

Shading indicates activities that are no longer active

Ia. Long-Term Measurement Activities (Listed according to Station Latitude)

Northern Hemisphere High-Latitude Stations (60°N - 90°N)

Alert, Canada (82.50°N, 62.33°W)

Sondes (Aerosol)	D. Tarasick (EC) and J. Rosen (U. Wyoming) – Backscatter measurements of aerosol profiles available for the winter from 1989 to 1993.
Sondes (Ozone)	D. Tarasick (EC) – ECC sondes launched weekly since 1987.

Heiss Island, Russia (80.6°N, 58.1°E)

Sondes (Aerosol)	J. Rosen (U. Wyoming) and V. Khattatov (CAO) – Backscatter measurements of aerosol profiles available for the winter from 1989 to 1992.
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Eureka, Canada (80.05°N, 86.42°W)

Dobson/Brewer	V. Fioletov and C. T. McElroy (EC) – Brewer measurements when sunlit conditions permit beginning in January 1991. Brewer measurements are currently being conducted at the nearby Eureka weather station (79.99°N, 85.90°W).
FTIR	H. Fast (EC) and K. Shibata (MRI) – Bomem DA8 system (0.004 cm ⁻¹ resolution) deployed in February 1993 and removed in February 2009. Intercompared with NPL mobile instrument in spring 1999. Operations were suspended from summer 2002 to winter 2004. Campaign operations from spring 2005 to spring 2008.
FTIR	K. Strong (U. Toronto) – Bruker 125HR (0.0027 cm ⁻¹ resolution, mid-infrared), installed in July 2006. Direct-sun solar absorption spectra are collected in a semi-automated way on clear-sky days from polar sunrise (approx. February 20) until polar sunset (approx. October 20). Three intercomparison campaigns with the Bomem DA8 FTIR (see above entry) were conducted prior to the removal of the DA8: February to April 2007, February to April 2008, and July 2007.

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Lidar (Aerosol)	T. Nagai (MRI) and O. Uchino (MRI) – Nd:YAG Lidar (1064 and 532 nm; dual polarization) deployed in February 1993. Operations were winter only. Operations were expanded to allow for tropospheric retrievals. Operations suspended after spring 2002.
Lidar (Ozone and Temperature)	K. Strawbridge (EC) – DIAL system (XeCl excimer laser similar to that at Toronto: 43.66°N, 79.40°W) deployed in February 1993 for winter season, nighttime only operations. Operation suspended for 2002 and 2003, and resumed in 2004. The system has five detection channels, four receiver channels (2 Raman, 2 Rayleigh) to improve the ozone profile in the presence of aerosols, and one channel for water vapor. Also retrieves temperature profiles in the stratosphere. Recent measurements have focused on the approximately 4-week period leading up to polar sunrise.
Sondes (Ozone)	D. Tarasick (EC) – ECC sondes launched once per week year-round beginning in November 1992, with two additional soundings per week in winter. Launches are currently taking place at the nearby Eureka weather station (79.99°N, 85.90°W, 10 masl).
UV/Vis Spectrometer	K. Strong (U. Toronto) – DOAS system (Jobin-Yvon Triax-180 triple-grating spectrometer with CCD detector) permanently installed in August 2006. Measures column O ₃ , NO ₂ , BrO, and OClO from polar sunrise (approx. February 20) until polar sunset (approx. October 20). Sun tracker installed in spring 2008 for direct sun and zenith-sky viewing. Springtime zenith-sky measurements were made on a campaign basis starting in 1999. Two intercomparison campaigns with a SAOZ instrument were conducted in spring 2007 and 2008.

Ny Ålesund, Spitsbergen (78.92°N, 11.93°E)

FTIR	J. Notholt (U. Bremen) and O Schrems (AWI) – Bruker 120M (0.004 cm ⁻¹ resolution), deployed 1992 to 1995. Replaced by Bruker 120HR (0.0028 cm ⁻¹ resolution) in 1995. Operates all year with lunar (polar night) observations added since December 1992.
Lidar (Aerosol and Temperature)	O. Schrems, R. Neuber, and M. Maturilli (AWI) – Multi-wavelength system (excimer and Nd:YAG) making winter measurements between 10 and 45 km since 1991. A four-channel receiver was added in 1999 for tropospheric aerosol and water vapor measurements.

