Figure DR1

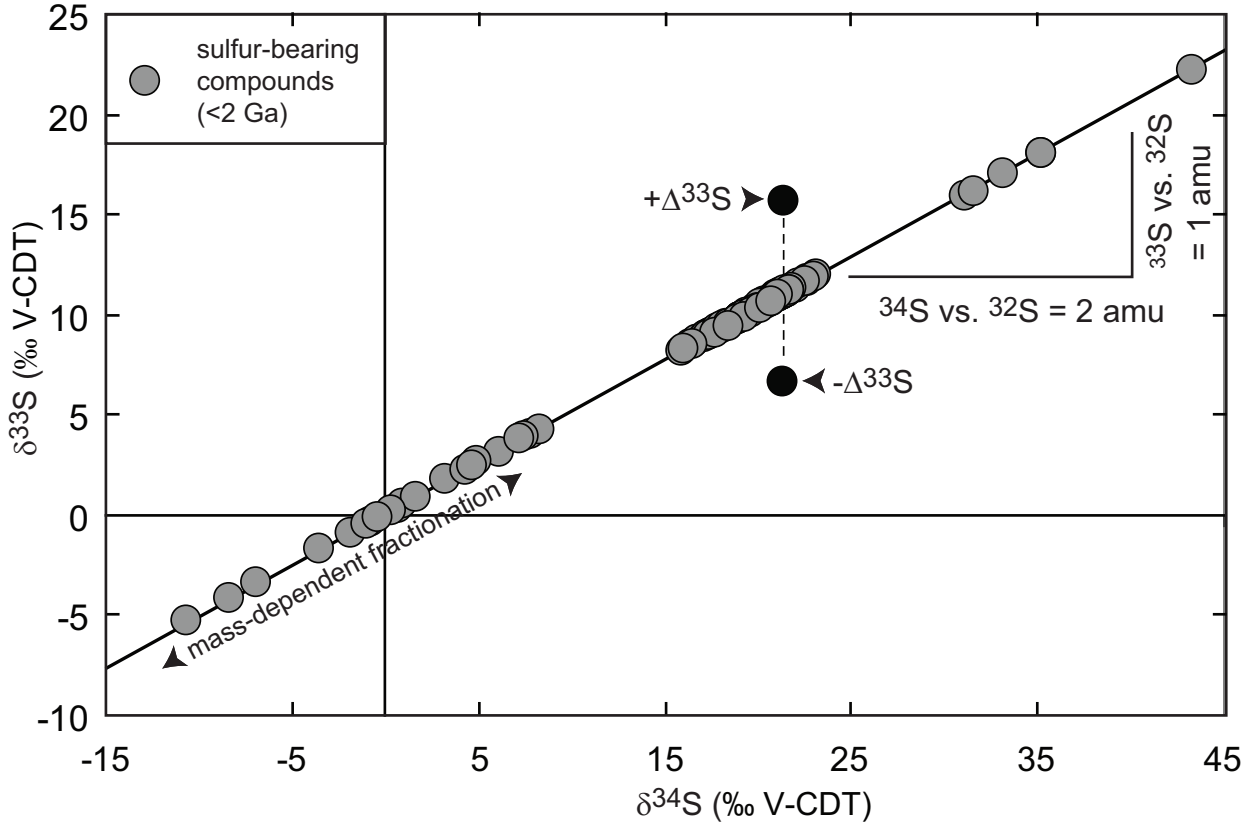
