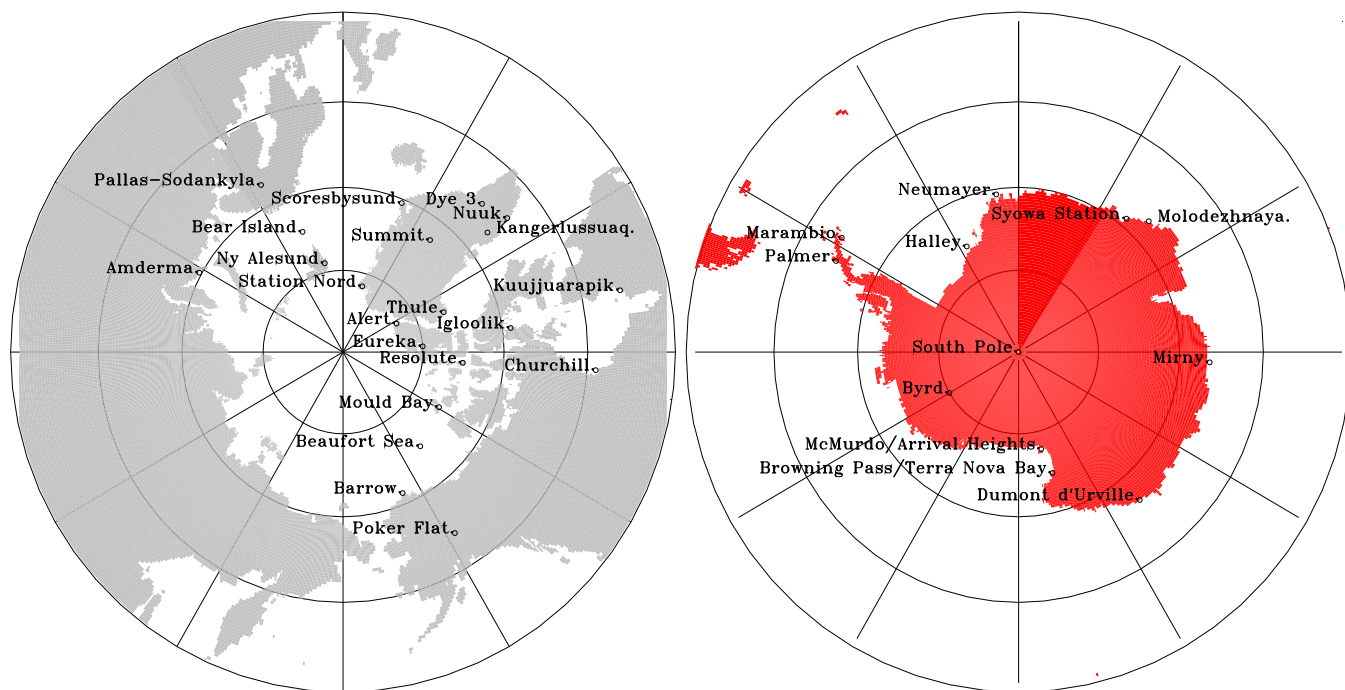


Tropospheric Measurements of Gas-Phase and Aerosol Chemistry in Polar Regions

Compiled by Rolf Sander

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Introduction

Many measurements of tropospheric gas-phase and aerosol chemistry in polar regions have been made and subsequently published in miscellaneous journals. In this compilation, an attempt is made to provide a concise overview of these measurements. The tables do not claim completeness but it is hoped they can serve as a starting point when searching for data of a particular compound. CO₂ is not included because gathering all data for this species would be beyond the scope of this work.

There are two main tables: The first contains measurements of gas-phase species, and the second contains aerosol measurements. The measurement sites are listed in Tab. 1, and also shown on the map on the title page.

In some cases, concentrations in [ng/m³] from the original papers were converted to mixing ratios assuming a molar volume of 20 l/mol for the cold air.

Several abbreviations and acronyms are used in the tables, as explained below:

date:	spr	=	spring
	sum	=	summer
	fal	=	fall
	win	=	winter
mercury:	GEM	=	gaseous elementary mercury
	TGM	=	total gaseous mercury
	RGM	=	reactive gaseous mercury
other:	bgr	=	background air
	DL	=	detection limit
	SCD	=	slant column density

In addition to the data presented in the peer-reviewed literature, there are several web sites providing large data sets.

- <http://gaw.kishou.go.jp/wdogg.html>
The World Data Centre for Greenhouse Gases (WDCGG) is established under the Global Atmosphere Watch (GAW) programme to collect, archive and provide data for greenhouse (CO₂, CH₄, CFCs, N₂O, etc.) and related (CO, NO_x, SO₂, VOC, etc.) gases and surface ozone in the atmosphere and ocean, measured under GAW and other programmes. From this web site, you can obtain information including WDCGG's publications and measurement data that have been contributed by organizations and individual researchers in the world.
- <http://www.cmdl.noaa.gov/ccgg/iadv/>
The Interactive Atmospheric Data Visualization web page provides data for CH₄, CO, CO₂, H₂, N₂O, SF₆, and other gases. The global coverage includes several Arctic and Antarctic stations.
- <http://www.amap.no/Assessment/ScientificBackground.htm>
The Arctic Monitoring and Assessment Programme (AMAP) offers several scientific reports.
- http://www.awi-bremerhaven.de/GPH/AirChemistryObservatory/scientific_program.html
A summary of the actual sampling program realised at the Air Chemistry Observatory of the Neumayer Station.

Table 1: List of measurement Sites

abbrev	name	longitude	latitude	altitude ^a
AL	Alert, NWT, Canada	82°27' N	62°31' W	210 m a.s.l.
AM	Amderma, Russia	69.72° N	61.62° E	
ant	Antarctic (miscellaneous sites)	—	—	
ARC	Arctic (miscellaneous sites)	—	—	
BA	Barrow, Alaska, USA	71°19' N	156°36' W	8 m a.s.l.
BI	Bear Island	74.5° N	19.0° E	
bp	Browning Pass, Ross Sea, Antarctica	74°36' S	163°56' E	
BS	Beaufort Sea	≈ 75° N	≈ 140° W	
by	Byrd Station	80.00° S	120.00° W	
CH	Churchill, Canada	59° N	94° W	
du	Dumont d'Urville, Antarctica	66°40' S	140°01' E	40 m a.s.l.
DY	Dye 3, Greenland	65.2° N	43.8° W	
EU	Eureka, Canada	80° N	86° W	
ha	Halley, Antarctic	75°35' S	26°39' W	32 m a.s.l.
HU	Hudson Bay, Canada	≈ 55° N	≈ 75° W	
IG	Igloolik, NWT, Canada	69° N	82° W	
KA	Kangerlussuaq (Søndre Strømfjord), Greenland	67° N	51° W	
KU	Kuujuarapik, Quebec, Canada	55.5° N	77.7° W	
ma	Marambio, Antarctic	64.2° S	57.7° W	
MB	Mould Bay, NWT, Canada	76°15' N	119°20' W	58 m a.s.l.
mi	Mirny, Antarctic	66.33° S	93.01° E	
mm	McMurdo station, Arrival Heights, Antarctic	77°49' S	166°35' E	11 m a.s.l.
mo	Molodezhnaya, Antarctic	67.4° S	45.5° E	
NA	Ny Ålesund Zeppelin Station, Spitzbergen, Norway	78°54' N	11°52' E	475 m a.s.l.
nm	Neumayer Station, Antarctic	70°39' S	8°15' W	42 m a.s.l.
NO	Norwegian Arctic (miscellaneous sites)	—	—	
NU	Nuuk, Greenland	64°06' N	51°24' W	
NW	Narwhal ice floe camp, Arctic (140 km NW of Alert)	83°54' N	63°17' W	
pa	Palmer Station, Antarctic	64°55' S	64°00' W	10 m a.s.l.
PF	Poker Flat, Alaska, USA	64°11' N	147°43' W	501 m a.s.l.
PS	Pallas-Sodankylä, Finland	67°22' N	26°39' E	
RE	Resolute, Canada	75° N	95° W	
SC	Scoresbysund, Greenland	70°29' N	21°58' W	
SN	Station Nord, Greenland	81°36' N	16°40' W	
sp	South Pole	90° S	—	2810 m a.s.l.
SU	Summit, Greenland	72°35' N	38°29' W	3238 m a.s.l.
SW	SWAN ice floe camp, Arctic (160 km N of Alert)	83.9° N	63.1° W	
sy	Syowa Station, Antarctic	69°00' S	39°35' E	
TH	Thule, Greenland	76°31' N	68°50' W	
tn	Terra Nova Bay, Antarctic	74°42' S	164°6' E	

^a a.s.l. = above sea level

species	value	date	site	reference
***** Gas-phase Species *****				
Oxygen and Hydrogen				
O ₃		1958	ha	Roscoe and Roscoe (2006)
O ₃		1966-2000	RE	Tarasick and Bottenheim (2002)
O ₃		1973-1978	BA	Oltmans (1981)
O ₃		1973-1984	BA	Oltmans and Komhyr (1986)
O ₃		1974-2000	CH	Tarasick and Bottenheim (2002)
O ₃		1975-1978	sp	Oltmans (1981)
O ₃		1975-1984	sp	Oltmans and Komhyr (1986)
O ₃		1975-2004	BA, sp	Oltmans et al. (2006)
O ₃	monthly mean: 20...35 nmol/mol	1975-1989	sp	Schnell et al. (1991)
O ₃	monthly mean: 18...25 nmol/mol	1975-1989 (Feb)	sp	Schnell et al. (1991)
O ₃	monthly mean: 32...38 nmol/mol	1975-1989 (Aug)	sp	Schnell et al. (1991)
O ₃		1979-1986	ARC	Oltmans et al. (1989)
O ₃	17...37 nmol/mol	Mar 1985	AL	Bottenheim et al. (1986)
O ₃		Apr 1986	AL	Mickle et al. (1989)
O ₃		1987-1988	mo,mi	Gruzdev et al. (1993)
O ₃		1988-1990	BI	Taalas et al. (1993)
O ₃		1988-1991	ma	Taalas et al. (1993)
O ₃		1988-1991	PS	Taalas et al. (1993)
O ₃		1989-1994	NA	Solberg et al. (1997b)
O ₃	14...32 nmol/mol	Sep-Oct 1989	mm	Sturges et al. (1993d)
O ₃	2...48 nmol/mol	Mar-Apr 1989	BA	Sturges et al. (1993c)
O ₃		1989-1990	NA	Taalas et al. (1993)
O ₃		1989-1990	sy	Murayama et al. (1992)
O ₃		1989-1993	NA	Solberg et al. (1996b)
O ₃		Mar-Apr 1990	BA	Sturges et al. (1993b)
O ₃	<0.4...20 nmol/mol	Apr 1992	SW	Hopper et al. (1994a)
O ₃	<0.5...45 nmol/mol	Apr 1992	AL	Anlauf et al. (1994)
O ₃	0.9...57.4 nmol/mol	1992-1993	NA	Beine (1999)
O ₃		1993	nm	Wessel et al. (1998)
O ₃	0...72 nmol/mol	Mar-May 1993	PF	Beine et al. (1996b)
O ₃		May-Jun 1993	SU	Bales et al. (1995b)
O ₃		1993-1994	NA	Wessel et al. (1998)
O ₃		1993-2000	EU	Tarasick and Bottenheim (2002)
O ₃		1994-1996	SC	Rasmussen et al. (1997)
O ₃		1994-1996	TH	Rasmussen et al. (1997)
O ₃	<0.5...36 nmol/mol	spr 1994	NW	Ariya et al. (1998)
O ₃		spr 1994	ARC	Galaktionov et al. (1997)
O ₃	4.0...51.0 nmol/mol	Feb-May 1994	NA	Beine et al. (1997a)
O ₃	4.0...51.0 nmol/mol	Feb-May 1994	NA	Beine et al. (1996a)
O ₃	bgr.: 4.0...50 nmol/mol	Feb-May 1994	NA	Beine et al. (1997b)
O ₃		Mar-Apr 1994	ARC	Hopper et al. (1998)
O ₃		Mar-Jun 1994	ARC	Jaeschke et al. (1997)
O ₃	15...45 nmol/mol	1994-1996	NA	Beine and Krognnes (2000)
O ₃		Apr 1994	NW	Gong et al. (1997)
O ₃		Jan-May 1995	KA	Miller et al. (1997)
O ₃		Feb-Apr 1995	AL	Ariya et al. (1999)
O ₃	bgr.: 30.0...61.6 nmol/mol	Mar-May 1995	PF	Beine et al. (1997a)
O ₃	mean: 54 nmol/mol	May-Jul 1995	SU	Munger et al. (1999)
O ₃		Sep 1995	mm	Kreher et al. (1997)
O ₃		1995-1996	KA	Rasmussen et al. (1997)
O ₃		1995-1996	NA	Martinez et al. (1999)
O ₃		1995, 1996	NA	Tuckermann et al. (1997)
O ₃		1995-2001	SN	Heidam et al. (2004)