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Lidar (Ozone)	R. Neuber, O. Schrems, and P. Von der Gathen (AWI) – Multi-wavelength system (excimer and Nd:YAG) making winter measurements between 13 and 45 km since 1991.
Microwave (ClO)	J. Notholt (U. Bremen) and O. Schrems (AWI) – Campaign operations in winter of 1993/94; permanent operation in winter/spring since 1995. Participated in a ClO radiometer intercomparison at Ny Ålesund in spring 1997. Data from 1995 to 2003.
Microwave (Ozone)	J. Notholt (U. Bremen) and O. Schrems (AWI) – Campaign operations in winters of 1992/93 and 1993/94; permanent operations since November 1994.
Sondes (Aerosol)	J. Rosen (U. Wyoming) – Backscatter measurements of aerosol profiles available from 1996 to 2003.
Sondes (Ozone)	P. von der Gathen (AWI) – Year-round soundings since 1992.
UV/Vis. Spectrometer	K. Stebel, C. Lund Myhre, and B. A. Kåstad Høiskar (NILU) – SAOZ NO ₂ and ozone system operating since September 1990.
UV/Vis. Spectrometer	J. P. Burrows and A. Richter (U. Bremen) – Measurements of ozone, NO ₂ , BrO, IO, and OClO from February to May and August to November. Participated in intercomparison at OHP in June 1996. Database extends to 1995.

Thule, Greenland (76.53°N, 68.74°W)

Dobson/Brewer	P. Eriksen (DMI) – Dobson spectrometer #092 operating at Qaanaaq for solar and lunar measurements beginning in 2000. Instrument completely refurbished and calibrated in 2004.
FTIR	M. Coffey and J. Hannigan (NCAR) – Bruker 120M (0.004 cm ⁻¹ resolution) installed at South Mountain in 1999, operating under autonomous control. Also capable of lunar observations. Operated an older instrument at Søndre Stromfjord (67.02°N, 50.72°W) during the 1994/95 winter for SESAME.
Lidar (Aerosol and Temperature)	G. Fiocco, D. Fuà, and A. di Sarra (U. Rome) – Winter-only measurements for two to three years beginning November 1990; year-round operation with daylight observations began July 1993. Did not operate in early 1998, late 1999, 2004, or 2005.

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Sondes (Aerosol)	J. Rosen (U. Wyoming) and N. Larsen (DMI) – Backscatter measurements of aerosol profiles available for January 1992 – December 1998.
Sondes (Ozone)	P. Eriksen (DMI) – Soundings made during campaigns. Database extends back to October 1991.
UV/Vis. Spectrometer	P. Eriksen (DMI) – SAOZ system for NO ₂ and ozone column measurements operating since September 1990.

Summit, Greenland (72.34°N, 38.29°W)

Sondes (Ozone)	S. Oltmans (ESRL/GMD) – Weekly soundings since February 2005. Daily launches in April and July, 2008.
Spectral UV	G. Bernhard and C. Booth (Biosperical Instr.) – Measurements of UV spectroradiometer irradiance, with an SUV-150B and GUV-511, initiated in August 2004.

Barrow, AK, USA (71.32°N, 156.68°W)

Spectral UV	G. Bernhard and C. Booth (Biosperical Instr.) – Measurements of UV spectroradiometer irradiance, with an SUV-100 and GUV-511, initiated in December 1990.
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Scoresbysund / Ittoqqortoormiit, Greenland (70.48°N, 21.97°W)

Sondes (Aerosol)	N. Larsen (DMI) and J. Rosen (U. Wyoming) – Backscatter measurements of aerosol profiles available for January 1994 – February 1996.
Sondes (Ozone)	P. Eriksen (DMI) – ECC sondes launched weekly since 1989.
UV/Vis. Spectrometer	A. Pazimo, F. Goutail, J. P. Pommereau (LATMOS-IPSL) and P. Eriksen (DMI) – SAOZ system for NO ₂ and O ₃ operated since October 1990, upgraded with a new detector in 1996.