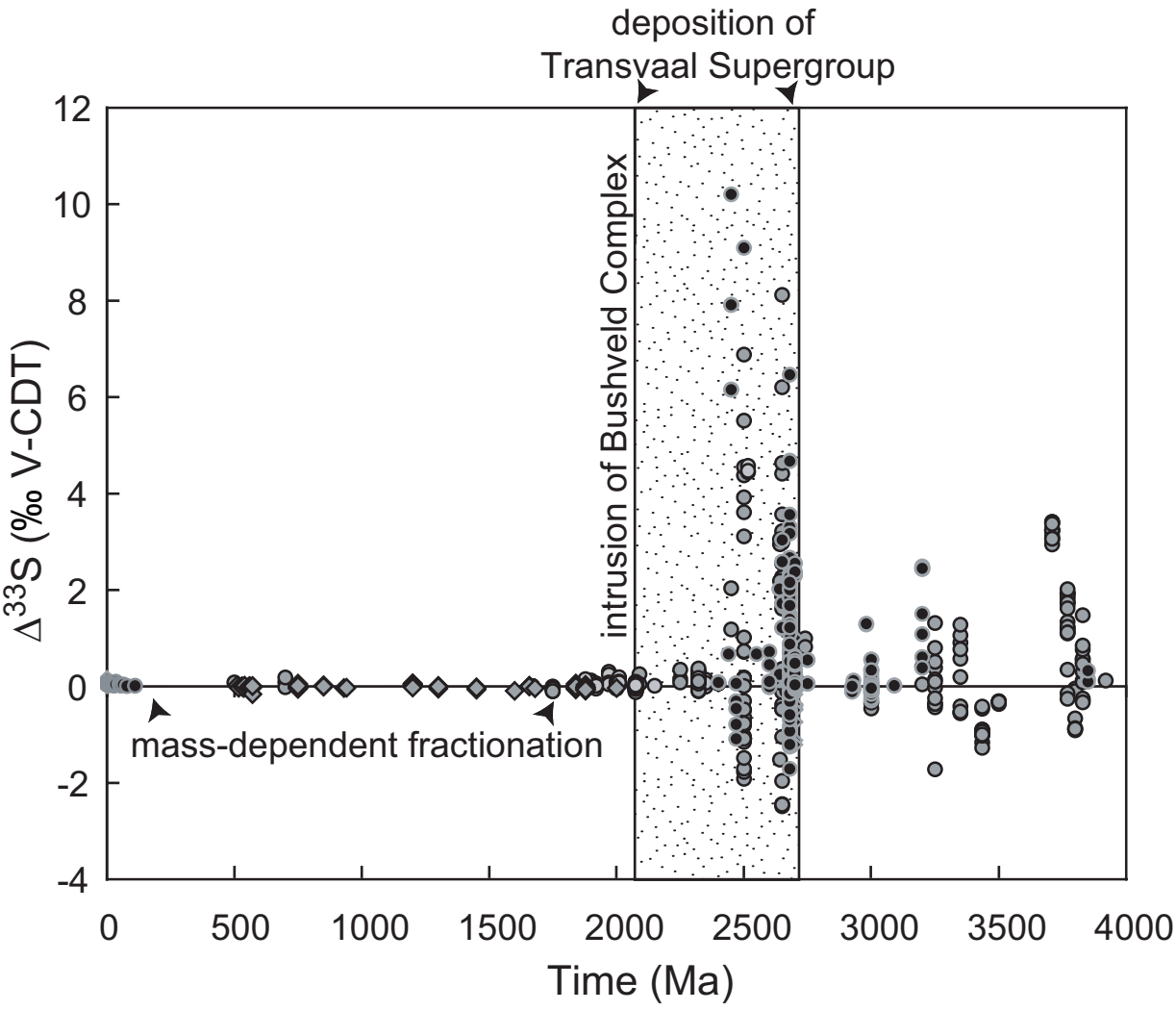
