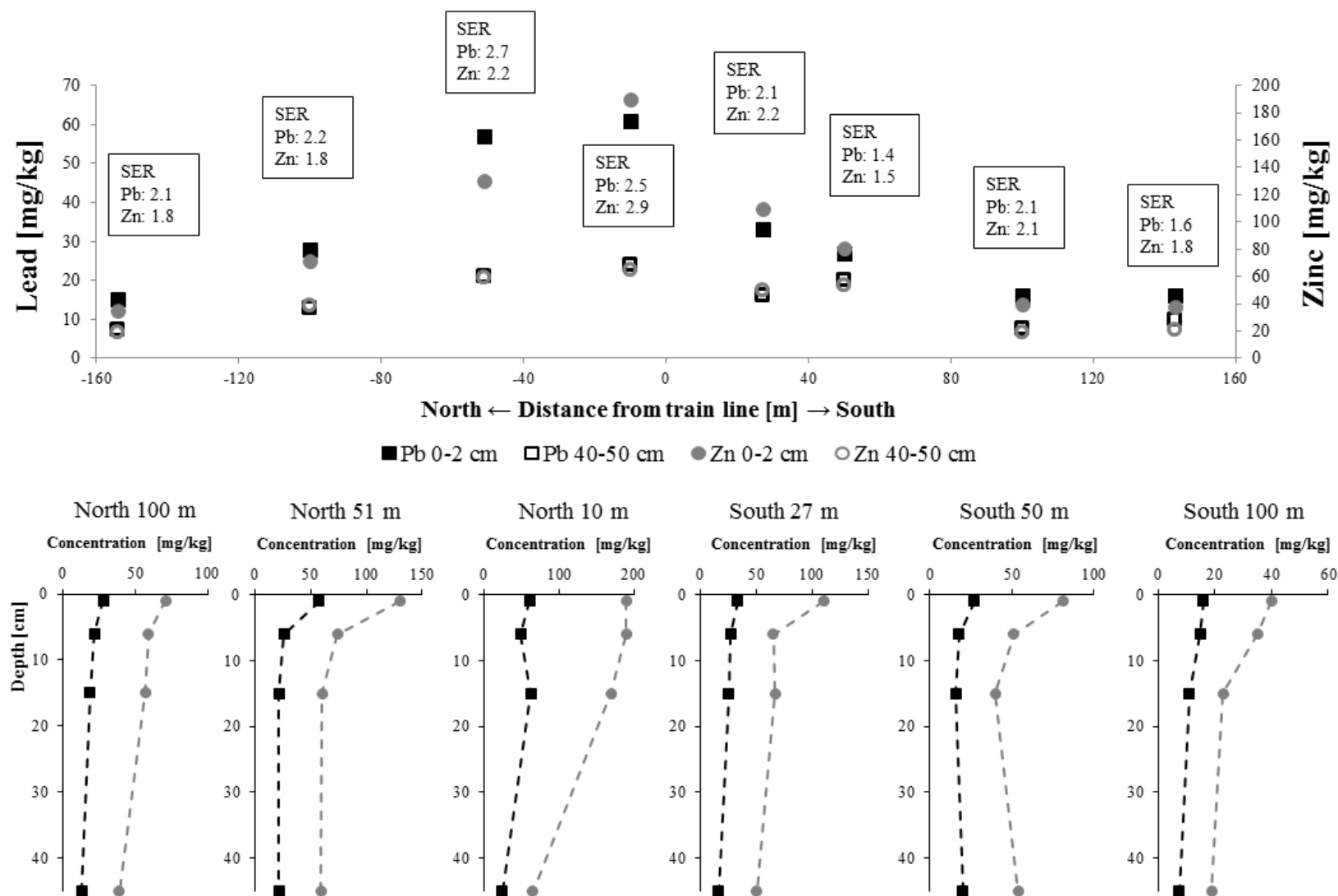
Train line	Direction from tracks	Distance to track [m]	Soil depth [cm]	Cu	Zn	Pb	<sup>206</sup> Pb/ <sup>207</sup> Pb	<sup>208</sup> Pb/ <sup>207</sup> Pb	<sup>206</sup> Pb/ <sup>204</sup> Pb
				[mg/kg]					
Silverton	North	11	0-2	18	1200	695	1.044	2.321	16.10
			2-10	24	780	380			
			40-50	25	110	39			
		58	0-2	18	150	61	1.065	2.347	16.42
			2-10	22	88	25			
			40-50	25	59	10			
		101	0-2	14	130	48	1.072	2.347	16.58
			2-10	19	72	23			
			40-50	25	60	11	1.180	2.454	18.37
	South	11	0-2	14	270	140	1.050	2.334	16.18
			2-10	20	130	46			
			40-50	26	74	13			
		53	0-2	16	130	56	1.070	2.347	16.46
			2-10	22	81	19			
			40-50	24	51	7.4			
		101	0-2	15	96	40	1.077	2.353	16.68
			2-10	20	59	12			
			40-50	19	50	7	1.209	2.476	18.82
Triple Chance	North	1.5	0-2	30	355	65	1.081	2.366	16.67
			2-10	32	290	46			
			10-20	23	320	50			
			20-30	19	74	12.5			
			30-40	20	79	12			
			40-50	17	74	10			
		60	0-2	14	270	38	1.073	2.353	16.62
			2-10	15	75	13			
			10-20	14	52	9.1			
			20-30	15	64	12			
			30-40	18	75	12			
			40-50	19	81	12			
		120	0-2	13	130	25.8	1.096	2.394	16.97
			2-10	15	65	11			