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Andøya, Norway (69.3°N, 16.0°E)

Lidar (Ozone)	G. Hansen and K. Stebel (NILU) – DIAL system operated at ALOMAR Observatory since December 1994.
	A. Hauchecorne (LATMOS-IPSL) – Rayleigh/Mie/Raman system operated since 1995 at ALOMAR Observatory. Data archived for 1995 and 1996.

Kiruna, Sweden (67.84°N, 20.41°E)

FTIR	U. Raffalski (IRF), T. Blumenstock (IMK), and Y. Matsumi (STEL) – Bruker 120HR (0.002 cm ⁻¹ resolution) fitted with four detectors for solar and lunar measurements. Intercompared with the NPL instrument in March 1998.
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Sondes (Aerosol)	N. Larsen (DMI) and J. Rosen (U. Wyoming) – Backscatter measurements of aerosol profiles available for the winter from 1991 to 2002.
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UV/Vis. Spectrometer	P. V. Johnston and K. Kreher (NIWA) – Operating for NO ₂ and ozone since 1991; extended to BrO and OClO in 1997.
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Sodankylä, Finland (67.37°N, 26.65°E)

Dobson/Brewer	E. Kyrö (FMI) – Brewer #037 observations beginning May 1988.
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Sondes (Aerosol)	E. Kyrö (FMI) and J. Rosen (U. Wyoming) – Backscatter aerosol profile measurements available for the winter from 1994 - 2003.
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Sondes (Ozone)	E. Kyrö (FMI) – Year round soundings approximately once per week with additional launches during winter and campaigns.
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UV/Vis. Spectrometer	A. Pazmino, F. Goutail, and J. P. Pommereau (LATMOS-IPSL) and E. Kyrö (FMI) – SAOZ system for NO ₂ and O ₃ operated since February 1990, upgraded with a new detector in 1995.
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Søndre Strømfjord, Greenland (66.99°N, 50.95°W)

Dobson/Brewer	P. Eriksen (DMI) – Brewer #053 observations when sunlit conditions permit beginning in February 1998.
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Lidar (Temperature) C. Heinselmann (SRI) and J. Thayer (U. Colorado) – Rayleigh/Mie system in operation since November 1992. Presently operates year-round and has a daylight-measurement capability. Also retrieves backscatter-ratio profiles of noctilucent clouds and polar stratospheric clouds.

Zhigansk, Russia (66.8°N, 123.4°E)

UV/Vis. Spectrometer A. Pazmino, F. Goutail, and J. P. Pommereau (LATMOS-IPSL) and V. Dorokhov (CAO) – SAOZ system for NO₂ and O₃ operated since December 1991, upgraded with a new detector in September 2005.

Salekhard, Russia (66.5°N, 66.7°E)

Sondes (Ozone) V. Dorokhov (CAO) – Two launches per week from January to March since 1997.

UV/Vis. Spectrometer A. Pazmino, F. Goutail, and J. P. Pommereau (LATMOS-IPSL) and V. Dorokhov (CAO) – SAOZ system for NO₂ and O₃ operated since November 1998 (real time data only before January 2001).

Yakutsk, Russia (62.0°N, 129.7°E)

Sondes (Aerosol) J. Rosen (U. Wyoming) and V. Yushkov (CAO) – Backscatter measurements of aerosol profiles available for the winter from 1995 - 2003.

Sondes (Ozone) V. Dorokhov (CAO) – ECC sondes launched twice per week from January to March, and once per month from April to December. Program ran from 1995 - 2005.