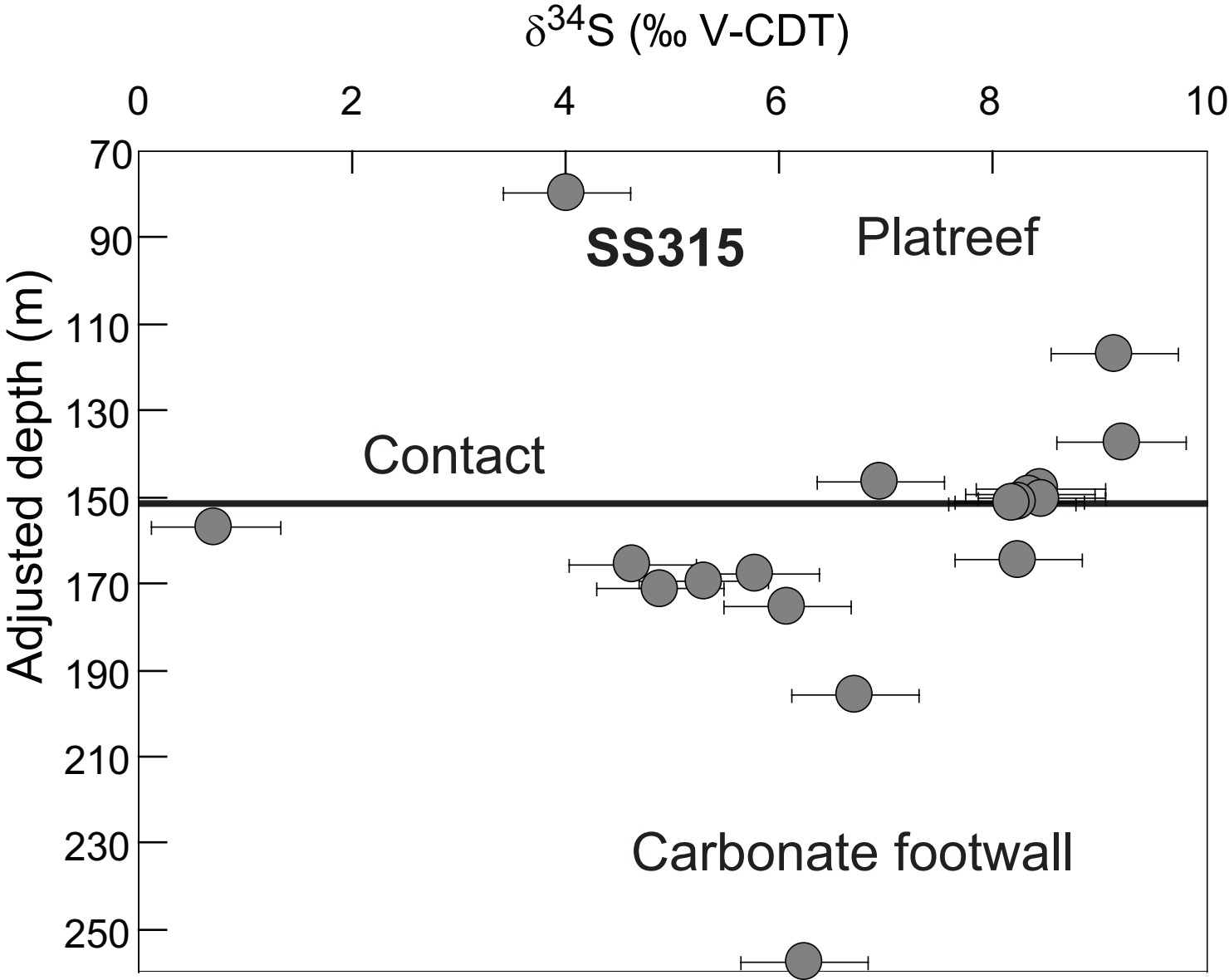