			10-20	17	67	12			
			20-30	21	78	14			
			30-40	21	71	12			
			40-50	21	61.5	10	1.190	2.484	18.54
	South	4	0-2	32	2230	325	1.051	2.328	16.21
			2-10	28	94	14			
			10-20	30	82	11			
			20-30	26	72	10			
			30-40	27	73	11			
			40-50	29	85	12			
		70	0-2	12	160	19.5	1.089	2.376	16.90
			2-10	16	270	33			
			10-20	19	59	12			
			20-30	24	65	11			
			30-40	25	66	11			
			40-50	25	72	11			
		125	0-2	15	84	12.5	1.126	2.416	17.48
			2-10	15	110	13			
			10-20	15	40	7.3			

				20-30	22	57	9.5			
				30-40	25	60	10.8			
				40-50	26	54	9.7	1.200	2.474	18.79
Broken Hill to Sydney (Broken Hill)	North	22	0-2	19	660	330	1.051	2.330	16.22	
			2-10	12	140	110				
			40-50	21	45	42				
		61	0-2	20	500	290	1.042	2.321	16.06	
			2-10	20	63	26				
			40-50	26	67	9				
		100	0-2	17	430	310	1.044	2.326	16.10	
			2-10	14	43	29				
			40-50	24	28	12	1.094	2.388	16.87	
	South	23	0-2	39	1300	530	1.049	2.324	16.16	
			2-10	39	280	160				
			40-50	66	61	27				
		55	0-2	27	740	380	1.046	2.322	16.13	
			2-10	23	80	37				
			40-50	28	45	10				
		112	0-2	17	490	290	1.043	2.323	16.07	
			2-10	21	96	53				
			40-50	18	29	11	1.115	2.401	17.22	