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Harestua, Norway (60.2°, 10.8°E)

FTIR	J. Mellqvist, J. Klyft, and G. Persson (Chalmers U. Technology) – Bruker 120M (0.0035 cm ⁻¹ resolution) measurements conducted throughout the year, but mainly during winter at the Solar Observatory. Intercompared with the NPL instrument in September/October 1994. Upgraded to 125M in 2008-2009. Data available since late 1994. Current retrieval algorithm is SFIT2 v.3.93.
UV/Vis. Spectrometer	M. Van Roozendaal (IASB-BIRA) – Two DOAS systems (one for NO ₂ and ozone, the other for BrO and OCIO) operated during winter campaigns from January 1994 until March 1997, and continuously since January 1998.

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Northern Hemisphere Midlatitude Stations (30°N - 60°N)

Onsala, Sweden (57.4°N, 11.93°E)

Microwave (Water Vapor) P. Forkman, P. Eriksson, G. Elgered, D. Murtagh, and A. Winnberg (OSO) – Data from microwave (water vapor) 22-GHz radiometer operating at Onsala Space Observatory since 2002.

Zvenigorod, Russia (55.7°N, 36.8°E)

UV/Vis Spectrometer A. Gruzdev and A. Elokhov (IAP) – Morning and evening NO₂ measurements since 1990. Hosted instrument intercomparison in September 1997.

Bremen, Germany (53.1°N, 8.8°E)

FTIR J. Notholt (U. Bremen) – Bruker 120HR through 2003, Bruker 125HR since 2004. Maximum resolution 0.0028 cm⁻¹. Typically make one or two observations per week. Retrieval with SFIT2 and GFIT. The flat surroundings are conducive to satellite validation. The FTIR observations are complemented by microwave and DOAS measurements.

Legionowo, Poland (52.40°N, 20.97°E)

Sondes (Ozone) G. Zablocki and B. Kois, (IMGW) – ECC sondes launched weekly since June 1993. Additional sondes have been launched in concert with the MATCH campaigns and the Envisat/ SCIAMACHY validation program. Database extends back to 1979 with OSE sondes. The station's WMO number is 12374.

DeBilt, The Netherlands (52.10°N, 5.18°E)

Dobson/Brewer M. Allaart (KNMI) – Brewer No. 100.

Sondes (Ozone) M. Allaart (KNMI) – Database extends back to 1992.

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Aberystwyth, UK (52.4°N, 4.1°W)

Sondes (Ozone)	G. Vaughan (U. Manchester) – Soundings on a campaign basis from 1991 - 2001. Activity has been completed.
UV/Vis. Spectrometer	G. Vaughan (U. Manchester) – SAOZ system for NO ₂ and O ₃ operated since 1991. Also operated at Lerwick, UK (60.1°N, 1.1°E) and Aberdeen, UK (57°N, 2°W) during the EASOE (November 1991 to April 1992) and SESAME (February to April 1994) campaigns, respectively.

Valentia, Ireland (51.94°N, 10.25°W)

Dobson/Brewer	K. Lambkin (ME) - Brewer (#088) MkIV observations beginning January 1993.
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Uccle, Belgium (50.8°N, 4.35°E)

Dobson/Brewer	H. De Backer (RMIB) – Brewer #016 (1984 – present) and Dobson #040 measurements. Dobson #040 observations started in July 1971 and stopper at the end of May 2009. This instrument is being refurbished and will be relocated at Kiev, Ukraine under the responsibility of the University of Kiev.
Sondes (Ozone)	H. De Backer (RMIB) – Brewer-Mast sondes launched three times per week from 1969 to March 1997. Z-ECC sondes used since April 1997.

Villeneuve d'Ascq, France (50.65°N, 3.08°E)

Spectral UV	C. Brogniez (LOAL) – Measurements of UV spectroradiometer irradiance, with a double monochromator, initiated in May 1997, and continuous since then with some interruptions due to instrument problems. The instrument took part in the SUSPEN intercomparison campaign (July 1997), and the instrument validation project QASUME (September 2004).
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Praha, Czech Republic (50.01°N, 14.45°E)

Sondes (Ozone) P. Skrivankova (CHMI) - ECC sondes launched 3 times per week since January 1992 for profile measurements from 0 to 34 km. More frequent launches have occurred during campaigns.

