Supporting Information

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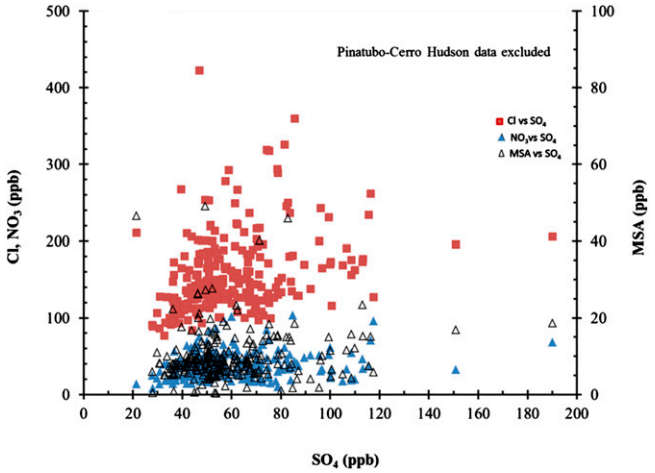

Fig. S1. Concentration of SO_4, NO_3, Cl, and methane sulfonic acid (MSA) of aerosol samples extracted from snow pit samples at the South Pole station, Antarctica, from 1982 to 2002.

Table S1. Oxygen-triple isotope composition and concentration profile of sulfate aerosol retrieved from a 1-m × 1-m snow pit at the South Pole

Sample depth (cm)	Year	SO_4 (ppb)	$\delta^{17}O$ (‰)	$\delta^{18}O$ (‰)	$\Delta^{17}O$ (‰)	$\Delta^{17}O^*$ (‰)
18–28	2002–2001.55	43.71	3.89	5.13	1.35	1.51
28–42	2001.55–2000.92	57.50	1.29	−0.08	1.43	1.61
42–70	2000.92–2000.07	50.55	5.10	7.54	1.26	1.41
70–81	2000.07–1999.6	59.50	2.42	1.73	1.63	1.85
87–94	1999.5–1999.2	52.80	2.67	2.51	1.64	1.85
99–103	1999.08–1999.0	59.03	5.80	9.67	0.82	0.90
103–113	1999–1998.33	49.33	4.69	5.05	2.52	2.89
113–117	1998.33–1998.0	80.96	6.10	8.86	1.54	1.73
117–122	1998.0–1997.7	99.72	3.49	2.10	2.52	2.89
122–133	1997.7–1997.25	99.72	5.98	7.40	2.24	2.55
140–148	1996.9–1996.6	57.48	4.81	3.85	3.00	3.45
148–154	1996.6–1996.3	57.48	4.87	2.82	3.63	4.18
154–162	1996.3–1996	65.93	3.44	0.76	3.22	3.71
168–177	1995.84–1995.52	119.09	3.92	3.60	2.14	2.44
177–188	1995.52–1995.20	56.45	4.65	4.51	2.58	2.95
194–200	1995.0–1994.71	80.02	0.55	−1.64	1.46	1.64
232–238	1993.36–1993.18	66.08	2.25	1.26	1.70	1.92
250–256	1992.70–1992.49	76.87	3.78	1.39	3.34	3.84
256–263	1992.49–1992.31	80.15	3.18	1.73	2.50	2.86
263–268	1992.31–1992.21	127.16	4.07	2.86	2.71	3.10
268–274	1992.21–1991.69	164.64	4.82	3.57	3.12	3.58
274–279	1991.69–1991.30	160.96	3.71	1.48	3.06	3.52
279–284	1991.30–1991.0	104.14	4.42	3.09	2.94	3.37
284–289	1991.0–1990.82	75.92	4.20	2.50	2.98	3.42
289–295	1990.82–1990.52	71.87	5.40	4.27	3.29	3.78
295–305	1990.52–1990.13	70.45	5.19	3.12	3.87	4.47
305–316	1990.13–1989.71	114.14	7.39	11.87	1.28	1.43
316–320	1989.71–1989.53	110.97	3.05	2.10	2.02	2.30
320–328	1989.53–1989.28	66.42	1.39	0.79	1.04	1.15
328–338	1989.21–1988.68	40.18	2.37	−0.65	2.98	3.42
338–347	1988.68–1988.45	48.61	3.13	0.49	3.14	3.61
347–356	1988.45–1988	49.08	2.32	0.74	2.04	2.32
356–365	1988–1987.71	54.67	2.24	−0.42	2.69	3.08
365–378	1987.71–1987	64.42	2.88	0.61	2.75	3.16
378–386	1987–1986.74	36.52	3.55	1.68	2.88	3.31
386–397	1986.7–1986.4	41.11	2.77	2.08	1.79	2.03
397–402	1986.4–1986.2	74.18	1.19	3.95	1.27	1.42
402–412	1986.2–1985.8	46.22	3.84	1.73	3.32	3.82
420–428	1985.3–1984.9	80.09	1.75	−1.77	2.99	3.44
428–441	1984.9–1984.2	83.01	1.46	−1.20	2.26	2.59
441–445	1984.2–1984	60.70	3.3.7	2.97	1.93	2.20
445–456	1984–1983.5	47.64	2.71	1.46	2.22	2.54
456–465	1983.5–1983	63.01	3.67	5.87	0.70	0.76
478–490	1982.5–1982.0	99.50	3.07	2.27	2.00	2.28
490–502	1982–1981.5	44.82	4.45	4.00	2.87	3.30
525–537	1980.5–1980	45.53	5.73	10.40	0.40	0.41

Depth profile indicates initial and final ice layers of the composite samples used to measure oxygen-triple isotopic composition. $\Delta^{17}O^*$, corrected for high-temperature pyrolysis (1,050 °C) using a quartz cup as $\Delta^{17}O^* = 1.17 \times \Delta^{17}O_{(quartz)} - 0.06$ (1).

1. Schauer AJ, et al. (2012) Oxygen isotope exchange with quartz during pyrolysis of silver sulfate and silver nitrate. *Rapid Commun Mass Spectrom* 26(18):2151–2157.