species	value	date	site	reference
O ₃	0...49.8 nmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
O ₃		Apr-May 1998	AL	Boudries and Bottenheim (2000)
O ₃		1998, 2000	AL	Sumner et al. (2002)
O ₃	12...21 nmol/mol	Mar 1999	ant	Jacobi and Schrems (1999)
O ₃	40.5 nmol/mol	sum 1999	SU	Yang et al. (2002)
O ₃		1999-2000	nm	Frieß et al. (2004)
O ₃		1999-2002	SN	Skov et al. (2004)
O ₃	51.9 nmol/mol	sum 2000	SU	Yang et al. (2002)
O ₃		2000-2001	nm	Ebinghaus et al. (2002)
O ₃		Feb-May 2000	AL	Bottenheim et al. (2002b)
O ₃		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
O ₃		Feb-May 2000	ARC	Blake et al. (2003)
O ₃		Jun 2000	SU	Helmig et al. (2002)
O ₃		spr 2001	HU	Hönninger et al. (2004)
O ₃	mean: 14.5 nmol/mol	Dec 2001	ant	Frey et al. (2005)
O ₃		Mar 2002	SN	Ferrari et al. (2004)
O ₃	mean: 19.3 nmol/mol	Dec 2002	ant	Frey et al. (2005)
O ₃	mean: 27.9 nmol/mol	Jan 2003	sp	Frey et al. (2005)
O ₃		Apr-May 2003	NA	Sprovieri et al. (2005a,b)
O ₃	< 1...42 nmol/mol	Mar-Apr 2003	ARC	Jacobi et al. (2006)
O ₃	19...42 nmol/mol	Mar-Apr 2003	NA	Jacobi et al. (2006)
O ₃		Aug-Oct 2003	ha	Jones et al. (2006)
O ₃	15...58 nmol/mol	Apr-May 2004	NA	Amoroso et al. (2005)
O ₃		spr 2004	AL	Morin et al. (2006)
O ₃		spr 2004	AL	Morin et al. (2005)
O ₃		2005	BA	Simpson et al. (2006)
O ₃		Jan-Apr 2005	BA	Keil and Shepson (2006)
O ₃		Mar-Apr 2005	BA	Tackett et al. (2006)
OH	mean: $1.1 \times 10^5 \text{ cm}^{-3}$	Feb 1994	pa	Jefferson et al. (1998); Davis et al. (1998)
OH		2000	sp	Mauldin III et al. (2004)
OH		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
OH		Feb-May 2000	ARC	Mauldin III et al. (2003)
OH	mean: $3.9 \times 10^5 \text{ cm}^{-3}$	Jan-Feb 2005	ha	Bloss et al. (2005); Lee et al. (2006)
OH	noon: $7.9 \times 10^5 \text{ cm}^{-3}$	Jan-Feb 2005	ha	Bloss et al. (2005); Lee et al. (2006)
HO ₂	mean: 0.76 pmol/mol	Jan-Feb 2005	ha	Bloss et al. (2005); Lee et al. (2006)
HO ₂	noon: 1.9 pmol/mol	Jan-Feb 2005	ha	Bloss et al. (2005); Lee et al. (2006)
H ₂ O ₂	0.3...3.5 nmol/mol	Jun-Jul 1990	SU	Sigg et al. (1992)
H ₂ O ₂		1992	AL	de Serves (1994)
H ₂ O ₂	up to 0.5 nmol/mol	1993-1994	ant	Fuhrer et al. (1996)
H ₂ O ₂		May-Jun 1993	SU	Bales et al. (1995b)
H ₂ O ₂		May-Jul 1993	SU	Bales et al. (1995a)
H ₂ O ₂		Aug 1994	SU	Dibb et al. (1996)
H ₂ O ₂	mean: 1.4 nmol/mol	Jun 1996	SU	Hutterli et al. (2001)
H ₂ O ₂	<DL...0.91 nmol/mol	1997-1999	nm	Riedel et al. (2000)
H ₂ O ₂	1.78 nmol/mol	sum 1999	SU	Yang et al. (2002)
H ₂ O ₂	mean: 278 pmol/mol	Dec 2000	sp	Hutterli et al. (2004)
H ₂ O ₂	mean: 321 pmol/mol	Dec 2000	ant	Frey et al. (2005)
H ₂ O ₂		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
H ₂ O ₂	80...1600 pmol/mol	Jun-Jul 2000	SU	Jacobi et al. (2002)
H ₂ O ₂	mean: 650 pmol/mol	Dec 2001	ant	Frey et al. (2005)
H ₂ O ₂	mean: 363 pmol/mol	Dec 2002	by	Frey et al. (2005)
H ₂ O ₂	mean: 230 pmol/mol	Jan 2003	sp	Frey et al. (2005)
Nitrogen				
NH ₃		Jan 1994	du	Legrand et al. (1998)
NH ₃		Aug 1994	SU	Dibb et al. (1996)

species	value	date	site	reference
NH ₃	0...4645.0 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
N ₂ O	mean: 341 pmol/mol	1988-1989	DY	Davidson et al. (1993b,a)
NO	median: 225 pmol/mol	1989-1999	sp	Davis et al. (2001)
NO	bgr.: 0...43.4 pmol/mol	Feb-May 1994	NA	Beine et al. (1997a)
NO	0...1501.8 pmol/mol	Mar-May 1995	PF	Beine et al. (1997a)
NO	mean: 3 pmol/mol	Jan-Mar 1997	nm	Jones et al. (1999)
NO		Jul 1998	SU	Honrath et al. (1999)
NO		1998, 2000	sp	Davis et al. (2004)
NO	mean: 1.2 pmol/mol	Jan-Feb 1999	nm	Jacobi et al. (2000)
NO		Jul 1999	SU	Dibb et al. (2002)
NO	24.7 pmol/mol	sum 1999	SU	Yang et al. (2002)
NO	16.0 pmol/mol	sum 2000	SU	Yang et al. (2002)
NO		Jun 2000	SU	Jacobi et al. (2004)
NO		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
NO	0...24.7 pmol/mol	Feb-May 2000	AL	Beine et al. (2002)
NO		Nov-Dec 2003	sp	Wang et al. (2006)
NO ₂	17...97 pmol/mol	Mar 1985	AL	Bottenheim et al. (1986)
NO ₂	85 pmol/mol	spr 1988	AL	Bottenheim et al. (1990)
NO ₂		Mar-Apr 1988	AL	Bottenheim et al. (1993)
NO ₂	SCD	1995	mm	Kreher et al. (1997)
NO ₂		1995-1996	NA	Martinez et al. (1999)
NO ₂		1995, 1996	NA	Tuckermann et al. (1997)
NO ₂	0...358.3 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
NO ₂	10...170 ng/m ³	May-Jun 1997	NA	Allegrini et al. (1999)
NO ₂	10...300 ng/m ³	Dec 1997	tn	Allegrini et al. (1999)
NO ₂	4.94...620.73 ng/m ³	1997-1999	tn	Ianniello et al. (2003)
NO ₂		Jul 1998	SU	Honrath et al. (1999)
NO ₂	mean: 3.2 pmol/mol	Jan-Feb 1999	nm	Jacobi et al. (2000)
NO ₂		Jul 1999	SU	Dibb et al. (2002)
NO ₂	32.7 pmol/mol	sum 1999	SU	Yang et al. (2002)
NO ₂		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
NO ₂	0...38.8 pmol/mol	Feb-May 2000	AL	Beine et al. (2002)
NO ₂		Jun 2000	SU	Jacobi et al. (2004)
NO ₂	15.2 pmol/mol	sum 2000	SU	Yang et al. (2002)
NO ₂	≤50 pmol/mol	Apr *	AL	Barrie and Delmas (1994)
NO _x	≤30 pmol/mol	spr 1992	AL	Muthuramu et al. (1994)
NO _x	<20...100 pmol/mol	Apr 1992	ARC	Leaitch et al. (1994)
NO _x	0...637.5 pmol/mol	Feb-May 1994	NA	Beine et al. (1996a)
NO _x	bgr.: 0...143.9 pmol/mol	Feb-May 1994	NA	Beine et al. (1997b)
NO _x	bgr.: 0...143.9 pmol/mol	Feb-May 1994	NA	Beine et al. (1997a)
NO _x	bgr.: 0...955.5 pmol/mol	Mar-May 1995	PF	Beine et al. (1997a)
NO _x		1998-1999	SU	Ford et al. (2002)
NO _x	49.4 pmol/mol	sum 1999	SU	Yang et al. (2002)
NO _x		Jun 2000	SU	Honrath et al. (2002); Jacobi et al. (2004)
NO _x	39.7 pmol/mol	sum 2000	SU	Yang et al. (2002)
NO _x		2000	sp	Oncley et al. (2004)
NO _x		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
NO _y		Mar-Apr 1988	AL	Bottenheim et al. (1993)
NO _y	mean: 300 pmol/mol	Feb-May 1994	NA	Solberg et al. (1997a)
NO _y	mean: 850 pmol/mol	May-Jul 1995	SU	Munger et al. (1999)
NO _y		1995	SU	Dibb et al. (1998)
NO _y	mean: 24 pmol/mol	Jan-Mar 1997	nm	Jones et al. (1999); Weller et al. (1999)
NO _y	100...600 ng/m ³	May-Jun 1997	NA	Allegrini et al. (1999)
NO _y	300...700 ng/m ³	Dec 1997	tn	Allegrini et al. (1999)
NO _y	14.58...701.20 ng/m ³	1997-1999	tn	Ianniello et al. (2003)
NO _y		Jul 1998	SU	Honrath et al. (1999)

species	value	date	site	reference
NO _y		1998-1999	SU	Ford et al. (2002)
NO _y	46 pmol/mol	1999-2000	nm	Weller et al. (2002)
NO _y		Feb-Mar 2000	AL	Bottenheim et al. (2002b)
NO _y		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
HONO	0... ≤240 pmol/mol	Apr 1992	AL	Hausmann and Platt (1994)
HONO	<1.7... 68 pmol/mol	win 1992	AL	Li (1994)
HONO	<1.7... 20 pmol/mol	spr 1992	AL	Li (1994)
HONO	0... 64.8 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
HONO		Jul 1999	SU	Dibb et al. (2002)
HONO	7.24 pmol/mol	sum 1999	SU	Yang et al. (2002)
HONO	12.7 pmol/mol	sum 2000	SU	Yang et al. (2002)
HONO		2000	sp	Dibb et al. (2004)
HONO		Feb-May 2000	AL	Zhou et al. (2001)
HONO		Jun 2000	SU	Honrath et al. (2002); Jacobi et al. (2004)
HONO	<DL... 20 pmol/mol	Feb-May 2001	NA	Beine et al. (2003)
HONO	0... 48.3 pmol/mol	Apr-May 2004	NA	Amoroso et al. (2005)
HONO	0... 7 pmol/mol	Nov 2004	bp	Beine et al. (2006)
HONO	10.1 pmol/mol(sum), 0.8 pmol/mol(win)	2004-2005	ha	Clemishaw et al. (2006)
HNO ₃ (g+aq)	24... 72 pmol/mol	Mar 1985	AL	Bottenheim et al. (1986)
HNO ₃	3.5... 180 pmol/mol	spr 1988	AL	Bottenheim et al. (1990)
HNO ₃		Mar-Apr 1988	AL	Bottenheim et al. (1993)
HNO ₃	mean: 77 ng/m ³	May 1989	AL	Kieser et al. (1993)
HNO ₃ (g+aq)		1990-2001	SN	Heidam et al. (2004)
HNO ₃		Jan-Feb 1991	tn	Allegrini et al. (1994)
HNO ₃	5... 100 pmol/mol	win/spr 1992	AL	Barrie et al. (1994a)
HNO ₃	≤40... 110 pmol/mol	Apr 1992	ARC	Leaitch et al. (1994)
HNO ₃	mean: 0.9 nmol/m ³ (STP)	Jun-Jul 1993	SU	Dibb et al. (1994)
HNO ₃		1994-1995	SU	Dibb et al. (1998)
HNO ₃		Mar-Jun 1994	ARC	Jaeschke et al. (1997)
HNO ₃		Aug 1994	SU	Dibb et al. (1996)
HNO ₃	mean: 5 pmol/mol	Jan-Mar 1997	nm	Jones et al. (1999); Weller et al. (1999)
HNO ₃	0... 229.1 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
HNO ₃	mean: 4.0 pmol/mol	Jan-Feb 1999	nm	Jacobi et al. (2000)
HNO ₃		2000-2001	du	Jourdain and Legrand (2002)
HNO ₃	mean: 14.5 ng/m ³	Feb 2000	AL	Ianniello et al. (2002)
HNO ₃		Mar-Apr 2000	NA	Hara et al. (2002b)
HNO ₃	mean: 54.9 ng/m ³	Apr-May 2000	AL	Ianniello et al. (2002)
HNO ₃		Jun 2000	SU	Honrath et al. (2002); Jacobi et al. (2004)
HNO ₃		2000	sp	Dibb et al. (2004)
HNO ₃		2000	sp	Huey et al. (2004)
HNO ₃	0.9... 70 pmol/mol	Feb-May 2001	NA	Beine et al. (2003)
HNO ₃		Nov-Dec 2003	sp	Wang et al. (2006)
HNO ₄		Feb-May 2000	AL	Zhou et al. (2001)
HNO ₄	mean: 25 pmol/mol	Dec 2000	sp	Slusher et al. (2002)
HNO ₄		Nov-Dec 2003	sp	Wang et al. (2006)
Organic: C, H (alkanes)				
CH ₄		Apr 1986	AL	Trivett et al. (1989)
CH ₄	mean: 1780 nmol/mol	1988-1989	DY	Davidson et al. (1993b,a)
CH ₄		1989-1990	AL	Hopper et al. (1994b)
CH ₄	1800... 1950 nmol/mol	win/spr 1992	AL	Worthy et al. (1994)
CH ₄		Apr 1994	AL, NW	Ariya et al. (1998)
CH ₄		Feb-Apr 1995	AL	Ariya et al. (1999)
CH ₄	1800 nmol/mol	sum 1999	SU	Yang et al. (2002)
CH ₄		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)

species	value	date	site	reference
CH ₄	1816 nmol/mol	sum 2000	SU	Yang et al. (2002)
C ₂ H ₆		1982, 1983	NO	Hov et al. (1984)
C ₂ H ₆	mean: 370 pmol/mol	1982-1985	nm	Rudolph et al. (1989)
C ₂ H ₆		1983-1986	NA	Hov et al. (1989)
C ₂ H ₆		1989-1994	NA	Solberg et al. (1996a)
C ₂ H ₆	2000...4300 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
C ₂ H ₆	mean: 853 pmol/mol	Apr 1989	AL	Kieser et al. (1993)
C ₂ H ₆	mean: 683 pmol/mol	May 1989	AL	Kieser et al. (1993)
C ₂ H ₆	1500...4000 pmol/mol	win/spr 1992	AL	Jobson et al. (1994)
C ₂ H ₆		Mar-Jun 1993	NA	Solberg et al. (1996b)
C ₂ H ₆		Apr 1994	AL, NW	Ariya et al. (1998)
C ₂ H ₆		Feb-Apr 1995	AL	Ariya et al. (1999)
C ₂ H ₆	1366...2594 pmol/mol	Mar-May 1995	PF	Herring et al. (1997)
C ₂ H ₆		1997-1998	SU	Swanson et al. (2003)
C ₂ H ₆		Apr-May 1998	AL	Boudries and Bottenheim (2000)
C ₂ H ₆		1998, 2000	AL	Bottenheim et al. (2002a)
C ₂ H ₆		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
C ₂ H ₆		Feb-May 2000	ARC	Blake et al. (2003)
C ₂ H ₆	mean: 186 pmol/mol	2004-2005	ha	Read et al. (2006)
C ₃ H ₈		1982, 1983	NO	Hov et al. (1984)
C ₃ H ₈	mean: 70 pmol/mol	1982-1985	nm	Rudolph et al. (1989)
C ₃ H ₈		1983-1986	NA	Hov et al. (1989)
C ₃ H ₈		1989-1994	NA	Solberg et al. (1996a)
C ₃ H ₈	800...2200 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
C ₃ H ₈	mean: 505 pmol/mol	Apr 1989	AL	Kieser et al. (1993)
C ₃ H ₈	mean: 288 pmol/mol	May 1989	AL	Kieser et al. (1993)
C ₃ H ₈	500...3000 pmol/mol	win/spr 1992	AL	Jobson et al. (1994)
C ₃ H ₈		Mar-Jun 1993	NA	Solberg et al. (1996b)
C ₃ H ₈		Apr 1994	AL, NW	Ariya et al. (1998)
C ₃ H ₈		Feb-Apr 1995	AL	Ariya et al. (1999)
C ₃ H ₈	188...1542 pmol/mol	Mar-May 1995	PF	Herring et al. (1997)
C ₃ H ₈		1997-1998	SU	Swanson et al. (2003)
C ₃ H ₈		Apr-May 1998	AL	Boudries and Bottenheim (2000)
C ₃ H ₈		1998, 2000	AL	Bottenheim et al. (2002a)
C ₃ H ₈		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
C ₃ H ₈		Feb-May 2000	ARC	Blake et al. (2003)
C ₃ H ₈	mean: 31 pmol/mol	2004-2005	ha	Read et al. (2006)
n-C ₄ H ₁₀		1982, 1983	NO	Hov et al. (1984)
n-C ₄ H ₁₀		1983-1986	NA	Hov et al. (1989)
n-C ₄ H ₁₀	460...910 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
n-C ₄ H ₁₀	mean: 167 pmol/mol	Apr 1989	AL	Kieser et al. (1993)
n-C ₄ H ₁₀	mean: 60 pmol/mol	May 1989	AL	Kieser et al. (1993)
n-C ₄ H ₁₀		1989-1994	NA	Solberg et al. (1996a)
n-C ₄ H ₁₀	100...1500 pmol/mol	win/spr 1992	AL	Jobson et al. (1994)
n-C ₄ H ₁₀	19.6...126.2 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
n-C ₄ H ₁₀		Mar-Jun 1993	NA	Solberg et al. (1996b)
n-C ₄ H ₁₀		Apr 1994	AL, NW	Ariya et al. (1998)
n-C ₄ H ₁₀		Feb-Apr 1995	AL	Ariya et al. (1999)
n-C ₄ H ₁₀	22...912 pmol/mol	Mar-May 1995	PF	Herring et al. (1997)
n-C ₄ H ₁₀		1997-1998	SU	Swanson et al. (2003)
n-C ₄ H ₁₀		Apr-May 1998	AL	Boudries and Bottenheim (2000)
n-C ₄ H ₁₀		1998, 2000	AL	Bottenheim et al. (2002a)
n-C ₄ H ₁₀		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
n-C ₄ H ₁₀		Feb-May 2000	ARC	Blake et al. (2003)
n-C ₄ H ₁₀	mean: 4.9 pmol/mol	2004-2005	ha	Read et al. (2006)
n-C ₄ H ₁₀		Mar-Apr 2005	BA	Tackett et al. (2006)
i-C ₄ H ₁₀		1982, 1983	NO	Hov et al. (1984)
i-C ₄ H ₁₀		1983-1986	NA	Hov et al. (1989)