Broken Hill to Sydney (Gorge)	North	10	0-2	26	190	61	1.085	2.363	16.75	
			2-10	31	190	49				
			10-20	26	170	62				
			40-50	28	65	24				
		51	0-2	22	130	57	1.083	2.361	16.78	
			2-10	28	74	26				
			10-20	31	60	21				
			40-50	28	59	21				
		100	0-2	24	71	28	1.143	2.421	17.73	
			2-10	26	59	22				
			10-20	27	57	19				
			40-50	20	39	13	1.199	2.466	18.76	
		154	0-2	8.3	35	15				
			2-10	8.7	29	12				
			10-20	9.3	28	12				
			40-50	8.1	19	7.3				
	South	27	0-2	11	33	110	1.088	2.372	16.86	
			2-10	12	27	65				
			10-20	28	25	67				
			40-50	32	16	50				
		33	0-2	11	25	72	1.105	2.393	17.12	
		50	0-2	23	81	27	1.140	2.414	17.73	
			2-10	13	51	18				
			10-20	13	40	16				
			40-50	25	54	20				
		100	0-2	8.4	40	16	1.134	2.425	17.70	
			2-10	7.7	35	15				
			10-20	6.4	23	11				
			40-50	8.3	19	7.6	1.214	2.504	18.80	
		143	0-2	8	38	16				
			2-10	6.9	26	10				
			10-20	6.9	28	10				
			40-50	7.3	21	10				
Broken Hill Ore	Sample 1						1.040	2.323	15.99	
	Sample 2						1.041	2.319	16.05	

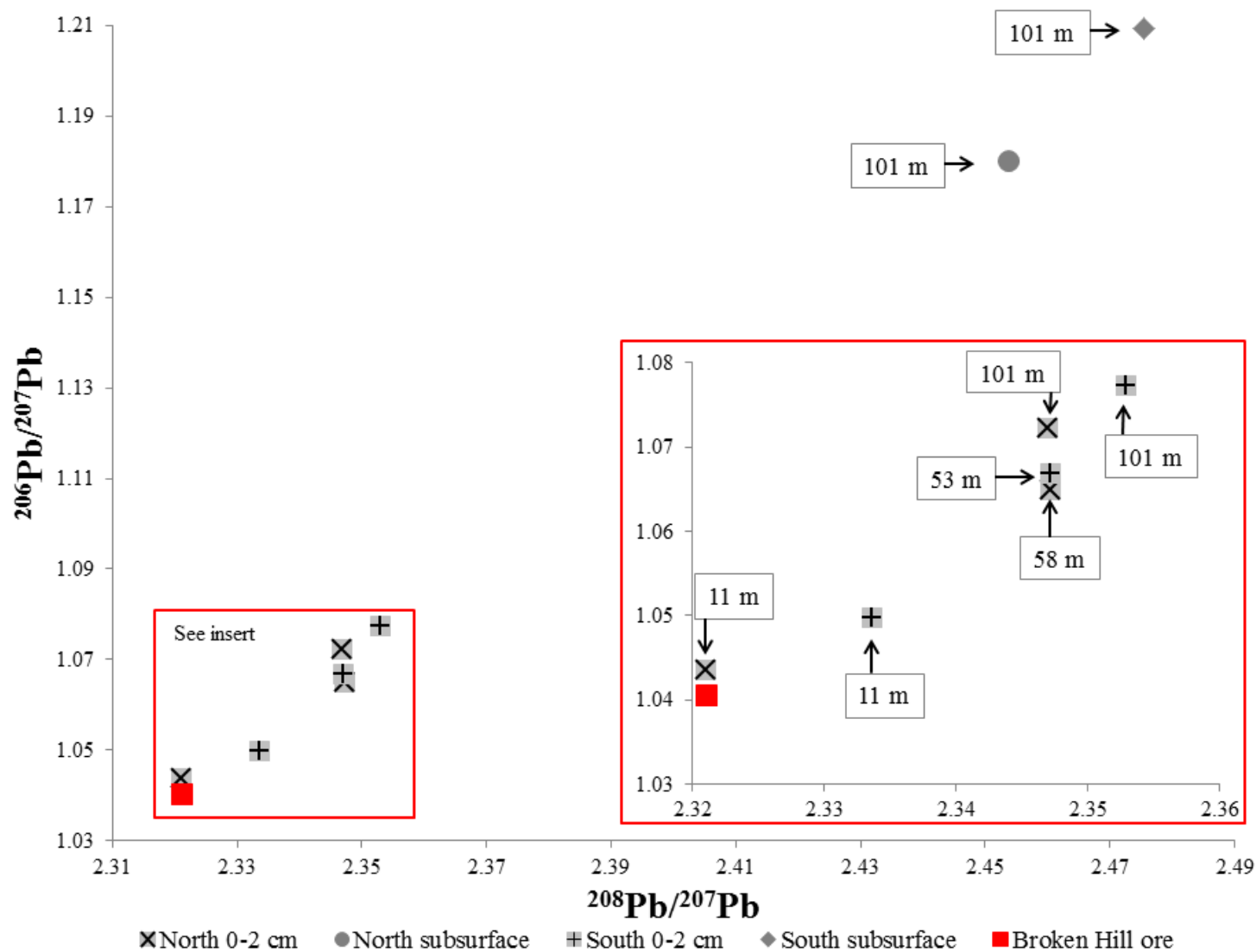
**Supplementary Figure S1:** Soil lead and zinc concentration profiles across Broken Hill train line transect at Broken Hill.