Groß-Enzersdorf, Austria (48.20°N, 16.57°E)

Spectral UV S. Simic and M. Fitzka (BOKU-Met) – Measurements of spectral distribution of UV irradiance using Bentham radiometer.

Hohenpeissenberg, Germany (47.80°N, 11.02°E)

Dobson/Brewer U. Köhler (DWD) – Daily Dobson #104 observations beginning May 1967; since 1986 only on work days. Daily Brewer #010 observations since January 1984.

Lidar (Ozone and Temperature) H. Claude and W. Steinbrecht (DWD) – Ozone and temperature measurements from 15 to 50 km and 30 to 60 km, respectively, several times per month since October 1987.

Sondes (Ozone) H. Claude (DWD) – Observations with Brewer-Mast ozonesondes since 1967. One launch per week before 1978; 2 to 3 launches per week since 1978.

Garmisch, Germany (47.48°N, 11.06°E) / Zugspitze, Germany (47.42°N, 10.98°E)

FTIR R. Sussmann (IMK-IFU) – Bruker 120HR (0.0028 cm⁻¹ resolution) operating since 1995. Remote control of measurements implemented in early 1998. Column retrieval and a priori profile optimization fully automated.

Lidar (Aerosol) T. Trickl (IMK-IFU) – System at Garmisch similar to the instrument at Mauna Loa (19.54°N, 155.58°W); operated as a ruby system from 1976 to 1990 and as a Nd:YAG system since 1991.

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Spectral UV P. Werle (IMK-IFU) – Measurements of spectral distribution of UV irradiance using a double monochromator Bentham DTM300V since 1994 at Garmisch and since 1995 at Zugspitze. Work initiated at both sites for the ground truthing of satellite-derived UV maps. Garmisch operations were suspended in 2002. Prior to 2000, the PI for measurements at both sites was G. Seckmeyer and until 2002 S. Thiel.

Hoher Sonnblick, Austria (47.05°N, 12.95°E)

Spectral UV S. Simic and M. Fitzka (BOKU-Met) – Measurements of spectral distribution of UV irradiance using Bentham radiometer.

Bern, Switzerland (46.95°N, 7.45°E) / Zimmerwald, Switzerland (46.88°N, 7.47°E)

Microwave (Ozone) N. Kämpfer (U. Bern) – Volume mixing ratio profiles (20 to 80 km) since November 1994 at Bern. Site is 60 km from the Jungfrauoch. Intercompared with Payerne, Switzerland (46.8°N, 7.0°E) ozonesondes. In the long-term future, this instrument will be replaced. A new instrument is operating on a regular basis in Payerne.

Microwave (Water Vapor) N. Kämpfer (U. Bern) – Volume mixing ratio profiles (20 to 70 km) since late 2002 at Zimmerwald. Instrument validated against balloon sondes for 20 to 25 km, and against HALOE and POAM above 25 km. H₂O profiles will be provided with an integration time of 12 to 24 hours, weather permitting. For details, refer to <http://www.iapmw.unibe.ch/research/projects/MIAWARA/>

Payerne, Switzerland (46.82°N, 6.95°E)

Microwave (Ozone) D. Ruffieux and E. Maillard (MeteoSwiss) – Deployed from January 2000 to June 2002 in Bern (46.95°N, 7.45°E), prior to permanent siting at Payerne. The instrument provides 48 ozone profiles a day for altitudes ranging from 20 to 70 km.

Sondes (Ozone) R. Stübi and D. Ruffieux (MeteoSwiss) – Observations with Brewer Mast ozonesondes three times per week beginning November 1966.