species	value	date	site	reference
i-C ₄ H ₁₀		1989-1994	NA	Solberg et al. (1996a)
i-C ₄ H ₁₀	140...350 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
i-C ₄ H ₁₀	mean: 459 pmol/mol	Apr 1989	AL	Kieser et al. (1993)
i-C ₄ H ₁₀	mean: 344 pmol/mol	May 1989	AL	Kieser et al. (1993)
i-C ₄ H ₁₀	100...800 pmol/mol	win/spr 1992	AL	Jobson et al. (1994)
i-C ₄ H ₁₀		Apr 1994	AL, NW	Ariya et al. (1998)
i-C ₄ H ₁₀		Feb-Apr 1995	AL	Ariya et al. (1999)
i-C ₄ H ₁₀	12...525 pmol/mol	Mar-May 1995	PF	Herring et al. (1997)
i-C ₄ H ₁₀		1997-1998	SU	Swanson et al. (2003)
i-C ₄ H ₁₀		Apr-May 1998	AL	Boudries and Bottenheim (2000)
i-C ₄ H ₁₀		1998, 2000	AL	Bottenheim et al. (2002a)
i-C ₄ H ₁₀		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
i-C ₄ H ₁₀	mean: 3.2 pmol/mol	2004-2005	ha	Read et al. (2006)
n-C ₅ H ₁₂		1982, 1983	NO	Hov et al. (1984)
n-C ₅ H ₁₂		1983-1986	NA	Hov et al. (1989)
n-C ₅ H ₁₂		1989-1994	NA	Solberg et al. (1996a)
n-C ₅ H ₁₂	140...330 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
n-C ₅ H ₁₂	20...600 pmol/mol	win/spr 1992	AL	Jobson et al. (1994)
n-C ₅ H ₁₂		Apr 1994	AL, NW	Ariya et al. (1998)
n-C ₅ H ₁₂		Feb-Apr 1995	AL	Ariya et al. (1999)
n-C ₅ H ₁₂		Apr-May 1998	AL	Boudries and Bottenheim (2000)
n-C ₅ H ₁₂		1998, 2000	AL	Bottenheim et al. (2002a)
n-C ₅ H ₁₂		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
i-C ₅ H ₁₂		1982, 1983	NO	Hov et al. (1984)
i-C ₅ H ₁₂		1983-1986	NA	Hov et al. (1989)
i-C ₅ H ₁₂		1989-1994	NA	Solberg et al. (1996a)
i-C ₅ H ₁₂	76...220 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
i-C ₅ H ₁₂	20...600 pmol/mol	win/spr 1992	AL	Jobson et al. (1994)
i-C ₅ H ₁₂	7.2...50.3 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
i-C ₅ H ₁₂		Apr 1994	AL, NW	Ariya et al. (1998)
i-C ₅ H ₁₂		Feb-Apr 1995	AL	Ariya et al. (1999)
i-C ₅ H ₁₂		Apr-May 1998	AL	Boudries and Bottenheim (2000)
i-C ₅ H ₁₂		1998, 2000	AL	Bottenheim et al. (2002a)
i-C ₅ H ₁₂		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
dimethylpropane		1983-1986	NA	Hov et al. (1989)
n-C ₆ H ₁₄		1982, 1983	NO	Hov et al. (1984)
n-C ₆ H ₁₄		1983-1986	NA	Hov et al. (1989)
n-C ₆ H ₁₄	35...139 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
n-C ₆ H ₁₄	7...200 pmol/mol	win/spr 1992	AL	Jobson et al. (1994)
n-C ₆ H ₁₄		Apr 1994	AL, NW	Ariya et al. (1998)
n-C ₆ H ₁₄		Feb-Apr 1995	AL	Ariya et al. (1999)
n-C ₆ H ₁₄		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
2-methylpentane		1982, 1983	NO	Hov et al. (1984)
2-methylpentane		1983-1986	NA	Hov et al. (1989)
2-methylpentane	7...200 pmol/mol	win/spr 1992	AL	Jobson et al. (1994)
2-methylpentane		Apr 1994	AL, NW	Ariya et al. (1998)
2-methylpentane		Feb-Apr 1995	AL	Ariya et al. (1999)
3-methylpentane		1982, 1983	NO	Hov et al. (1984)
3-methylpentane		1983-1986	NA	Hov et al. (1989)
3-methylpentane	42...98 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
3-methylpentane		Apr 1994	AL, NW	Ariya et al. (1998)
3-methylpentane		Feb-Apr 1995	AL	Ariya et al. (1999)
2,2-dimethylbutane		1983-1986	NA	Hov et al. (1989)
2,2-dimethylbutane	<2...82 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
cyclohexane		1982, 1983	NO	Hov et al. (1984)
methylcyclopentane	23...60 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)

species	value	date	site	reference
n-C ₇ H ₁₆	14. . . 50 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
n-C ₇ H ₁₆		Apr 1994	AL, NW	Ariya et al. (1998)
n-C ₇ H ₁₆		Feb-Apr 1995	AL	Ariya et al. (1999)
methylhexane	24. . . 60 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)

Organic: C, H (unsaturated)

C ₂ H ₄	mean: 360 pmol/mol	1982-1985	nm	Rudolph et al. (1989)
C ₂ H ₄		1982, 1983	NO	Hov et al. (1984)
C ₂ H ₄		1983-1986	NA	Hov et al. (1989)
C ₂ H ₄		1989-1994	NA	Solberg et al. (1996a)
C ₂ H ₄	330. . . 1000 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
C ₂ H ₄	mean: 40 pmol/mol	Apr 1989	AL	Kieser et al. (1993)
C ₂ H ₄	0. . . 1000 pmol/mol	win/spr 1992	AL	Jobson et al. (1994)
C ₂ H ₄		Mar-Jun 1993	NA	Solberg et al. (1996b)
C ₂ H ₄	23. . . 509 pmol/mol	Mar-May 1995	PF	Herring et al. (1997)
C ₂ H ₄	mean: 26 pmol/mol	Mar-May 1996	NA	Ramacher et al. (1999)
C ₂ H ₄		1998, 2000	AL	Bottenheim et al. (2002a)
C ₃ H ₆		1982, 1983	NO	Hov et al. (1984)
C ₃ H ₆	mean: 210 pmol/mol	1982-1985	nm	Rudolph et al. (1989)
C ₃ H ₆		1983-1986	NA	Hov et al. (1989)
C ₃ H ₆		1989-1994	NA	Solberg et al. (1996a)
C ₃ H ₆	160. . . 330 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
C ₃ H ₆	mean: 94 pmol/mol	Apr 1989	AL	Kieser et al. (1993)
C ₃ H ₆	mean: 117 pmol/mol	May 1989	AL	Kieser et al. (1993)
C ₃ H ₆	18. . . 169 pmol/mol	Mar-May 1995	PF	Herring et al. (1997)
1-butene	mean: 34 pmol/mol	Apr 1989	AL	Kieser et al. (1993)
1-butene	mean: 30 pmol/mol	May 1989	AL	Kieser et al. (1993)
cis-2-butene		1983-1986	NA	Hov et al. (1989)
trans-2-butene		1983-1986	NA	Hov et al. (1989)
isobutene		1983-1986	NA	Hov et al. (1989)
isobutene	mean: 77 pmol/mol	Apr 1989	AL	Kieser et al. (1993)
isobutene	mean: 115 pmol/mol	May 1989	AL	Kieser et al. (1993)
C ₂ H ₂		1982, 1983	NO	Hov et al. (1984)
C ₂ H ₂	mean: 11 pmol/mol	1982-1985	nm	Rudolph et al. (1989)
C ₂ H ₂		1983-1986	NA	Hov et al. (1989)
C ₂ H ₂		1989-1994	NA	Solberg et al. (1996a)
C ₂ H ₂	900. . . 1800 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
C ₂ H ₂	mean: 53 pmol/mol	Apr 1989	AL	Kieser et al. (1993)
C ₂ H ₂	mean: 80 pmol/mol	May 1989	AL	Kieser et al. (1993)
C ₂ H ₂		1992-1999	NA	Albrecht et al. (2002)
C ₂ H ₂	0. . . 1600 pmol/mol	win/spr 1992	AL	Jobson et al. (1994)
C ₂ H ₂		Mar-Jun 1993	NA	Solberg et al. (1996b)
C ₂ H ₂	bgr.: 123.0. . . 939.0 pmol/mol	Feb-May 1994	NA	Beine et al. (1997b)
C ₂ H ₂		Apr 1994	AL, NW	Ariya et al. (1998)
C ₂ H ₂		Feb-Apr 1995	AL	Ariya et al. (1999)
C ₂ H ₂	190. . . 1080 pmol/mol	Mar-May 1995	PF	Herring et al. (1997)
C ₂ H ₂	mean: 329 pmol/mol	Mar-May 1996	NA	Ramacher et al. (1999)
C ₂ H ₂		1997-1998	SU	Swanson et al. (2003)
C ₂ H ₂		Apr-May 1998	AL	Boudries and Bottenheim (2000)
C ₂ H ₂		1998, 2000	AL	Bottenheim et al. (2002a)
C ₂ H ₂		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
C ₂ H ₂		Feb-May 2000	ARC	Blake et al. (2003)
C ₂ H ₂	mean: 19 pmol/mol	2004-2005	ha	Read et al. (2006)
C ₃ H ₄		1983-1986	NA	Hov et al. (1989)
isoprene	0.6. . . 7.3 pmol/mol	Jan 1992	AL	Yokouchi et al. (1994)
isoprene	0.6. . . 10.3 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
benzene		1982, 1983	NO	Hov et al. (1984)
benzene	390. . . 470 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)

species	value	date	site	reference
benzene	200...400 pmol/mol	win/spr 1992	AL	Jobson et al. (1994)
benzene		Mar-Jun 1993	NA	Solberg et al. (1996b)
benzene		Apr 1994	AL, NW	Ariya et al. (1998)
benzene		Feb-Apr 1995	AL	Ariya et al. (1999)
benzene		Feb-May 2000	AL	Boudries et al. (2002)
benzene		Feb-May 2000	ARC	Blake et al. (2003)
toluene		1982, 1983	NO	Hov et al. (1984)
toluene	23...150 pmol/mol	Mar 1989	BA	Doskey and Gaffney (1992)
toluene		Apr 1994	AL, NW	Ariya et al. (1998)
toluene		Feb-Apr 1995	AL	Ariya et al. (1999)
total NMHC	5.6...15.7 nmolC/mol	Mar-May 1993	PF	Beine et al. (1996b)

Organic: C, H, O

CH ₃ OH		Feb-May 2000	AL	Boudries et al. (2002)
C ₂ H ₅ OH		Feb-May 2000	AL	Boudries et al. (2002)
HCHO	≤ 39 pmol/mol	spr 1988	AL	Bottenheim et al. (1990)
HCHO		1989-1994	NA	Solberg et al. (1996a)
HCHO	100...700 pmol/mol	win 1992	AL	de Serves (1994)
HCHO	30...600 pmol/mol	spr 1992	AL	de Serves (1994)
HCHO		1992-1999	NA	Albrecht et al. (2002)
HCHO	0.2...0.3 nmol/mol	1993-1994	ant	Fuhrer et al. (1996)
HCHO	mean: 0.3 nmol/mol	1993-1994	SU	Fuhrer et al. (1996)
HCHO	mean: 193 pmol/mol	Apr 1994	AL	Shepson et al. (1996)
HCHO	mean: 0.23 nmol/mol	Jun 1996	SU	Hutterli et al. (1999)
HCHO	0.03...0.7 nmol/mol	1997-1999	nm	Riedel et al. (1999)
HCHO	78...372 pmol/mol	Feb 1998	AL	Sumner and Shepson (1999)
HCHO	52...690 pmol/mol	Apr 1998	AL	Sumner and Shepson (1999)
HCHO		1998, 2000	AL	Sumner et al. (2002)
HCHO	0.74 nmol/mol	sum 1999	SU	Yang et al. (2002)
HCHO	mean: 103 pmol/mol	Dec 2000	sp	Hutterli et al. (2004)
HCHO	166 pmol/mol	2000	AL	Grannas et al. (2002)
HCHO		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
HCHO	30...420 pmol/mol	Jun-Jul 2000	SU	Jacobi et al. (2002)
HCHO	mean: 121 pmol/mol	Dec 2002	by	Frey et al. (2005)
HCHO	mean: 154 pmol/mol	Dec 2002	ant	Frey et al. (2005)
CH ₃ CHO	65 pmol/mol	spr 1988	AL	Bottenheim et al. (1990)
CH ₃ CHO		1989-1994	NA	Solberg et al. (1996a)
CH ₃ CHO	mean: 93 pmol/mol	Apr 1994	AL	Shepson et al. (1996)
CH ₃ CHO	53 pmol/mol	2000	AL	Grannas et al. (2002)
CH ₃ CHO		Feb-May 2000	AL	Boudries et al. (2002)
CH ₃ CHO		Mar-May 2000	AL	Guimbaud et al. (2002)
C ₂ H ₅ CHO		Feb-May 2000	AL	Boudries et al. (2002)
C ₃ H ₇ CHO		Feb-May 2000	AL	Boudries et al. (2002)
CH ₃ COCH ₃	393 pmol/mol	spr 1988	AL	Bottenheim et al. (1990)
CH ₃ COCH ₃		1989-1994	NA	Solberg et al. (1996a)
CH ₃ COCH ₃	901...1585 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
CH ₃ COCH ₃	mean: 1730 pmol/mol	Apr 1994	AL	Shepson et al. (1996)
CH ₃ COCH ₃	385 pmol/mol	2000	AL	Grannas et al. (2002)
CH ₃ COCH ₃		Feb-May 2000	AL	Boudries et al. (2002)
CH ₃ COCH ₃		Mar-May 2000	AL	Guimbaud et al. (2002)
CH ₃ COCH ₃		Mar-Apr 2005	BA	Tackett et al. (2006)
C ₂ H ₅ COCH ₃		Feb-May 2000	AL	Boudries et al. (2002)
C ₂ H ₅ COCH ₃		Mar-Apr 2005	BA	Tackett et al. (2006)
HCOOH		1994-1995	SU	Dibb et al. (1998)
HCOOH		Jun 2000	SU	Jacobi et al. (2004)
HCOOH	mean: 159 pmol/mol	Dec 2000	SU	Dibb and Arsenaault (2002)
HCOOH	mean: 460 pmol/mol	Jun-Jul 2000	SU	Dibb and Arsenaault (2002)
HCOOH	mean: 49 nmol/m ³ (STP)	Jun-Jul 1993	SU	Dibb et al. (1994)
CH ₃ COOH		1994-1995	SU	Dibb et al. (1998)