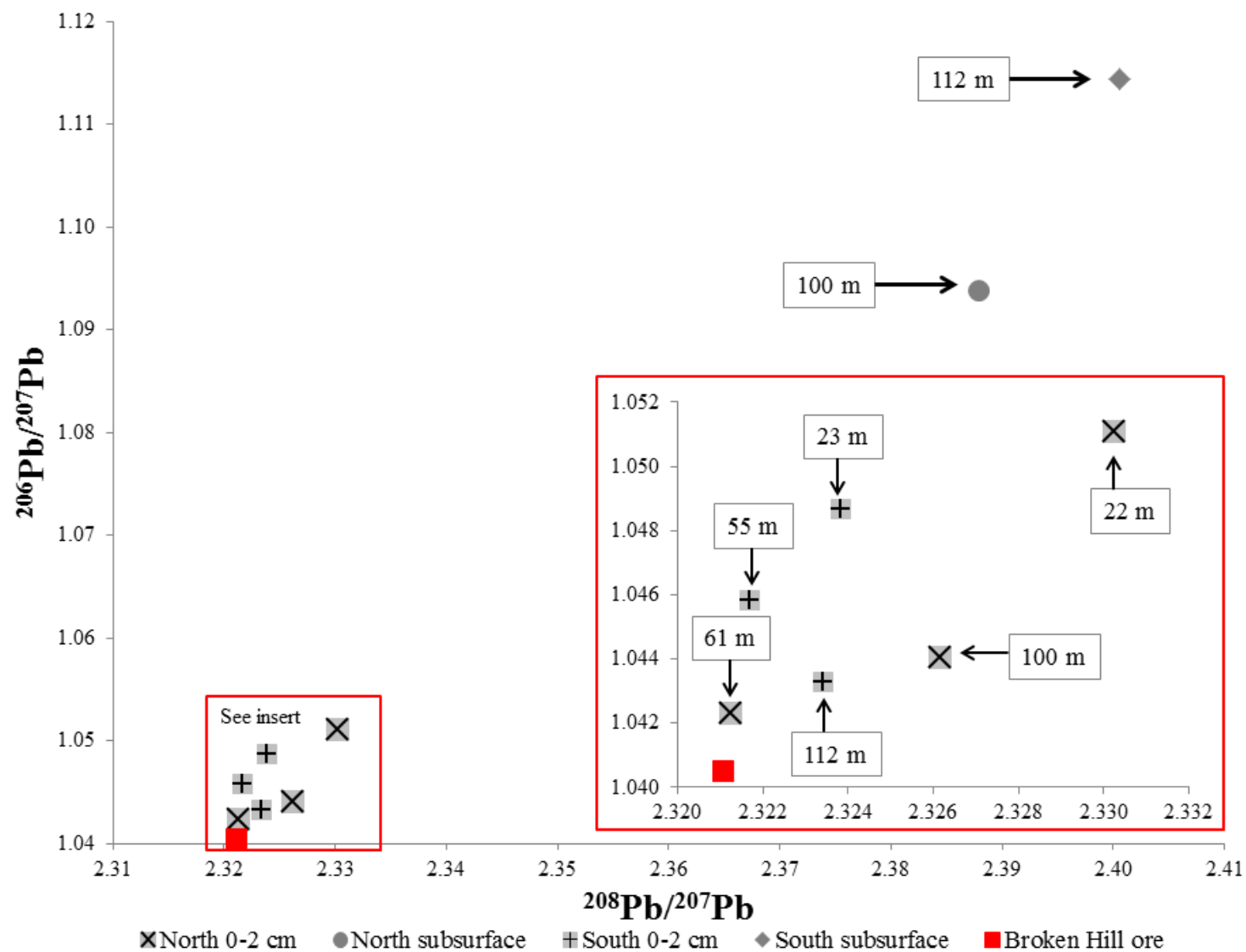
**Supplementary Figure S2:** Soil lead and zinc concentration profiles across Broken Hill train line transect at The Gorge.