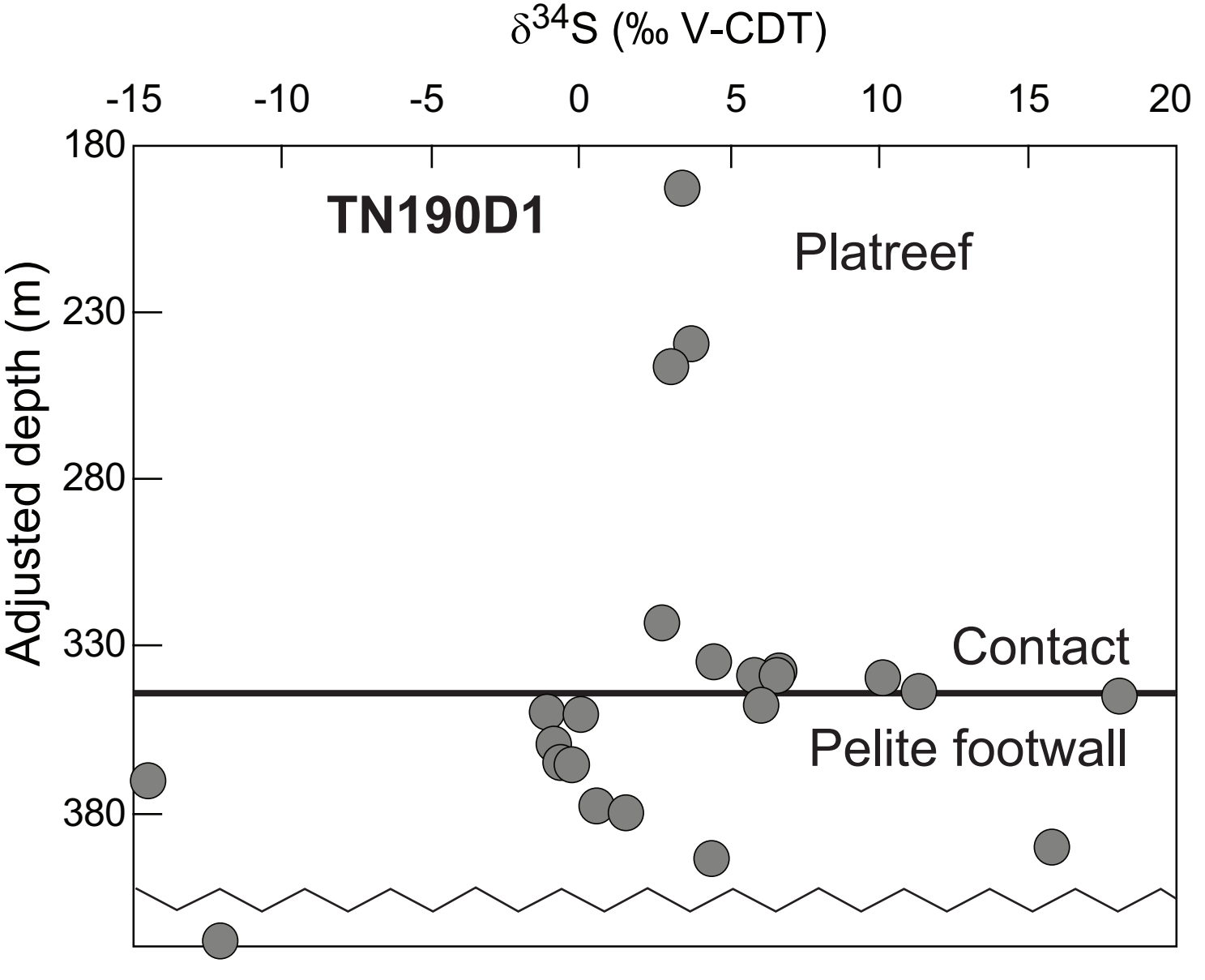