species	value	date	site	reference
CH ₃ COOH		Jun 2000	SU	Jacobi et al. (2004)
CH ₃ COOH	mean: 310 pmol/mol	Dec 2000	sp	Dibb and Arsenault (2002)
CH ₃ COOH	mean: 32 nmol/m ³ (STP)	Jun-Jul 1993	SU	Dibb et al. (1994)
CH ₃ COOH	mean: 445 pmol/mol	Jun-Jul 2000	SU	Dibb and Arsenault (2002)
CH ₃ OOH	<DL...0.89 nmol/mol	1997-1999	nm	Riedel et al. (2000)
CH ₃ OOH		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
CH ₃ OOH	mean: 317 pmol/mol	Dec 2001	ant	Frey et al. (2005)
CH ₃ OOH	mean: 426 pmol/mol	Dec 2002	by	Frey et al. (2005)
CH ₃ OOH	mean: 102 pmol/mol	Jan 2003	sp	Frey et al. (2005)
ROOH+H ₂ O ₂	10...40 pmol/mol	win 1992	AL	Yokouchi et al. (1994)
ROOH+H ₂ O ₂	100...400 pmol/mol	spr 1992	AL	Yokouchi et al. (1994)
RO ₂		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
RO ₂ +HO ₂		2000	sp	Mauldin III et al. (2004)
CO		1980-1982	BA	Khalil and Rasmussen (1983)
CO	mean: 131 nmol/mol	1988-1989	DY	Davidson et al. (1993b,a)
CO	52.3...302.0 nmol/mol	1992-1993	NA	Beine (1999)
CO	89...216 nmol/mol	Mar-May 1995	PF	Herring et al. (1997)
CO	90 nmol/mol	sum 1999	SU	Yang et al. (2002)
CO	110 nmol/mol	sum 2000	SU	Yang et al. (2002)
CO		Feb-Mar 2000	AL	Bottenheim et al. (2002b)
CO		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)

Organic: C, H, O, N

PAN	189...234 pmol/mol	Mar 1985	AL	Bottenheim et al. (1986)
PAN	200...500 pmol/mol	spr 1988	AL	Barrie and Delmas (1994)
PAN		Mar-Apr 1988	AL	Bottenheim et al. (1993)
PAN	150...600 pmol/mol	win/spr 1992	AL	Barrie et al. (1994a)
PAN	27...371 pmol/mol	Mar-May 1993	PF	Beine et al. (1996b)
PAN		Mar-Jun 1994	ARC	Jaeschke et al. (1997)
PAN	69.0...729.0 pmol/mol	Feb-May 1994	NA	Beine et al. (1997a)
PAN	19.7...1608.2 pmol/mol	1994-1996	NA	Beine and Krognnes (2000)
PAN	bgr.: 2.9 ...739.0 pmol/mol	Mar-May 1995	PF	Beine et al. (1997a)
PAN	100...420 pmol/mol	Mar 1998	NA	Jacobi et al. (1999)
PAN		1998-1999	SU	Ford et al. (2002)
PAN		1998-1999	SU	Dassau et al. (2004)
PAN		1998,2000	AL	Dassau et al. (2004)
PAN	mean: 13 pmol/mol	Jan-Feb 1999	nm	Jacobi et al. (2000)
PAN	mean: 18 pmol/mol	Mar 1999	ant	Jacobi and Schrems (1999)
PAN		Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
PPN	mean: 26 pmol/mol	Feb-May 1994	NA	Solberg et al. (1997a)
methyl nitrate	mean: 10 pmol/mol	Jan-Mar 1997	nm	Jones et al. (1999); Weller et al. (2002)
methyl nitrate		1997-1998	SU	Swanson et al. (2003)
methyl nitrate	mean: 9.5 pmol/mol	Feb 1999	nm	Weller et al. (2002)
methyl nitrate	mean: 84 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
methyl nitrate		2000	sp	Swanson et al. (2004)
methyl nitrate		Feb-May 2000	ARC	Blake et al. (2003)
ethyl nitrate	mean: 3 pmol/mol	Jan-Mar 1997	nm	Jones et al. (1999); Weller et al. (2002)
ethyl nitrate		1997-1998	SU	Swanson et al. (2003)
ethyl nitrate	mean: 2.3 pmol/mol	Feb 1999	nm	Weller et al. (2002)
ethyl nitrate	mean: 4.6 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
ethyl nitrate		2000	sp	Swanson et al. (2004)
ethyl nitrate		Feb-May 2000	ARC	Blake et al. (2003)
1-propyl nitrate	3.14...3.33 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)

species	value	date	site	reference
1-propyl nitrate		1997-1998	SU	Swanson et al. (2003)
1-propyl nitrate	mean: 1.1 pmol/mol	Feb 1999	nm	Weller et al. (2002)
1-propyl nitrate	mean: 1.1 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
2-propyl nitrate	12.44... 13.08 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
2-propyl nitrate		1997-1998	SU	Swanson et al. (2003)
2-propyl nitrate	mean: 1.2 pmol/mol	Feb 1999	nm	Weller et al. (2002)
2-propyl nitrate	mean: 0.7 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
2-propyl nitrate		2000	sp	Swanson et al. (2004)
2-propyl nitrate		Feb-May 2000	ARC	Blake et al. (2003)
1-butyl nitrate	1.18... 1.7 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
1-butyl nitrate	mean: 0.03 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
2-butyl nitrate	13.73... 18.41 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
2-butyl nitrate		1997-1998	SU	Swanson et al. (2003)
2-butyl nitrate	mean: 0.5 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
2-butyl nitrate		Feb-May 2000	ARC	Blake et al. (2003)
1-pentyl nitrate	0.53... 1.01 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
1-pentyl nitrate	mean: 0.7 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
2-pentyl nitrate	2.47... 5.44 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
2-pentyl nitrate	mean: < DL	Feb 1999	nm	Fischer et al. (2002)
3-pentyl nitrate	2.31... 4.31 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
3-pentyl nitrate	mean: 0.03 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
2-methyl-1-butyl nitrate	0.39... 0.77 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
3-methyl-1-butyl nitrate	0.30... 0.55 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
3-methyl-2-butyl nitrate	2.32... 4.84 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
1-hexyl nitrate	mean: 0.5 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
2-hexyl nitrate	0.98... 2.46 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
2-hexyl nitrate	mean: 1.0 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
3-hexyl nitrate	1.65... 4.27 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
3-hexyl nitrate	mean: 0.08 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
2-heptyl nitrate	0.56... 1.45 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
2-heptyl nitrate	mean: 0.18 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
3-heptyl nitrate	0.68... 1.86 pmol/mol	Jan-Apr 1992	AL	Muthuramu et al. (1994)
4-heptyl nitrate	mean: 0.02 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
alkyl nitrates	11... 66 pmol/mol	Mar-May 1993	PF	Beine et al. (1996b)
organic nitrates		Mar-Apr 1988	AL	Bottenheim et al. (1993)
organic nitrates	0... 2828.0 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
organic nitrates	mean: 1038.8 ng/m ³	Apr-May 2000	AL	Ianniello et al. (2002)
organic nitrates	mean: 309 ng/m ³	Feb 2000	AL	Ianniello et al. (2002)
hydroxy nitrates	mean: 1.1 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
organic dinitrates	mean: 5.9 pmol/mol	Feb 1999	nm	Fischer et al. (2002)

Chlorine (inorganic)

inorg-Cl	0... 500 pmol/mol	win/spr 1992	AL	Barrie et al. (1994a)
photolyzable Cl	<9... 100 pmol/mol	Feb-Apr 1995	AL	Impey et al. (1997)
photolyzable Cl		Mar-Apr 1997	AL	Impey et al. (1999)
gaseous Cl		1996-1999	NA	Hara et al. (2002a)
gaseous Cl		Mar-Apr 2000	NA	Hara et al. (2002b)
HCl	0... 303.6 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
HCl	mean: 11.3 ng/m ³	Feb 2000	AL	Ianniello et al. (2002)
HCl	mean: 32.7 ng/m ³	Apr-May 2000	AL	Ianniello et al. (2002)
HCl		2000-2001	du	Jourdain and Legrand (2002)
Cl atoms	$3.9 \times 10^3 \dots 7.7 \times 10^4 \text{ cm}^{-3}$	spr 1992	AL	Jobson et al. (1994)
Cl atoms	$3.8 \times 10^3 \dots 1.0 \times 10^4 \text{ cm}^{-3}$	spr 1992	AL	Muthuramu et al. (1994)
Cl atoms	$4.5 \times 10^3 \text{ cm}^{-3}$	spr 1994	NW	Ariya et al. (1998)
Cl atoms	$7.5 \times 10^4 \text{ cm}^{-3}$	Apr-May 1998	AL	Boudries and Bottenheim (2000)
Cl atoms	$1.7 \times 10^3 \dots 3.4 \times 10^4 \text{ cm}^{-3}$	2004-2005	ha	Read et al. (2006)
ClO		1995, 1996	NA	Tuckermann et al. (1997)

species	value	date	site	reference
OCIO	SCD	1995	mm	Kreher et al. (1997)
OCIO		Jan-May 1995	KA	Miller et al. (1997)
Cl ₂	< DL (2 pmol/mol)	Feb-Mar 2000	AL	Foster et al. (2001); Spicer et al. (2002)

Chlorine (organic)

org-Cl	1200...3400 pmol/mol	win/spr 1992	AL	Barrie et al. (1994a)
CH ₃ Cl		1980-1982	BA	Khalil and Rasmussen (1983)
CH ₃ Cl		1982, 1983	NO	Hov et al. (1984)
CH ₂ Cl ₂		1982, 1983	NO	Hov et al. (1984)
CH ₂ Cl ₂	53.4...69.8 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
CHCl ₃		1982, 1983	NO	Hov et al. (1984)
CHCl ₃	mean: 23.0 pmol/mol	1988-1989	DY	Davidson et al. (1993b,a)
CHCl ₃	9.7...15.8 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
CCl ₄		1982, 1983	NO	Hov et al. (1984)
CCl ₄	mean: 125 pmol/mol	1988-1989	DY	Davidson et al. (1993b,a)
CCl ₄	mean: 95 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
CH ₃ CCl ₃		1980-1982	BA	Khalil and Rasmussen (1983)
CH ₃ CCl ₃		1982, 1983	NO	Hov et al. (1984)
CH ₃ CCl ₃	mean: 211pmol/mol	1988-1989	DY	Davidson et al. (1993b,a)
CH ₃ CCl ₃	mean: 75 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
C ₂ Cl ₆	mean: 0.06 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
C ₂ HCl ₃		1980-1982	BA	Khalil and Rasmussen (1983)
C ₂ HCl ₃		1982, 1983	NO	Hov et al. (1984)
C ₂ HCl ₃	5.4...11.5 pmol/mol	Jan 1992	AL	Yokouchi et al. (1994)
C ₂ HCl ₃	0.5...4.3 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
C ₂ HCl ₃	0.1...1.2 pmol/mol	Apr 1992	SW	Hopper et al. (1994a)
C ₂ HCl ₃	0.17...4.77 pmol/mol	Apr 1992	ARC	Leitch et al. (1994)
C ₂ HCl ₃	mean: < DL	Feb 1999	nm	Fischer et al. (2002)
C ₂ Cl ₄		1980-1982	BA	Khalil and Rasmussen (1983)
C ₂ Cl ₄		1982, 1983	NO	Hov et al. (1984)
C ₂ Cl ₄	6.6...9.7 pmol/mol	Jan 1992	AL	Yokouchi et al. (1994)
C ₂ Cl ₄	4.3...9.5 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
C ₂ Cl ₄	6.08...15.05 pmol/mol	Apr 1992	ARC	Leitch et al. (1994)
C ₂ Cl ₄	mean: 0.3 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
chloroacetaldehyde		Jan-Apr 2005	BA	Keil and Shepson (2006)
chloroacetone		Jan-Apr 2005	BA	Keil and Shepson (2006)

Chlorine and Fluorine (organic)

CFCl ₃ (F11)		1980-1982	BA	Khalil and Rasmussen (1983)
CFCl ₃ (F11)		1982, 1983	NO	Hov et al. (1984)
CFCl ₃ (F11)	mean: 285 pmol/mol	1988-1989	DY	Davidson et al. (1993b,a)
CF ₂ Cl ₂ (F12)		1980-1982	BA	Khalil and Rasmussen (1983)
CF ₂ Cl ₂ (F12)		1982, 1983	NO	Hov et al. (1984)
CF ₂ Cl ₂ (F12)	mean: 465 pmol/mol	1988-1989	DY	Davidson et al. (1993b,a)
C ₂ F ₃ Cl ₃ (F113)		1982, 1983	NO	Hov et al. (1984)
C ₂ F ₃ Cl ₃ (F113)	mean: 44.6 pmol/mol	1988-1989	DY	Davidson et al. (1993b,a)
C ₂ F ₄ Cl ₂ (F114)		1982, 1983	NO	Hov et al. (1984)
CHF ₂ Cl		1980-1982	BA	Khalil and Rasmussen (1983)