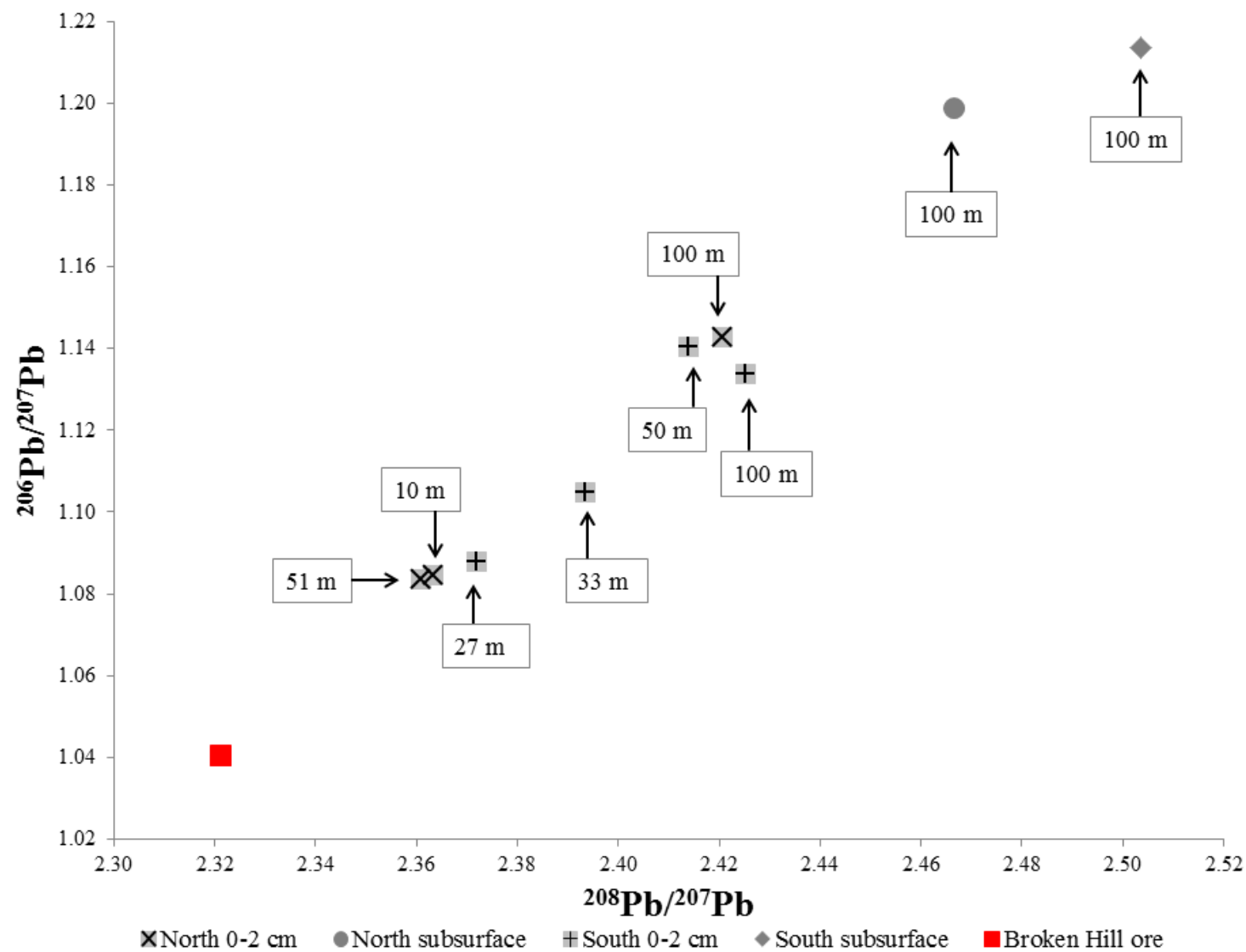
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