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Arosa, Switzerland (46.78°N, 9.68°E)

Dobson/Brewer R. Stübi and H. Schill (MeteoSwiss) – Daily Dobson #101 observations beginning July 1926.

Jungfrauoch, Switzerland (46.55°N, 7.98°E)

FTIR P. Demoulin and E. Mahieu (U. Liège) – Double-pass grating instrument operated routinely from 1977 until October 1989 (limited data back to 1950). Two FTIR systems have been used since 1984 (a home-built unit with 2m maxOPD) and 1990 (Bruker 120HR with 5m maxOPD). Operated with support from M. De Mazière (IASB-BIRA). Remote control of the Bruker instrument fully operational since October 2008.

UV/Vis. Spectrometer M. Van Roozendaal (IASB-BIRA) – SAOZ system for NO₂ and ozone operated since June 1990. Upgraded with new detector (more pixels) and control system in late 1998.

Briançon, France (44.90°N, 6.65°E)

Spectral UV A. de la Casinière and T. Cabot (IRSA, UJF Grenoble) – Measurements of spectral UV irradiance with two instruments. The first UV spectroradiometer (SPUV02, JY DH10 system) was operational from 2000 to 2003. The instrument was intercompared at Huelva, Spain in 2002. The other UV spectroradiometer (IRSA, Bentham DM150 system) was operational from 2001 to 2005.

Observatoire de Bordeaux, France (44.83°N, 0.52°W)

Dobson/Brewer J. de La Noë (Bordeaux) – Daily Dobson #49 observations beginning in 1985, but previously carried out at Biscarosse (60 km from Bordeaux) from 1976 to 1983. Instrument moved to Observatoire Midi-Pyrénées/Lannemezan in September 2004.

Microwave (Ozone) J. de La Noë and N. Schneider (Bordeaux) – Profiles from 25 to 70 km obtained on a year-round basis since January 1995. Ceased operations in 2004.

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Moshiri, Japan (44.4°N, 142.3°E)

FTIR	T. Nagahama (STEL) – Bruker 120HR (0.0028 cm ⁻¹ resolution) operating at the Observatory since April 1996.
UV/Vis. Spectrometer	Y. Matsumi (STEL), M. Koike and Y. Kondo (U. Tokyo), and P. V. Johnston (NIWA) – Measurements of NO ₂ and ozone have been made at the Observatory available since 1991.

Observatoire Haute Provence, France (43.94°N, 5.71°E)

Dobson/Brewer	R. De Backer-Barilly (GSMA Reims)) and S. Oltmans (ESRL/GMD) – Total ozone and Umkehr database using Dobson instrument #085 extends back to 1983.
Lidar (Aerosol)	C. David and Ph. Keckhut (LATMOS-IPSL) – Began NDACC operations in March 1991 (stopped between April 2008 and July 2009).
Lidar (Ozone)	S. Godin-Beekmann (LATMOS-IPSL) – Began NDACC operations in January 1991. Database extends back to October 1986. New lidar system installed in 1994. Participated in July 1997 intercomparison with GSFC mobile lidar and ozonesondes.
Lidar (Temperature)	Ph. Keckhut and A. Hauchecorne (LATMOS-IPSL) – Began NDACC operations in January 1991. Database extends back to 1979. Participated in July 1997 intercomparison with GSFC mobile lidar and ozonesondes.
Lidar (Trop. Ozone)	G. Ancellet (LATMOS-IPSL) – Tropospheric ozone measurements; database extends back to 1990.
Sondes (Ozone)	S. Godin-Beekmann and G. Ancellet (LATMOS-IPSL) – Soundings conducted approximately once per week since 1986. Participated in July 1997 intercomparison with GSFC mobile lidar.
UV/Vis. Spectrometer	A. Pazmino, F. Goutail, and J. P. Pommereau (LATMOS-IPSL) – SAOZ system for NO ₂ and ozone operating since June 1992, upgraded with a new detector in June 1995; NDACC intercomparisons in 1992, 1995, 1996, and 2003.