Bromine (inorganic)

gaseous Br	7.4 ng/m ³ (STP)	Nov-Dec 1970	sp	Duce et al. (1973)
gaseous Br	7.9 ng/m ³ (STP)	Nov-Dec 1970	mm	Duce et al. (1973)
gaseous Br		1976-1980	BA	Berg et al. (1983)
gas-Br _x	0.3...61 pmol/mol	spr 1988	AL	Bottenheim et al. (1990)
inorg-Br	0...45 ng/m ³	Mar-Apr 1989	BA	Sturges et al. (1993c)
inorg-Br		Mar-Apr 1990	BA	Sturges et al. (1993b)
inorg-Br	<5...80 pmol/mol	win/spr 1992	AL	Barrie et al. (1994a)
photolyzable Br	<4...38 pmol/mol	Feb-Apr 1995	AL	Impey et al. (1997)
gaseous Br		1996-1999	NA	Hara et al. (2002a)

species	value	date	site	reference
soluble (g+aq)	bromide	Feb-May 2000	ARC	Ridley et al. (2003); Evans et al. (2003)
HBr	0...16.5 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
HBr	mean: 16.7 ng/m ³	Feb 2000	AL	Ianniello et al. (2002)
HBr	mean: 41.5 ng/m ³	Apr-May 2000	AL	Ianniello et al. (2002)
Br atoms	3.0×10 ⁶ ... 6.1×10 ⁷ cm ⁻³	spr 1992	AL	Jobson et al. (1994)
Br atoms	1.4×10 ⁷ cm ⁻³	Apr-May 1998	AL	Boudries and Bottenheim (2000)
Br atoms	1.4×10 ⁶ ... 2.9×10 ⁷ cm ⁻³	2004-2005	ha	Read et al. (2006)
BrO	<4...17 pmol/mol	Apr 1992	AL	Hausmann and Platt (1994)
BrO	SCD	1995	mm	Kreher et al. (1997)
BrO		Jan-May 1995	KA	Miller et al. (1997)
BrO		1995, 1996	NA	Tuckermann et al. (1997)
BrO		1995-1996	NA	Martinez et al. (1999)
BrO		Sep 1996	ant	Wagner and Platt (1998)
BrO		1997	ARC	Richter et al. (1998)
BrO		1997	ARC	Chance (1998)
BrO		1999-2000	nm	Frieß et al. (2004)
BrO		1999-2000	ARC, ant	Richter et al. (2002)
BrO		Apr-May 2000	AL	Hönninger and Platt (2002)
BrO		spr 2001	HU	Hönninger et al. (2004)
BrO	SCD	Sep-Oct 2002	mm	Schofield et al. (2006)
BrO	0...15 pmol/mol	spr 2004	AL	Morin et al. (2005)
BrO	SCD	2005	BA	Simpson et al. (2006)
HOBr		Mar-Apr 1997	AL	Impey et al. (1999)
Br ₂		Mar-Apr 1997	AL	Impey et al. (1999)
Br ₂	up to 25 pmol/mol	Feb-Mar 2000	AL	Foster et al. (2001); Spicer et al. (2002)
BrCl	up to 35 pmol/mol	Feb-Mar 2000	AL	Foster et al. (2001); Spicer et al. (2002)

Bromine (organic)

org-Br		Mar-Apr 1990	BA	Sturges et al. (1993b)
org-Br	9...80 pmol/mol	win/spr 1992	AL	Barrie et al. (1994a)
CH ₃ Br		1982, 1983	NO	Hov et al. (1984)
CH ₃ Br	11 pmol/mol	spr 1983	ARC	Berg et al. (1984)
CH ₃ Br	9.1...14.7 pmol/mol	all 1983	BA	Rasmussen and Khalil (1984)
CH ₃ Br		1985-1987	BA	Cicerone et al. (1988)
CH ₃ Br	7.5...9.5 pmol/mol	Nov 1989	mm	Sturges et al. (1993d)
CH ₃ Br		Feb-May 2000	ARC	Wingenter et al. (2003)
CH ₂ Br ₂	15 pmol/mol	spr 1983	ARC	Berg et al. (1984)
CH ₂ Br ₂	4.7...5.6 pmol/mol	all 1983	BA	Rasmussen and Khalil (1984)
CH ₂ Br ₂	0.1...1.48 pmol/mol	spr 1988	AL	Bottenheim et al. (1990)
CH ₂ Br ₂	≤0.1...1 pmol/mol	win/spr 1992	AL	Li et al. (1994)
CH ₂ Br ₂	0.5...1.0 pmol/mol	Jan 1992	AL	Yokouchi et al. (1994)
CH ₂ Br ₂	0.6...1.0 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
CH ₂ Br ₂	0.7...1.67 pmol/mol	Apr 1992	ARC	Leitch et al. (1994)
CH ₂ Br ₂	mean: 0.45 pmol/mol	Sep 1992	NA	Schall and Heumann (1993)
CH ₂ Br ₂	mean: 0.8 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
CHBr ₃	15 pmol/mol	spr 1983	ARC	Berg et al. (1984)
CHBr ₃	4...8 pmol/mol	all 1983	BA	Rasmussen and Khalil (1984)
CHBr ₃		1984-1987	ARC	Oltmans et al. (1989)
CHBr ₃		1984-1987	BA	Cicerone et al. (1988)
CHBr ₃	0.90...4.13 pmol/mol	spr 1988	AL	Bottenheim et al. (1990)
CHBr ₃	0.36...2.0 pmol/mol	Nov 1989	mm	Sturges et al. (1993d)
CHBr ₃	0...18 pmol/mol	Mar-Apr 1989	BA	Sturges et al. (1993c)
CHBr ₃	0.6...5 pmol/mol	win/spr 1992	AL	Li et al. (1994)
CHBr ₃	2.0...3.7 pmol/mol	Jan 1992	AL	Yokouchi et al. (1994)
CHBr ₃	0.9...3.2 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
CHBr ₃	0.93...3.1 pmol/mol	Apr 1992	ARC	Leitch et al. (1994)
CHBr ₃	mean: 0.45 pmol/mol	Sep 1992	NA	Schall and Heumann (1993)

species	value	date	site	reference
CHBr ₃	mean: 0.3 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
CHBr ₃		2000	sp	Swanson et al. (2004)
CHBr ₃		Mar 2004	HU	Carpenter et al. (2005)
C ₂ H ₄ Br ₂	0.10...0.25 pmol/mol	spr 1988	AL	Bottenheim et al. (1990)
CH ₂ BrCH ₂ Br	11 pmol/mol	spr 1983	ARC	Berg et al. (1984)
CH ₂ BrCH ₂ Br	1.0...1.9 pmol/mol	all 1983	BA	Rasmussen and Khalil (1984)
CH ₂ BrCH ₂ Br	mean: 0.1 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
bromoacetaldehyde		Jan-Apr 2005	BA	Keil and Shepson (2006)
bromoacetone		Jan-Apr 2005	BA	Keil and Shepson (2006)
CH ₂ BrCl	2.3...3.1 pmol/mol	all 1983	BA	Rasmussen and Khalil (1984)
CH ₂ BrCl	≤0.2 pmol/mol	win/spr 1992	AL	Li et al. (1994)
CH ₂ BrCl	0.15...0.34 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
CHBr ₂ Cl	0.17...0.53 pmol/mol	spr 1988	AL	Bottenheim et al. (1990)
CHBr ₂ Cl	0...1.6 pmol/mol	Mar-Apr 1989	BA	Sturges et al. (1993c)
CHBr ₂ Cl	0.06...0.4 pmol/mol	win/spr 1992	AL	Li et al. (1994)
CHBr ₂ Cl	0.1...0.5 pmol/mol	Jan 1992	AL	Yokouchi et al. (1994)
CHBr ₂ Cl	0.1...0.4 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
CHBr ₂ Cl	0.16...0.36 pmol/mol	Apr 1992	ARC	Leaitch et al. (1994)
CHBr ₂ Cl	mean: 0.33 pmol/mol	Sep 1992	NA	Schall and Heumann (1993)
CHBr ₂ Cl	mean: 0.02 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
CHBrCl ₂	0...1.6 pmol/mol	Mar-Apr 1989	BA	Sturges et al. (1993c)
CHBrCl ₂	0.11...0.39 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
CHBrCl ₂	0.3...1.3 pmol/mol	win/spr 1992	AL	Li et al. (1994)
CHBrCl ₂	0.38...0.73 pmol/mol	Apr 1992	ARC	Leaitch et al. (1994)
CHBrCl ₂	mean: 0.12 pmol/mol	Sep 1992	NA	Schall and Heumann (1993)
CHBrCl ₂	mean: 0.05 pmol/mol	Feb 1999	nm	Fischer et al. (2002)
CBrClF ₂	0.9...1.2 pmol/mol	all 1983	BA	Rasmussen and Khalil (1984)

Iodine (inorganic)

gaseous I	2.2 ng/m ³ (STP)	Nov-Dec 1970	nm	Duce et al. (1973)
gaseous I	2.7 ng/m ³ (STP)	Nov-Dec 1970	sp	Duce et al. (1973)
IO		1995-1996	NA	Tuckermann et al. (1997)
IO		1995-1998	NA	Wittrock et al. (2000)
IO	up to 10 pmol/mol	1999	nm	Frieß et al. (2001)
IO		May 2000	AL	Hönninger (2002)

Iodine (organic)

CH ₃ I		1982, 1983	NO	Hov et al. (1984)
CH ₃ I	0.9...1.4 pmol/mol	Jan 1992	AL	Yokouchi et al. (1994)
CH ₃ I	0.2...0.6 pmol/mol	Apr 1992	AL	Yokouchi et al. (1994)
CH ₃ I	mean: 1.04 pmol/mol	Sep 1992	NA	Schall and Heumann (1993)
CH ₃ I		2000	sp	Swanson et al. (2004)
CH ₂ I ₂	mean: 0.46 pmol/mol	Sep 1992	NA	Schall and Heumann (1993)
CH ₂ I ₂		Mar 2004	HU	Carpenter et al. (2005)
CH ₂ ICl	mean: 0.07 pmol/mol	Sep 1992	NA	Schall and Heumann (1993)
CH ₂ ICl		Mar 2004	HU	Carpenter et al. (2005)
CH ₂ IBr		Mar 2004	HU	Carpenter et al. (2005)
C ₃ H ₇ I	mean: 0.20 pmol/mol	Sep 1992	NA	Schall and Heumann (1993)
CH ₃ CHICH ₃	mean: 2.00 pmol/mol	Sep 1992	NA	Schall and Heumann (1993)

Sulfur (inorganic)

SO ₂	5...100 pmol/mol	Jun-Aug 1980	NO	Ockelmann and Georgii (1984)
SO ₂	5...100 pmol/mol	Jun-Aug 1980	ARC	Ockelmann and Georgii (1984)
SO ₂	100...200 pmol/mol	Nov/Dec 1981	IG	Hoff et al. (1983)
SO ₂	700...1300 pmol/mol	Feb 1982	IG	Hoff et al. (1983)
SO ₂	<110...590 pmol/mol	Apr 1982	IG	Barrie and Hoff (1984)
SO ₂	0...>1000 pmol/mol	Apr 1983	BA	Radke et al. (1984)
SO ₂	11 pmol/mol	Mar-Apr 1986	ant	Berresheim (1987)
SO ₂	6...1600 pmol/mol	spr 1988	AL	Bottenheim et al. (1990)
SO ₂		Mar-Apr 1988	AL	Bottenheim et al. (1993)

species	value	date	site	reference
SO ₂		Jun 1990	ARC	Ferek et al. (1995)
SO ₂		1990-2001	SN	Heidam et al. (2004)
SO ₂		Jan-Feb 1991	tn	Allegrini et al. (1994)
SO ₂		May-Oct 1991	BA	Ferek et al. (1995)
SO ₂	0... 5000 pmol/mol	win/spr 1992	AL	Barrie et al. (1994a)
SO ₂		Apr 1992	ARC	Ferek et al. (1995)
SO ₂	mean: 0.9 nmol/m ³ (STP)	Jun-Jul 1993	SU	Dibb et al. (1994)
SO ₂		Mar-Jun 1994	ARC	Jaeschke et al. (1997)
SO ₂		Aug 1994	SU	Dibb et al. (1996)
SO ₂		1995-1996	NA	Martinez et al. (1999)
SO ₂		1995, 1996	NA	Tuckermann et al. (1997)
SO ₂	0... 2592.7 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
SO ₂		1998-1999	du	Jourdain and Legrand (2001), Legrand et al. (2001)
SO ₂		Mar-Apr 2000	NA	Hara et al. (2002b)
SO ₂	mean: 1487.5 ng/m ³	Feb 2000	AL	Ianniello et al. (2002)
SO ₂	mean: 280.0 ng/m ³	Apr-May 2000	AL	Ianniello et al. (2002)
SO ₂		2000	sp	Huey et al. (2004)
SO ₂		2002-2005	NU	Skov et al. (2006)
H ₂ SO ₄	mean: 1.61×10 ⁶ cm ⁻³	Feb 1994	pa	Jefferson et al. (1998); Davis et al. (1998)
H ₂ SO ₄		2000	sp	Mauldin III et al. (2004)
H ₂ SO ₄		Feb-May 2000	ARC	Mauldin III et al. (2003)
Sulfur (organic)				
CH ₃ SCH ₃	96 pmol/mol	Mar-Apr 1986	ant	Berresheim (1987)
CH ₃ SCH ₃		Jun 1990	ARC	Ferek et al. (1995)
CH ₃ SCH ₃		May-Oct 1991	BA	Ferek et al. (1995)
CH ₃ SCH ₃	<0.3 pmol/mol	Jan-Apr 1992	AL	Yokouchi et al. (1994)
CH ₃ SCH ₃		Apr 1992	ARC	Ferek et al. (1995)
CH ₃ SCH ₃	mean: 119 pmol/mol	Jan-Feb 1994	pa	Berresheim et al. (1998)
CH ₃ SCH ₃		1998-1999	du	Jourdain and Legrand (2001), Legrand et al. (2001)
CH ₃ SCH ₃		2000	sp	Swanson et al. (2004)
CH ₃ SCH ₃	mean: 38.1 pmol/mol	2004-2005	ha	Read et al. (2006)
CH ₃ SOCH ₃		Jan 1994	pa	Davis et al. (1998)
CH ₃ SOCH ₃	mean: 2.3 pmol/mol	Jan-Feb 1994	pa	Berresheim et al. (1998)
CH ₃ SOCH ₃		1998-1999	du	Jourdain and Legrand (2001), Legrand et al. (2001)
CH ₃ SO ₂ CH ₃		Jan 1994	pa	Davis et al. (1998)
CH ₃ SO ₂ CH ₃	mean: 1.7 pmol/mol	Jan-Feb 1994	pa	Berresheim et al. (1998)
OCS		1982, 1983	NO	Hov et al. (1984)
MSA (gaseous)	mean: 9.5×10 ⁵ cm ⁻³	Feb 1994	pa	Jefferson et al. (1998); Davis et al. (1998)
MSA (gaseous)		Feb-May 2000	ARC	Mauldin III et al. (2003)
Mercury				
Hg	annual mean: 1.50... 1.79 ng/m ³	1994-2002	NA	Berg et al. (2004)
Hg (TGM)		1995	AL	Schroeder et al. (1998)
Hg (GEM)		1995-1999	AL	Banic et al. (2003)
Hg (GEM)	median: 1.58 ng/m ³	1995-2002	AL	Steffen et al. (2005)
Hg	mean: 1.26 ng/m ³	1996-1997	PS	Berg et al. (2001)
Hg	mean: 1.43 ng/m ³	1996-1997	NA	Berg et al. (2001)
Hg (GEM)		Apr-May 1998	AL	Lu et al. (2001)
Hg (GEM)		Apr 1998	BS	Banic et al. (2003)
Hg (GEM)		1998-2002	SN	Skov et al. (2004)
Hg (GEM)	median: 1.8 ng/m ³	1999-2000	KU	Steffen et al. (2005)
Hg (RGM)		1999-2000	BA	Lindberg et al. (2001)
Hg (GEM)		1999-2000	BA	Lindberg et al. (2001)