sulfur-bearing compounds (<2 Ga)
+Δ33S
-Δ33S
33S vs. 32S = 1 amu
34S vs. 32S = 2 amu
mass-dependent fractionation
δ33S (‰ V-CDT)
δ34S (‰ V-CDT)
25
20
15
10
5
0
-5
-10
-15
-5
5
15
25
35
45

Figure DR2


deposition of
Transvaal Supergroup
intrusion of Bushveld Complex
mass-dependent fractionation
$\Delta^{33}S$ (‰ V-CDT)
Time (Ma)
12
10
8
6
4
2
0
-2
-4
0
500
1000
1500
2000
2500
3000
3500
4000


δ34S (‰ V-CDT)
0
2
4
6
8
10
Adjusted depth (m)
70
90
110
130
150
170
190
210
230
250
SS315
Platreef
Contact
Carbonate footwall


δ34S (‰ V-CDT)
-15
-10
-5
0
5
10
15
20
180
230
280
330
380
Adjusted depth (m)
TN190D1
Platreef
Contact
Pelite footwall

DATA REPOSITORY ITEM

Table DR1. Multiple sulfur isotope compositions

Sample	Depth (m)	Description	Category	Sample type	$\delta^{33}S$ (‰)	$\delta^{34}S$ (‰)	$\Delta^{33}S$ (‰)
BHTv1.1	--	Main Zone	PM	WR	0.82	1.34	0.13
N6.2	--	Main Zone	PM	WR	0.91	1.53	0.12
ZN259							
20	--	Platreef	PM	WR	1.79	3.15	0.17
TN31							
MZLo	--	Main Zone	PM	WR	1.58	2.86	0.11
MZHi	--	Main Zone	PM	WR	0.89	1.32	0.21
SS315							
5	49.6	Feldspathic Pyroxenite	Plat	WR	2.32	4.01	0.26
11	102.8	Feldspathic Pyroxenite	Plat	WR	4.66	8.77	0.15
14	131.5	Feldspathic Pyroxenite	Plat	WR	4.96	9.20	0.23
16a	144.8	Feldspathic Pyroxenite	Plat	WR	4.04	6.94	0.47
18A	147.1	Feldspathic Pyroxenite	Plat	Po	4.73	8.36	0.43
18B	147.1	Feldspathic Pyroxenite	Plat	Po	4.74	8.36	0.44
18C	147.1	Feldspathic Pyroxenite	Plat	Ccp	4.86	8.60	0.44
19	148.7	Feldspathic Pyroxenite	Plat	WR	4.84	8.34	0.55
19A	148.7	Feldspathic Pyroxenite	Plat	Po	4.75	8.39	0.44
19B	148.7	Feldspathic Pyroxenite	Plat	Po	4.86	8.68	0.40
19C	148.7	Feldspathic Pyroxenite	Plat	Ccp	3.95	7.19	0.25
20	149.6	Feldspathic Pyroxenite	Plat	WR	4.79	8.45	0.45
21	150.8	Feldspathic Pyroxenite	Plat	WR	4.73	8.24	0.49
22	151.5	Feldspathic Pyroxenite	Plat	WR	4.52	8.17	0.32
23	159.1	Calc-silicate	FW	WR	1.02	0.72	0.65
25	169.9	Calc-silicate	FW	WR	5.62	8.23	1.39
25a	171.6	Calc-silicate	FW	WR	3.73	4.62	1.35
25b	174.8	Calc-silicate	FW	WR	5.08	5.77	2.11
25c	177.3	Calc-silicate	FW	WR	6.11	5.29	3.39
26	179.3	Calc-silicate	FW	WR	6.92	4.88	4.41
27	185.5	Calc-silicate	FW	WR	8.15	6.07	5.04
31	214.6	Calc-silicate	FW	WR	7.81	6.71	4.36
38	301.9	Calc-silicate	FW	WR	6.23	5.60	3.35
TN190D1							
74	130.2	Pyroxenite	Plat	Po	1.93	3.44	0.16
167	196.0	Pyroxenite	Plat	Po	2.18	3.78	0.23
109	206.2	Norite	Plat	Po	1.61	3.07	0.03
139	314.7	Pyroxenite	Plat	Po	1.56	2.74	0.15
22	331.3	Leuconorite	Plat	Po	2.50	4.54	0.16
2-2	335.0	Pyroxenite	Plat	WR	3.56	6.73	0.09

Table DR1 (cont.)