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UV/Vis. Spectrometer	M. Van Roozendael (IASB-BIRA) – Zenith-sky measurements of BrO from 1998 until 2002. System upgraded to MAXDOAS in 2005 and continuously operated since then.
Spectral UV	C. Brogniez (LOAL) Benthal DM300 spectroradiometer installed in 2001.

Toronto, Canada (43.66°N, 79.40°W)

FTIR K. Strong (U. Toronto) - Bomem DA8 (0.004 cm⁻¹ resolution) installed October 2001; routine measurements since May 2002.

Lidar (Aerosol and Temperature) H. Fast (EC) – Year-round operation of Rayleigh system from late 1989 through April 2000.

Lidar (Ozone) H. Fast (EC) – DIAL system with year-round nighttime measurements from late 1990 through April 2000 and during the 2001/2002 winter; also retrieved aerosol and temperature profiles.

Rikubetsu, Japan (43.5°N, 143.8°E)

FTIR T. Nagahama (STEL) – Bruker 120M (0.004 cm⁻¹ resolution) installed in May 1995. Tested at Toyokawa (35°N, 137°E) from December 1994 to April 1995.

Microwave (Ozone) H. Nakane (NIES), A. Mizuno (STEL), T. Nagahama (STEL) – Profiles from 15 to 60 km obtained on a year-round basis since December 1999.

UV/Vis. Spectrometer Y. Matsumi (STEL), M. Koike and Y. Kondo (U. Tokyo), and P. V. Johnston (NIWA) – Measurements of NO₂ and ozone were made at the Observatory from March 1994 to October 1997.

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Observatoire Midi-Pyrénées/Lannemezan, France (43.12°N, 0.38°E)

Dobson/Brewer	P. Ricaud and S. Derrien (Univ. Paul Sabatier) – Daily Dobson #49 observations beginning in October 2004, continuing previous observations at Biscarosse (60 km from Bordeaux) from 1976 to 1983 and Observatoire de Bordeaux (44.83°N, 0.52°W) from 1985 to 2004.
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Issyk-Kul, Kyrgyz Republic (42.6°N, 77.0°E)

UV/Vis Spectrometer	V. Sinyakov (IEM) and V. Semenov (KNU) – Morning and evening NO ₂ measurements. Participated in 1997 intercomparison at Zvenigorod.
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Laramie, WY, USA (41.32°N, 105.67°W)

Sondes (Aerosol)	J. Rosen (U. Wyoming) – Backscatter measurements of aerosol profiles available for May 1989 – September 2000.
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Boulder, CO, USA (39.99°N, 105.26°W)

Dobson/Brewer	R. Evans and S. J. Oltmans (ESRL/GMD) – Daily Dobson #061 observations beginning September 1966.
Lidar (Aerosol)	J. E. Barnes, D. J. Hofmann, and M. S. O’Neill (ESRL/GMD) – Aerosol measurements using Nd:YAG system. The database for 532-nm backscatter extends back to January 2000.
Sondes (Ozone)	B. Johnson (ESRL/GMD) - Weekly ECC sondes since June 1991.
Spectral UV	D. J. Hofmann, S. J. Oltmans, and M. S. O’Neill (ESRL/GMD) and R. L. McKenzie (NIWA) – Measurements of spectral UV irradiance since June 1998. Three different NIWA double monochromators have been used. Three different sites have been used in and around Boulder. The present instrument has been in use since August 2001, and was included in the 2003 Table Mountain Facility UV Spectroradiometer Intercomparison.

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Wallops Island, VA, USA (37.94°N, 75.46°W)

Dobson/Brewer	F. J. Schmidlin (WFF) and R. Evans (ESRL/GMD) – Daily Dobson #038 observations beginning June 1967.
Sondes (Ozone)	F. J. Schmidlin (WFF) – ECC sondes have been launched since July 1967.