species	value	date	site	reference
Hg (GEM)		1999-2001	BA	Lindberg et al. (2002)
Hg (RGM)		1999-2001	BA	Lindberg et al. (2002)
Hg (GEM)		1999-2001	SN	Heidam et al. (2004)
Hg (GEM)	median: 1.47 ng/m ³	2000	NA	Berg et al. (2003)
Hg (RGM)		2000	NA	Berg et al. (2003)
Hg (GEM)		Feb-May 2000	AL	Steffen et al. (2002)
Hg		Feb-Mar 2000	AL	Bottenheim et al. (2002b)
Hg (TGM)		2000-2001	nm	Ebinghaus et al. (2002)
Hg (GEM)	median: 1.7 ng/m ³	2001-2003	AM	Steffen et al. (2005)
Hg (GEM)		Mar 2002	SN	Ferrari et al. (2004)
Hg (GEM,RGM)		Apr 2002	AL	Steffen et al. (2003)
Hg (TGM,RGM)		Apr-May 2002	NA	Sommar et al. (2007)
Hg (GEM,RGM)		Apr-May 2003	NA	Sprovieri et al. (2005a,b)
Hg (GEM)		Apr-May 2003	NA	Aspmo et al. (2005); Gauchard et al. (2005)
Hg (RGM)		Apr-May 2003	NA	Aspmo et al. (2005); Gauchard et al. (2005)
Hg (TGM)		Mar 2004	HU	Carpenter et al. (2005)
Hg (GEM)		Mar-Apr 2005	BA	Tackett et al. (2006)

species	value	date	site	reference
***** Aerosols *****				
Nitrogen				
NH ₄ ⁺		1979-1984	ARC	Barrie and Hoff (1985)
NH ₄ ⁺		1980-1995	AL	Sirois and Barrie (1999)
NH ₄ ⁺		Apr-May 1980	MB, IG	Barrie et al. (1981)
NH ₄ ⁺	115...1030 ng/m ³	Feb 1982	IG	Hoff et al. (1983)
NH ₄ ⁺		Mar-May 1986	BA	Li and Winchester (1989a,b)
NH ₄ ⁺	20...701 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
NH ₄ ⁺	mean: 180 ng/m ³	May 1989	AL	Kieser et al. (1993)
NH ₄ ⁺		1990-2001	SN	Heidam et al. (2004)
NH ₄ ⁺		1991-1995	du	Legrand et al. (1998)
NH ₄ ⁺		1991-1995	nm	Legrand et al. (1998)
NH ₄ ⁺		1991-1999	du	Jourdain and Legrand (2002)
NH ₄ ⁺	mean: 69 ng/m ³	May-Jul 1993	SU	Bergin et al. (1995)
NH ₄ ⁺		Jan 1994	du	Legrand et al. (1998)
NH ₄ ⁺		Aug 1994	SU	Dibb et al. (1996)
NH ₄ ⁺	0...969.6 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
NH ₄ ⁺	mean: 124.5 ng/m ³	Feb 2000	AL	Ianniello et al. (2002)
NH ₄ ⁺	mean: 89.9 ng/m ³	Apr-May 2000	AL	Ianniello et al. (2002)
NH ₄ ⁺	mean: 105 ng/m ³	Apr-May 2001	NA	Teinilä et al. (2003)
NH ₄ ⁺	mean: 108 ng/m ³	Feb-Mar 2001	NA	Teinilä et al. (2003)
NO ₂ ⁻	<23 ng/m ³	win/spr 1992	AL	Li (1994)
NO ₂ ⁻	<DL...20 pmol/mol	Feb-May 2001	NA	Beine et al. (2003)
NO ₂ ⁻	0...260.1 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
NO ₃ ⁻		1979-1984	ARC	Barrie and Hoff (1985)
NO ₃ ⁻		Apr-May 1980	MB, IG	Barrie et al. (1981)
NO ₃ ⁻	10...100 ng/m ³	1980-1988	AL	Barrie and Delmas (1994)
NO ₃ ⁻		1980-1995	AL	Sirois and Barrie (1999)
NO ₃ ⁻	17...260 ng/m ³	Feb 1982	IG	Hoff et al. (1983)
NO ₃ ⁻	30 ng/m ³	Apr 1983	BA	Radke et al. (1984)
NO ₃ ⁻		1983-1996	nm	Wagenbach et al. (1998b)
NO ₃ ⁻		Mar-May 1986	BA	Li and Winchester (1989a,b)
NO ₃ ⁻	7.1...245.7 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
NO ₃ ⁻		Mar-Apr 1988	AL	Bottenheim et al. (1993)
NO ₃ ⁻	mean: 189 ng/m ³	May 1989	AL	Kieser et al. (1993)
NO ₃ ⁻		Jan-Feb 1991	tn	Allegrini et al. (1994)
NO ₃ ⁻		1991-1995	du	Wagenbach et al. (1998b)
NO ₃ ⁻		1991-2001	du	Jourdain and Legrand (2002)
NO ₃ ⁻	30...400 ng/m ³	win/spr 1992	AL	Barrie et al. (1994a)
NO ₃ ⁻	mean: 26 ng/m ³	May-Jul 1993	SU	Bergin et al. (1995)
NO ₃ ⁻	mean: 0.06 nmol/m ³ (STP)	Jun-Jul 1993	SU	Dibb et al. (1994)
NO ₃ ⁻		Jan 1994	du	Legrand et al. (1998)
NO ₃ ⁻		Mar-Jun 1994	ARC	Jaeschke et al. (1997)
NO ₃ ⁻		Aug 1994	SU	Dibb et al. (1996)
NO ₃ ⁻		1996-1999	NA	Hara et al. (2002a)
NO ₃ ⁻	mean: 4 pmol/mol	Jan-Mar 1997	nm	Jones et al. (1999)
NO ₃ ⁻	0...3537.1 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
NO ₃ ⁻	mean: 39 ng/m ³	1998-1999	sp	Arimoto et al. (2001)
NO ₃ ⁻		1998, 2000	sp	Arimoto et al. (2004a)
NO ₃ ⁻	mean: 4.2 pmol/mol	Jan-Feb 1999	nm	Jacobi et al. (2000)
NO ₃ ⁻	mean: 81.3 ng/m ³	Feb 2000	AL	Ianniello et al. (2002)
NO ₃ ⁻		Mar-Apr 2000	NA	Hara et al. (2002b)
NO ₃ ⁻	mean: 137.4 ng/m ³	Apr-May 2000	AL	Ianniello et al. (2002)
NO ₃ ⁻		2001	du	Savarino et al. (2006)
NO ₃ ⁻		Jan-Dec 2001	ha	Rankin and Wolff (2003)
NO ₃ ⁻	mean: 59 ng/m ³	Feb-Mar 2001	NA	Teinilä et al. (2003)
NO ₃ ⁻	7...80 pmol/mol	Feb-May 2001	NA	Beine et al. (2003)
NO ₃ ⁻	mean: 65 ng/m ³	Apr-May 2001	NA	Teinilä et al. (2003)

species	value	date	site	reference
NO ₃ ⁻		spr 2004	AL	Morin et al. (2006)
Fluorine				
F		1979-1984	ARC	Barrie and Hoff (1985)
Chlorine				
Cl ⁻		Apr-May 1980	MB, IG	Barrie et al. (1981)
Cl ⁻		1980-1995	AL	Sirois and Barrie (1999)
Cl ⁻	149...563 ng/m ³	Feb 1982	IG	Hoff et al. (1983)
Cl ⁻	230 ng/m ³	Apr 1983	BA	Radke et al. (1984)
Cl ⁻		1983-1996	nm	Wagenbach et al. (1998a)
Cl ⁻		Mar-May 1986	BA	Li and Winchester (1989a,b)
Cl ⁻	mean: 286 ng/m ³	May 1989	AL	Kieser et al. (1993)
Cl ⁻		1991-1993	ha	Wagenbach et al. (1998a)
Cl ⁻		1991-1995	du	Wagenbach et al. (1998a)
Cl ⁻		1991-2001	du	Jourdain and Legrand (2002)
Cl ⁻		Jan 1994	du	Legrand et al. (1998)
Cl ⁻		Aug 1994	SU	Dibb et al. (1996)
Cl ⁻		1996-1999	NA	Hara et al. (2002a)
Cl ⁻	0...1391.0 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
Cl ⁻		1998, 2000	sp	Arimoto et al. (2004a)
Cl ⁻	mean: 73.9 ng/m ³	Feb 2000	AL	Ianniello et al. (2002)
Cl ⁻	mean: 220.9 ng/m ³	Apr-May 2000	AL	Ianniello et al. (2002)
Cl ⁻		Jan-Dec 2001	ha	Rankin and Wolff (2003)
Cl ⁻	mean: 449 ng/m ³	Feb-Mar 2001	NA	Teinilä et al. (2003)
Cl ⁻	mean: 373 ng/m ³	Apr-May 2001	NA	Teinilä et al. (2003)
Cl	< 20...4000 ng/m ³ (STP)	Jan 1965	BA	Duce et al. (1966)
Cl	<0.01 ng/m ³ (STP)	Nov-Dec 1970	sp	Duce et al. (1973)
Cl	0.07 ng/m ³ (STP)	Nov-Dec 1970	mm	Duce et al. (1973)
Cl		1976-1980	BA	Berg et al. (1983)
Cl		1979-1980	ARC	Heidam (1985)
Cl		1979-1984	ARC	Barrie and Hoff (1985)
Cl	87.9...411 ng/m ³	Feb 1982	IG	Hoff et al. (1983)
Cl		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
Cl		spr 1983	ARC	Winchester et al. (1985)
Cl		1983-1986	NA, NO	Maenhaut et al. (1989)
Cl	<20...302 ng/m ³	spr 1983	ARC	Cahill and Eldred (1984)
Cl		1984-1987	PF	Sturges and Shaw (1993)
Cl	21...2575 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
Cl	0.028...55 ng/m ³	1988-1989	DY	Mosher et al. (1993)
Cl	0.53...20 ng/m ³	1988-1989	SU	Mosher et al. (1993)
Cl	0...1200 ng/m ³	win/spr 1992	AL	Barrie et al. (1994b)
Cl	mean: 34 ng/m ³	1998-1999	sp	Arimoto et al. (2001)
Cl	mean: 519.43 ng/m ³	2002-2005	NU	Skov et al. (2006)
Bromine				
Br ⁻		1983-1996	nm	Wagenbach et al. (1998a)
Br ⁻		Mar-May 1986	BA	Li and Winchester (1989a,b)
Br ⁻	1...54 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
Br ⁻	mean: 45 ng/m ³	May 1989	AL	Kieser et al. (1993)
Br ⁻		1991-1995	du	Wagenbach et al. (1998a)
Br ⁻	10...20 ng/m ³	win 1992	AL	Li et al. (1994)
Br ⁻	20...120 ng/m ³	spr 1992	AL	Li et al. (1994)
Br ⁻		1996-1999	NA	Hara et al. (2002a)
Br ⁻	mean: 13.1 ng/m ³	Apr-May 2000	AL	Ianniello et al. (2002)
Br ⁻	mean: 5.2 ng/m ³	Feb 2000	AL	Ianniello et al. (2002)
Br	1...30 ng/m ³ (STP)	Jan 1965	BA	Duce et al. (1966)
Br	0.63 ng/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
Br	0.43 ng/m ³ (STP)	Nov-Dec 1970	sp	Duce et al. (1973)
Br	0.96 ng/m ³ (STP)	Nov-Dec 1970	mm	Duce et al. (1973)

species	value	date	site	reference
Br		1976-1980	ARC	Oltmans et al. (1989)
Br		1976-1980	BA	Berg et al. (1983)
Br		1977-1978	NA	Berg et al. (1983)
Br		1979-1980	ARC	Heidam (1985)
Br	4.2...10.4 ng/m ³	win 1979-84	AL	Sturges and Barrie (1988)
Br	9.0...27.8 ng/m ³	spr 1979-84	AL	Sturges and Barrie (1988)
Br	0.5...0.7 ng/m ³	Jun-Nov 1979-84	AL	Sturges and Barrie (1988)
Br	3.8...21.1 ng/m ³	win 1979-84	IG	Sturges and Barrie (1988)
Br	13.0...30.4 ng/m ³	spr 1979-84	IG	Sturges and Barrie (1988)
Br	1.4...3.8 ng/m ³	Jun-Nov 1979-84	IG	Sturges and Barrie (1988)
Br	3.4...14.5 ng/m ³	win 1979-84	MB	Sturges and Barrie (1988)
Br	20.5...54.6 ng/m ³	spr 1979-84	MB	Sturges and Barrie (1988)
Br		1979-1984	ARC	Barrie and Hoff (1985)
Br	<0.5...1.8 ng/m ³	Jun-Nov 1979-84	MB	Sturges and Barrie (1988)
Br		1980-1986	AL	Barrie and Barrie (1990)
Br		1980-1995	AL	Sirois and Barrie (1999)
Br	16.9...39.2 ng/m ³	Feb 1982	IG	Hoff et al. (1983)
Br	25...63 ng/m ³	Mar 1983	BA	Hansen and Rosen (1984)
Br		1983-1986	NA, NO	Maenhaut et al. (1989)
Br	monthly mean: ng/m ³	0...5 1984-1987	PF	Sturges and Shaw (1993)
Br	3.1...84.5 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
Br	0.02...5.0 ng/m ³	1988-1989	DY	Mosher et al. (1993)
Br	0.17...1.6 ng/m ³	1988-1989	SU	Mosher et al. (1993)
Br	0...260 ng/m ³	Mar-Apr 1989	BA	Sturges et al. (1993c)
Br		Mar-Apr 1990	BA	Sturges et al. (1993b)
Br	10...20 ng/m ³	win 1992	AL	Li et al. (1994)
Br	20...120 ng/m ³	spr 1992	AL	Li et al. (1994)
Br	4...100 ng/m ³	win/spr 1992	AL	Barrie et al. (1994a)
Br		1996	NA	Martinez et al. (1999)
filterable Br		1999-2002	SN	Skov et al. (2004)
Br	mean: 0.72 ng/m ³	2002-2005	NU	Skov et al. (2006)
BrO ₃ ⁻		1996-1999	NA	Hara et al. (2002a)