Sample	Depth (m)	Description	Category	Sample type	$\delta^{33}S$ (‰)	$\delta^{34}S$ (‰)	$\Delta^{33}S$ (‰)
TN190D1 (cont.)							
56A	336.9	Pyroxenite	Plat	Po	3.14	5.86	0.13
56B	336.9	Pyroxenite	Plat	Ccp	3.47	6.59	0.09
2-1	338.2	Leuconorite	Plat	WR	5.31	10.14	0.10
149	343.9	Serpentinite	Plat	Po	5.97	11.40	0.12
H1	345.6	Hornfels	FW	WR	9.62	18.10	0.34
P2	350.1	Calc-silicate	FW	WR	3.29	6.08	0.17
H2	352.8	Hornfels	FW	WR	-0.53	-1.08	0.03
H3	353.6	Hornfels	FW	WR	0.11	0.04	0.09
H6	366.2	Hornfels	FW	WR	-0.02	-0.85	0.41
H7	373.9	Hornfels	FW	WR	0.00	-0.67	0.35
H8	374.9	Hornfels	FW	WR	0.24	-0.26	0.38
H9a	381.8	Hornfels	FW	WR	-7.31	-14.47	0.17
H9c	392.5	Hornfels	FW	WR	1.03	0.59	0.72
H10	395.4	Hornfels	FW	WR	1.73	1.57	0.93
B1	409.4	BIF	FW	WR	8.90	15.83	0.78
B2	414.6	BIF	FW	WR	3.03	4.40	0.77
TN194							
7	>430	Hornfels	FW	WR	-5.34	-12.05	0.88

Notes: Sample numbers – BHTv1.1 and N6.2 are sample numbers from Nex *et al*. (2002), All other samples –borehole numbers (see Figure 1) are at the top and sample numbers are listed within each borehole. Capital letters at the end of the sample numbers refer to analyses of different portions/separates from the same sample. Core TN194 was sampled stratigraphically below core TN190D1 based on locations of Banded Iron Formation (BIF) portions of cores. Sample depth from core TN194 relative to core TN190D1 is unknown, depth is listed as > 430m. Category – PM=sample collected to represent parental magma, Plat=sample collected from Platreef, FW=sample collected from contact metamorphosed footwall rocks below Platreef. Type of sample – WR=whole rock, Po=pyrrhotite, Ccp=chalcopyrite.

DATA REPOSITORY FIGURE CAPTIONS

Figure DR1. Mass-dependent fractionation line of $\delta^{34}S$ vs. $\delta^{33}S$. Most terrestrial processes involve mass-dependent fractionation of sulfur isotopes which fall on a line with slope of ~0.515. Deviations from mass-dependent fractionation are expressed as non-zero values of $\Delta^{33}S$.

Figure DR2. Compilation of $\Delta^{33}S$ values over time from Farquhar *et al.* (2000, 2002), Mojzsis *et al.* (2003), Ono *et al.* (2003), Hu *et al.* (2003), Bekker *et al.* (2004), Johnston *et al.* (2005), Whitehouse *et al.* (2005), unpublished data (UMD). The time period for deposition of footwall rocks surrounding the Bushveld (Transvaal Supergroup) is indicated by the box filled with the dotted pattern. The age of the intrusion of the Bushveld Complex at ~2060 Ma is indicated on the graph.

Figure DR3. $\delta^{34}S$ composition of samples in SS315 carbonate core with depth adjusted for ~45 degree angle contact between Platreef and carbonate footwall rock. Error bars for $\delta^{34}S$ measurements are 2σ.

Figure DR4. $\delta^{34}S$ composition of samples in TN190D1 pelite core with depth adjusted for ~45 degree angle contact between Platreef and pelite footwall rock. Error bars for $\delta^{34}S$ measurements (2σ) are approximately the size of the symbols. The zigzag line shows the break between cores TN190D1 (above) and TN194 (below).

DATA REPOSITORY ADDITIONAL REFERENCES CITED

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