Iodine

I	0.3...10 ng/m ³ (STP)	Jan 1965	BA	Duce et al. (1966)
I	0.49 ng/m ³ (STP)	Nov-Dec 1970	sp	Duce et al. (1973)
I	0.93 ng/m ³ (STP)	Nov-Dec 1970	mm	Duce et al. (1973)
I		1976-1980	BA	Berg et al. (1983)
I		1979-1984	ARC	Barrie and Hoff (1985)
I		1980-1986	AL	Barrie and Barrie (1990)
I		1980-1995	AL	Sirois and Barrie (1999)
I	0.28...1.11 ng/m ³	Feb 1982	IG	Hoff et al. (1983)
I		1983-1986	NA, NO	Maenhaut et al. (1989)
I	monthly mean: ng/m ³	0...1 1984-1987	PF	Sturges and Shaw (1993)
I	0.34...2.62 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
I	0.017...1.2 ng/m ³	1988-1989	DY	Mosher et al. (1993)
I	0.14...0.89 ng/m ³	1988-1989	SU	Mosher et al. (1993)
I	0.3...2 ng/m ³	win/spr 1992	AL	Barrie et al. (1994b)
I		1996	NA	Martinez et al. (1999)

Sulfur

S		1979-1980	ARC	Heidam (1985)
SO ₄ ²⁻		1979-1984	ARC	Barrie and Hoff (1985)
SO ₄ ²⁻		Apr-May 1980	MB, IG	Barrie et al. (1981)
SO ₄ ²⁻		1980-1986	AL	Barrie and Barrie (1990)
SO ₄ ²⁻		1980-1995	AL	Sirois and Barrie (1999)
SO ₄ ²⁻	360...540 ng/m ³	Nov/Dec 1981	IG	Hoff et al. (1983)
SO ₄ ²⁻	560...2730 ng/m ³	Feb 1982	IG	Hoff et al. (1983)

species	value	date	site	reference
SO ₄ ²⁻	1460...3810 ng/m ³	Apr 1982	IG	Barrie and Hoff (1984)
SO ₄ ²⁻	384...4380 ng/m ³	Feb 1982	IG	Hoff et al. (1983)
S		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
S	185...1070 ng/m ³	spr 1983	ARC	Cahill and Eldred (1984)
S		spr 1983	ARC	Winchester et al. (1985)
SO ₄ ²⁻	mean: 3200 ng/m ³	Mar-Apr 1983	BA	Lazrus and Ferek (1984)
SO ₄ ²⁻	2600 ng/m ³	Apr 1983	BA	Radke et al. (1984)
S		1983-1986	NA, NO	Maenhaut et al. (1989)
nss-SO ₄ ²⁻		1983-1994	nm	Minikin et al. (1998)
nss-SO ₄ ²⁻		1983-1995	nm	Legrand and Pasteur (1998)
SO ₄ ²⁻		1983-1996	nm	Wagenbach et al. (1998a)
SO ₄ ²⁻		Mar-May 1986	BA	Li and Winchester (1989a,b)
nss-SO ₄ ²⁻	0.31 nmol/m ³	Mar-Apr 1986	ant	Berresheim (1987)
SO ₄ ²⁻	440...5870 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
SO ₄ ²⁻		Mar-Apr 1988	AL	Bottenheim et al. (1993)
SO ₄ ²⁻	mean: 82 ng/m ³	1988-1989	DY	Davidson et al. (1993b,a); Jaffrezo et al. (1994)
SO ₄ ²⁻	mean: 1450 ng/m ³	May 1989	AL	Kieser et al. (1993)
nss-SO ₄ ²⁻		Jun 1990	ARC	Ferek et al. (1995)
SO ₄ ²⁻		1990-1991	SU	Jaffrezo et al. (1994)
SO ₄ ²⁻		1990-2001	SN	Heidam et al. (2004)
SO ₄ ²⁻		Jan-Feb 1991	tn	Allegrini et al. (1994)
nss-SO ₄ ²⁻		1991-1992	ha	Minikin et al. (1998)
nss-SO ₄ ²⁻		1991-1992	ha	Legrand and Pasteur (1998)
SO ₄ ²⁻		1991-1993	ha	Wagenbach et al. (1998a)
nss-SO ₄ ²⁻		1991-1995	du	Minikin et al. (1998)
SO ₄ ²⁻		1991-1995	du	Wagenbach et al. (1998a)
nss-SO ₄ ²⁻		1991-1995	nm	Legrand et al. (1998)
nss-SO ₄ ²⁻		1991-1996	du	Legrand and Pasteur (1998)
SO ₄ ²⁻		1991-2001	du	Jourdain and Legrand (2002)
SO ₄ ²⁻	720...7700 ng/m ³	win/spr 1992	AL	Barrie et al. (1994a)
nss-SO ₄ ²⁻		Apr 1992	ARC	Ferek et al. (1995)
SO ₄ ²⁻	mean: 120 ng/m ³	Jun-Jul 1992	SU	Bergin et al. (1994)
SO ₄ ²⁻		Mar-Jun 1993	NA	Solberg et al. (1996b)
SO ₄ ²⁻	mean: 402 ng/m ³	May-Jul 1993	SU	Bergin et al. (1995)
SO ₄ ²⁻	mean: 3.0 nmol/m ³ (STP)	Jun-Jul 1993	SU	Dibb et al. (1994)
SO ₄ ²⁻		Jan 1994	du	Legrand et al. (1998)
nss-SO ₄ ²⁻	mean: 69.1 pmol/mol	Jan-Feb 1994	pa	Berresheim et al. (1998)
SO ₄ ²⁻		Mar-Jun 1994	ARC	Jaeschke et al. (1997)
SO ₄ ²⁻		Aug 1994	SU	Dibb et al. (1996)
SO ₄ ²⁻	0...611.1 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
nss-SO ₄ ²⁻		1998-1999	du	Jourdain and Legrand (2001), Legrand et al. (2001)
SO ₄ ²⁻	mean: 224 ng/m ³	1998-1999	sp	Arimoto et al. (2001)
SO ₄ ²⁻		1998, 2000	sp	Arimoto et al. (2004a)
SO ₄ ²⁻	mean: 1111.1 ng/m ³	Feb 2000	AL	Ianniello et al. (2002)
SO ₄ ²⁻	mean: 746.3 ng/m ³	Apr-May 2000	AL	Ianniello et al. (2002)
SO ₄ ²⁻		Mar-Apr 2000	NA	Hara et al. (2002b)
nss-SO ₄ ²⁻		Jan-Dec 2001	ha	Rankin and Wolff (2003)
nss-SO ₄ ²⁻	mean: 929 ng/m ³	Feb-Mar 2001	NA	Teinilä et al. (2003)
nss-SO ₄ ²⁻	mean: 1430 ng/m ³	Apr-May 2001	NA	Teinilä et al. (2003)
S	mean: 119.31 ng/m ³	2002-2005	NU	Skov et al. (2006)
MSA		1980-1995	AL	Sirois and Barrie (1999)
MSA		1983-1994	nm	Minikin et al. (1998)
MSA		1983-1995	nm	Legrand and Pasteur (1998)
MSA	0.3...6 pmol/mol	1986-1988	AL	Li et al. (1993)
MSA		Mar-May 1986	BA	Li and Winchester (1989a,b)
MSA	0.27 nmol/m ³	Mar-Apr 1986	ant	Berresheim (1987)
MSA		sum 1988	ARC	Li et al. (1993)

species	value	date	site	reference
MSA	mean: 0.58 ng/m ³	1988-1989	DY	Davidson et al. (1993b,a); Jaffrezo et al. (1994); Li et al. (1993)
MSA	1...25 pmol/mol	Mar-Apr 1989	BA	Li et al. (1993)
MSA		1990-1991	SU	Jaffrezo et al. (1994)
MSA		1991-1992	ha	Minikin et al. (1998)
MSA		1991-1992	ha	Legrand and Pasteur (1998)
MSA		1991-1995	du	Minikin et al. (1998)
MSA		1991-1995	nm	Legrand et al. (1998)
MSA		1991-1996	du	Legrand and Pasteur (1998)
MSA		1991-2001	du	Jourdain and Legrand (2002)
MSA	mean: 3.2 ng/m ³	Jun-Jul 1992	SU	Bergin et al. (1994)
MSA	mean: 5.6 ng/m ³	May-Jul 1993	SU	Bergin et al. (1995)
MSA		Jan 1994	du	Legrand et al. (1998)
MSA	mean: 42.3 pmol/mol	Jan-Feb 1994	pa	Berresheim et al. (1998)
MSA		1998-1999	du	Jourdain and Legrand (2001), Legrand et al. (2001)
MSA	mean: 12 ng/m ³	1998-1999	sp	Arimoto et al. (2001)
MSA		1998, 2000	sp	Arimoto et al. (2004a)
MSA		Jan-Dec 2001	ha	Rankin and Wolff (2003)
MSA	mean: 50 ng/m ³	Apr-May 2001	NA	Teinilä et al. (2003)

Carbon

black carbon	206...295 ng/m ³	Mar 1983	BA	Hansen and Rosen (1984)
black carbon		1989-1990	AL	Hopper et al. (1994b)
black carbon		1989-2003	AL	Sharma et al. (2006)
black carbon		1989-2003	BA	Sharma et al. (2006)
black carbon		1992-1995	ha	Wolff and Cachier (1998)
black carbon		Feb-Mar 2000	AL	Bottenheim et al. (2002b)
oxalic acid		1991-1995	du	Legrand et al. (1998)
oxalic acid		1991-2001	du	Jourdain and Legrand (2002)
oxalic acid		Jan 1994	du	Legrand et al. (1998)
oxalic acid		Aug 1994	SU	Dibb et al. (1996)
oxalic acid		Feb-May 2000	AL	Narukawa et al. (2002)
oxalic acid	mean: 8.6 ng/m ³	Apr-May 2001	NA	Teinilä et al. (2003)
oxalic acid	mean: 9.0 ng/m ³	Feb-Mar 2001	NA	Teinilä et al. (2003)
malonic acid		Feb-May 2000	AL	Narukawa et al. (2002)
succinic acid		Feb-May 2000	AL	Narukawa et al. (2002)
glutaric acid		Feb-May 2000	AL	Narukawa et al. (2002)
adipic acid		Feb-May 2000	AL	Narukawa et al. (2002)
pimelic acid		Feb-May 2000	AL	Narukawa et al. (2002)
suberic acid		Feb-May 2000	AL	Narukawa et al. (2002)
azelaic acid		Feb-May 2000	AL	Narukawa et al. (2002)
sebacic acid		Feb-May 2000	AL	Narukawa et al. (2002)
undecanedioic acid		Feb-May 2000	AL	Narukawa et al. (2002)
methylmalonic acid		Feb-May 2000	AL	Narukawa et al. (2002)
methylsuccinic acid		Feb-May 2000	AL	Narukawa et al. (2002)
2-methylglutaric acid		Feb-May 2000	AL	Narukawa et al. (2002)
4-ketopimelic acid		Feb-May 2000	AL	Narukawa et al. (2002)
maleic acid		Feb-May 2000	AL	Narukawa et al. (2002)
fumaric acid		Feb-May 2000	AL	Narukawa et al. (2002)
methylmaleic acid		Feb-May 2000	AL	Narukawa et al. (2002)
methylfumaric acid		Feb-May 2000	AL	Narukawa et al. (2002)
phthalic acid		Feb-May 2000	AL	Narukawa et al. (2002)
acetate		Mar-May 1986	BA	Li and Winchester (1989a,b)
acetate		Aug 1994	SU	Dibb et al. (1996)
acetate	mean: 0.16 nmol/m ³ (STP)	Jun-Jul 1993	SU	Dibb et al. (1994)
formate		Mar-May 1986	BA	Li and Winchester (1989a,b)
formate		Aug 1994	SU	Dibb et al. (1996)

species	value	date	site	reference
formate	mean: 1.05 nmol/m ³ (STP)	Jun-Jul 1993	SU	Dibb et al. (1994)
organic acids		1987-1988	AL	Kawamura and Kasukabe (1996)
propanoate		Mar-May 1986	BA	Li and Winchester (1989a,b)
pyruvate		Mar-May 1986	BA	Li and Winchester (1989a,b)

Metals

Al	0.57 ng/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
Al	mean: 30 ng/m ³ (win)	1976-1978	BA	Rahn and McCaffrey (1979)
Al		1979-1980	ARC	Heidam (1985)
Al		1979-1984	ARC	Barrie and Hoff (1985)
Al		1980-1986	AL	Barrie and Barrie (1990)
Al		1980-1995	AL	Sirois and Barrie (1999)
Al		1980-2000	AL	Gong and Barrie (2005)
Al		Apr-May 1980	MB, IG	Barrie et al. (1981)
Al		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
Al		1983-1986	NA, NO	Maenhaut et al. (1989)
Al		1984-1987	PF	Sturges and Shaw (1993)
Al	15...976 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
Al	mean: 4.2 ng/m ³	1988-1989	DY	Davidson et al. (1993b,a)
Al	mean: 5.5 ng/m ³	1988-1989	DY	Davidson et al. (1993b,a)
Al	0.29...260 ng/m ³	1988-1989	DY	Mosher et al. (1993)
Al	1.1...48 ng/m ³	1988-1989	SU	Mosher et al. (1993)
Al		1990-2001	SN	Heidam et al. (2004)
Al	mean: 44.36 ng/m ³	2002-2005	NU	Skov et al. (2006)
As		1984-1987	PF	Sturges and Shaw (1993)
As		1990-2001	SN	Heidam et al. (2004)
As	mean: 0.02 ng/m ³	2002-2005	NU	Skov et al. (2006)
Ba		1979-1984	ARC	Barrie and Hoff (1985)
Ba		1980-2000	AL	Gong and Barrie (2005)
Ba		1983-1986	NA, NO	Maenhaut et al. (1989)
Ca	0.5 ng/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
Ca	mean: 55 ng/m ³ (win)	1976-1978	BA	Rahn and McCaffrey (1979)
Ca		1979-1980	ARC	Heidam (1985)
Ca		1979-1984	ARC	Barrie and Hoff (1985)
Ca		1980-1995	AL	Sirois and Barrie (1999)
Ca		1980-2000	AL	Gong and Barrie (2005)
Ca		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
Ca ²⁺		1983-1996	nm	Wagenbach et al. (1998a)
Ca		1983-1986	NA, NO	Maenhaut et al. (1989)
Ca	19...915 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
Ca	mean: 2.7 ng/m ³	1988-1989	DY	Davidson et al. (1993b,a)
Ca	mean: 4.2 ng/m ³	1988-1989	DY	Davidson et al. (1993b,a)
Ca	0.095...170 ng/m ³	1988-1989	DY	Mosher et al. (1993)
Ca	0.5...110 ng/m ³	1988-1989	SU	Mosher et al. (1993)
Ca		1990-2001	SN	Heidam et al. (2004)
Ca ²⁺		1991-1995	du	Wagenbach et al. (1998a)
Ca ²⁺		1991-1999	du	Jourdain and Legrand (2002)
Ca ²⁺	mean: 29 ng/m ³	May-Jul 1993	SU	Bergin et al. (1995)
Ca ²⁺		Jan 1994	du	Legrand et al. (1998)
Ca ²⁺		Aug 1994	SU	Dibb et al. (1996)
nss-Ca ²⁺	mean: 32 ng/m ³	Apr-May 2001	NA	Teinilä et al. (2003)
nss-Ca ²⁺	mean: 8.7 ng/m ³	Feb-Mar 2001	NA	Teinilä et al. (2003)
Ca	mean: 51.66 ng/m ³	2002-2005	NU	Skov et al. (2006)
Cd	mean: 0.37 ng/m ³ (win)	1976-1978	BA	Rahn and McCaffrey (1979)
Cd	annual mean: 0.01...0.03 ng/m ³	1994-2002	NA	Berg et al. (2004)
Co	annual mean: 0.055...0.14 ng/m ³	1994-2002	NA	Berg et al. (2004)
Cr	5.3 pg/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
Cr		1979-1980	ARC	Heidam (1985)

species	value	date	site	reference
Cr		1979-1984	ARC	Barrie and Hoff (1985)
Cr		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
Cr		1983-1986	NA, NO	Maenhaut et al. (1989)
Cr	annual mean: 0.04...0.9 ng/m ³	1994-2002	NA	Berg et al. (2004)
Cr	mean: 0.11 ng/m ³	2002-2005	NU	Skov et al. (2006)
Cu	36 pg/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
Cu		1979-1980	ARC	Heidam (1985)
Cu		1979-1984	ARC	Barrie and Hoff (1985)
Cu		Apr-May 1980	MB, IG	Barrie et al. (1981)
Cu		1980-1995	AL	Sirois and Barrie (1999)
Cu		1980-2000	AL	Gong and Barrie (2005)
Cu		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
Cu		1983-1986	NA, NO	Maenhaut et al. (1989)
Cu		1990-2001	SN	Heidam et al. (2004)
Cu	annual mean: 0.25...0.41 ng/m ³	1994-2002	NA	Berg et al. (2004)
Cu	mean: 0.36 ng/m ³	2002-2005	NU	Skov et al. (2006)
Fe	0.84 ng/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
Fe		1979-1980	ARC	Heidam (1985)
Fe		1979-1984	ARC	Barrie and Hoff (1985)
Fe		1980-2000	AL	Gong and Barrie (2005)
Fe		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
Fe		1983-1986	NA, NO	Maenhaut et al. (1989)
Fe	0.1...260 ng/m ³	1988-1989	DY	Mosher et al. (1993)
Fe	0.45...44 ng/m ³	1988-1989	SU	Mosher et al. (1993)
Fe		1990-2001	SN	Heidam et al. (2004)
Fe	mean: 33.42 ng/m ³	2002-2005	NU	Skov et al. (2006)
Ga	mean: 0.02 ng/m ³	2002-2005	NU	Skov et al. (2006)
Hg	mean: < 0.4 ng/m ³ (win)	1976-1978	BA	Rahn and McCaffrey (1979)
Hg	mean: 1.44 pg/m ³	1996-1997	PS	Berg et al. (2001)
Hg	mean: 2.67 pg/m ³	1996-1997	NA	Berg et al. (2001)
Hg		Apr-May 1998	AL	Lu et al. (2001)
Hg		2000	sp	Arimoto et al. (2004b)
Hg		2000	NA	Berg et al. (2003)
Hg		Apr-Jun 2001	BA	Lindberg et al. (2002)
Hg		Apr 2002	AL	Steffen et al. (2003)
Hg		Apr-May 2002	NA	Sommar et al. (2007)
Hg		Apr-May 2003	NA	Sprovieri et al. (2005a,b)
Hg		Apr-May 2003	NA	Aspmo et al. (2005); Gauchard et al. (2005)
K	0.3 ng/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
K		1979-1980	ARC	Heidam (1985)
K ⁺		1980-1995	AL	Sirois and Barrie (1999)
K		1980-2000	AL	Gong and Barrie (2005)
K		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
K ⁺		1983-1996	nm	Wagenbach et al. (1998a)
K		1983-1986	NA, NO	Maenhaut et al. (1989)
K ⁺		Mar-May 1986	BA	Li and Winchester (1989a,b)
K ⁺	3.6...62.8 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
K ⁺	mean: 37 ng/m ³	May 1989	AL	Kieser et al. (1993)
K		1990-2001	SN	Heidam et al. (2004)
K ⁺		1991-1995	du	Wagenbach et al. (1998a)
K ⁺		1991-1999	du	Jourdain and Legrand (2002)
K ⁺	mean: 3.4 ng/m ³	May-Jul 1993	SU	Bergin et al. (1995)
K ⁺		Jan 1994	du	Legrand et al. (1998)
K ⁺		Aug 1994	SU	Dibb et al. (1996)
nss-K ⁺	mean: 6.0 ng/m ³	Apr-May 2001	NA	Teinilä et al. (2003)
nss-K ⁺	mean: 8.8 ng/m ³	Feb-Mar 2001	NA	Teinilä et al. (2003)
K	mean: 42.89 ng/m ³	2002-2005	NU	Skov et al. (2006)
Mg	1.0 ng/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)

species	value	date	site	reference
Mg	mean: 160 ng/m ³ (win)	1976-1978	BA	Rahn and McCaffrey (1979)
Mg		1979-1984	ARC	Barrie and Hoff (1985)
Mg		1980-1995	AL	Sirois and Barrie (1999)
Mg		1980-2000	AL	Gong and Barrie (2005)
Mg		1983-1986	NA, NO	Maenhaut et al. (1989)
Mg ²⁺		1983-1996	nm	Wagenbach et al. (1998a)
Mg	13...262 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
Mg	0.69...92 ng/m ³	1988-1989	DY	Mosher et al. (1993)
Mg	2.5...27 ng/m ³	1988-1989	SU	Mosher et al. (1993)
Mg ²⁺		1991-1993	ha	Wagenbach et al. (1998a)
Mg ²⁺		1991-1995	du	Wagenbach et al. (1998a)
Mg ²⁺	mean: 6.8 ng/m ³	May-Jul 1993	SU	Bergin et al. (1995)
Mg ²⁺		Jan 1994	du	Legrand et al. (1998)
Mg ²⁺		Aug 1994	SU	Dibb et al. (1996)
nss-Mg ²⁺	mean: 7.3 ng/m ³	Apr-May 2001	NA	Teinilä et al. (2003)
nss-Mg ²⁺	mean: 7.7 ng/m ³	Feb-Mar 2001	NA	Teinilä et al. (2003)
Mn	10.3 pg/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
Mn	mean: 1.12 ng/m ³ (win)	1976-1978	BA	Rahn and McCaffrey (1979)
Mn		1979-1980	ARC	Heidam (1985)
Mn		1979-1984	ARC	Barrie and Hoff (1985)
Mn		Apr-May 1980	MB, IG	Barrie et al. (1981)
Mn		1980-1995	AL	Sirois and Barrie (1999)
Mn		1980-2000	AL	Gong and Barrie (2005)
Mn		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
Mn		1983-1986	NA, NO	Maenhaut et al. (1989)
Mn	0.19...6.7 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
Mn	0.004...3.3 ng/m ³	1988-1989	DY	Mosher et al. (1993)
Mn	0.052...0.84 ng/m ³	1988-1989	SU	Mosher et al. (1993)
Mn		1990-2001	SN	Heidam et al. (2004)
Mn	annual mean: 0.24...0.57 ng/m ³	1994-2002	NA	Berg et al. (2004)
Mn	mean: 0.60 ng/m ³	2002-2005	NU	Skov et al. (2006)
Na	7.2 ng/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
Na	mean: 770 ng/m ³ (win)	1976-1978	BA	Rahn and McCaffrey (1979)
Na		1976-1980	BA	Berg et al. (1983)
Na		1979-1984	ARC	Barrie and Hoff (1985)
Na		1980-1986	AL	Barrie and Barrie (1990)
Na ⁺		1980-1995	AL	Sirois and Barrie (1999)
Na		1980-2000	AL	Gong and Barrie (2005)
Na ⁺		Apr-May 1980	MB, IG	Barrie et al. (1981)
Na ⁺	74...289 ng/m ³	Feb 1982	IG	Hoff et al. (1983)
Na	14...188 ng/m ³	Feb 1982	IG	Hoff et al. (1983)
Na	<40...236 ng/m ³	spr 1983	ARC	Cahill and Eldred (1984)
Na		1983-1986	NA, NO	Maenhaut et al. (1989)
Na ⁺		1983-1996	nm	Wagenbach et al. (1998a)
Na		1984-1987	PF	Sturges and Shaw (1993)
Na ⁺		Mar-May 1986	BA	Li and Winchester (1989a,b)
Na	24...1240 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
Na	0.1...300 ng/m ³	1988-1989	DY	Mosher et al. (1993)
Na	0.52...17.4 ng/m ³	1988-1989	SU	Mosher et al. (1993)
Na	mean: 8.0 ng/m ³	1988-1989	DY	Davidson et al. (1993b,a)
Na ⁺	mean: 117ng/m ³	May 1989	AL	Kieser et al. (1993)
Na ⁺		1991-1993	ha	Wagenbach et al. (1998a)
Na ⁺		1991-1995	du	Wagenbach et al. (1998a)
Na ⁺		1991-1999	du	Jourdain and Legrand (2002)
Na ⁺	mean: 14 ng/m ³	May-Jul 1993	SU	Bergin et al. (1995)
Na ⁺		1996-1999	NA	Hara et al. (2002a)
Na ⁺	0...1062.0 pmol/mol	1997-1999 (spr)	NA	Beine et al. (2001)
Na	mean: 45 ng/m ³	1998-1999	sp	Arimoto et al. (2001)
Na ⁺		1998, 2000	sp	Arimoto et al. (2004a)
Na ⁺	mean: 339.3 ng/m ³	Apr-May 2000	AL	Ianniello et al. (2002)

species	value	date	site	reference
Na ⁺	mean: 69.1 ng/m ³	Feb 2000	AL	Ianniello et al. (2002)
Na		Mar-Apr 2000	NA	Hara et al. (2002b)
Na		Jan-Dec 2001	ha	Rankin and Wolff (2003)
Na ⁺	mean: 312 ng/m ³	Feb-Mar 2001	NA	Teinilä et al. (2003)
Na ⁺	mean: 261 ng/m ³	Apr-May 2001	NA	Teinilä et al. (2003)
Ni		1979-1980	ARC	Heidam (1985)
Ni		1979-1984	ARC	Barrie and Hoff (1985)
Ni		Apr-May 1980	MB, IG	Barrie et al. (1981)
Ni		1980-2000	AL	Gong and Barrie (2005)
Ni		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
Ni		1983-1986	NA, NO	Maenhaut et al. (1989)
Ni		1990-2001	SN	Heidam et al. (2004)
Ni	annual mean: 0.07...0.19 ng/m ³	1994-2002	NA	Berg et al. (2004)
Ni	mean: 0.17 ng/m ³	2002-2005	NU	Skov et al. (2006)
Pb	0.63 ng/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
Pb		1979-1980	ARC	Heidam (1985)
Pb		1979-1984	ARC	Barrie and Hoff (1985)
Pb		Apr-May 1980	MB, IG	Barrie et al. (1981)
Pb		1980-1986	AL	Barrie and Barrie (1990)
Pb		1980-1995	AL	Sirois and Barrie (1999)
Pb		1980-2000	AL	Gong and Barrie (2005)
Pb		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
Pb		1983-1986	NA, NO	Maenhaut et al. (1989)
Pb		Feb-Mar 1990	BA	Sturges et al. (1993a)
Pb		1990-2001	SN	Heidam et al. (2004)
Pb	annual mean: 0.48...0.83 ng/m ³	1994-2002	NA	Berg et al. (2004)
Pb		2000	sp	Arimoto et al. (2004b)
Pb	mean: 0.48 ng/m ³	2002-2005	NU	Skov et al. (2006)
Rb	mean: 0.11 ng/m ³	2002-2005	NU	Skov et al. (2006)
Se		1983-1986	NA, NO	Maenhaut et al. (1989)
Se	monthly mean: 0.03...0.08 ng/m ³	1984-1987	PF	Sturges and Shaw (1993)
Se	mean: 0.05 ng/m ³	2002-2005	NU	Skov et al. (2006)
Si		1990-2001	SN	Heidam et al. (2004)
Si	mean: 143.46 ng/m ³	2002-2005	NU	Skov et al. (2006)
Sr		1979-1980	ARC	Heidam (1985)
Sr		1979-1984	ARC	Barrie and Hoff (1985)
Sr		1983-1986	NA, NO	Maenhaut et al. (1989)
Sr		1990-2001	SN	Heidam et al. (2004)
Sr	mean: 0.79 ng/m ³	2002-2005	NU	Skov et al. (2006)
Ti		1979-1984	ARC	Barrie and Hoff (1985)
Ti		1980-2000	AL	Gong and Barrie (2005)
Ti		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
Ti		1983-1986	NA, NO	Maenhaut et al. (1989)
Ti		1990-2001	SN	Heidam et al. (2004)
Ti	mean: 3.09 ng/m ³	2002-2005	NU	Skov et al. (2006)
V	1.5 pg/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
V	mean: 0.65 ng/m ³ (win)	1976-1978	BA	Rahn and McCaffrey (1979)
V		1979-1984	ARC	Barrie and Hoff (1985)
V		Apr-May 1980	MB, IG	Barrie et al. (1981)
V		1980-1995	AL	Sirois and Barrie (1999)
V		1980-2000	AL	Gong and Barrie (2005)
V		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
V		1983-1986	NA, NO	Maenhaut et al. (1989)
V		1984-1987	PF	Sturges and Shaw (1993)
V	0.05...1.72 ng/m ³	spr 1988	AL	Bottenheim et al. (1990)
V	0.014...5.5 ng/m ³	1988-1989	DY	Mosher et al. (1993)
V	0.006...25 ng/m ³	1988-1989	SU	Mosher et al. (1993)

species	value	date	site	reference
V		1990-2001	SN	Heidam et al. (2004)
V	annual mean: 0.07...0.20 ng/m ³	1994-2002	NA	Berg et al. (2004)
V	mean: 0.17 ng/m ³	2002-2005	NU	Skov et al. (2006)
Zn	30 pg/m ³ (STP)	Oct 1970	sp	Zoller et al. (1974)
Zn	mean: 14.8 ng/m ³ (win)	1976-1978	BA	Rahn and McCaffrey (1979)
Zn		1979-1980	ARC	Heidam (1985)
Zn		1979-1984	ARC	Barrie and Hoff (1985)
Zn		Apr-May 1980	MB, IG	Barrie et al. (1981)
Zn		1980-1995	AL	Sirois and Barrie (1999)
Zn		1980-2000	AL	Gong and Barrie (2005)
Zn		Aug-Sep 1983	ARC	Pacyna and Ottar (1985)
Zn		1983-1986	NA, NO	Maenhaut et al. (1989)
Zn	mean: 0.63 ng/m ³	1988-1989	DY	Davidson et al. (1993b,a)
Zn		1990-2001	SN	Heidam et al. (2004)
Zn	annual mean: 1.2...1.9 ng/m ³	1994-2002	NA	Berg et al. (2004)
Zn	mean: 2.62 ng/m ³	2002-2005	NU	Skov et al. (2006)
Zr	mean: 0.10 ng/m ³	2002-2005	NU	Skov et al. (2006)

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