Tsukuba, Japan (36.05°N, 140.13°E)

Lidar (Ozone)	H. Nakane (NIES) – Permanent operation since mid-1988. Also retrieves temperature and aerosols.
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Kiso, Japan (35.8°N, 137.6°E)

UV/Vis. Spectrometer	Y. Kondo (U. Tokyo) and P. V. Johnston (NIWA) – Measurements of NO ₂ and ozone were made at the Observatory from 1992 to 1996.
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Table Mountain, CA, USA (34.4°N, 117.7°W)

Lidar (Aerosol)	I. S. McDermid, T. Leblanc, and T. D. Walsh (JPL) – Aerosol measurements at four wavelengths from July 1991 to 1998.
Lidar (Aerosol, Ozone, Temperature)	I. S. McDermid, T. Leblanc, and T. D. Walsh (JPL) – Aerosol, ozone, and temperature database extends back to February 1988. Instrument has been used for testing, research, and intercomparisons.
Lidar (Trop. Ozone)	I. S. McDermid, T. Leblanc, and T. D. Walsh (JPL) – Tropospheric ozone system operational since November 1999.
Microwave (Ozone)	A. Parrish (Millitech & U. MA), and I. S. Boyd and B. J. Connor (NIWA) – Deployed from August 1989 – June 1992 prior to permanent siting at Lauder.

Shading indicates activities that are no longer active

Microwave (Water Vapor) G. Nedoluha, R. M. Gomez, and R. Bevilacqua (NRL) – Instrument #1 (WVMS1) deployed from January to October 1992 and May to November 1993; WVMS3 deployed from September 1995 until March 1996 when it was deployed to Mauna Loa (19.54°N, 155.58°W); WVMS2 deployed September 1993 to November 1997 and operated intermittently from November 2003 to July 2008. WVMS4 replacement of WVMS2 began in July 2008 and has operated continuously from December 2008 to present.

San Diego, CA, USA (32.77°N, 117.20°W)

Spectral UV G. Bernhard and C. Booth (Biosperical Instr.) – Measurements of UV spectroradiometer irradiance, with an SUV-100 and GUV-511, initiated in November 1992.

Kitt Peak, AZ, USA (31.9°N, 111.6°W)

FTIR C. Rinsland (LaRC) – Continuous record of infrared solar spectra from 1978 to 2005 using the FTS (0.005 cm⁻¹ resolution) in the McMath Pierce Telescope. Operations resumed in 2009.

Shading indicates activities that are no longer active

Northern Hemisphere Subtropical and Tropical Stations (0°N - 30°N)

Izaña, Tenerife, Spain (28.30°N, 16.48°W)

Dobson/Brewer	A. Redondas and E. Cuevas (AEMET) – Brewer measurements initiated in May 1991 using a Mark II single monochromator. Replaced with a double Brewer #157 in July 1998.
FTIR	T. Blumenstock (IMK) – Measurements performed using a Bruker 120M (0.0035 cm ⁻¹ resolution) since February 1999. Replaced with a Bruker 120HR (0.0035 cm ⁻¹ resolution) in 2005.
Sondes (Ozone)	A. Redondas and E. Cuevas (AEMET) - Weekly ECC sondes since November 1992 for profile measurements from 0 to 34 km. More frequent launches have occurred during specific campaigns.
UV/Vis. Spectrometer	M. Gil (INTA) – Measurements conducted December 1998; continues the NO ₂ data set started in 1993 with a scanning spectrometer (that is still operating). Instrument certified for NO ₂ measurements during the 1996 OHP intercomparison. Also retrieve column abundances of ozone, H ₂ O, and O ₄ .

Mauna Kea, HI, USA (19.83°N, 155.48°W)

Microwave (ClO)	B. Conner and J. Kodak (SUNY) – One of three NDACC instruments developed by Millitech; in operation since 1992. Two instruments were intercompared at this site for 22 months from 1993 to 1995 prior to the Antarctic deployment of one of them (see Scott Base entry).
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Hilo, HI, USA (19.72°N, 155.07°W)

Sondes (Ozone)	B. Johnson and S. Oltmans (ESRL/GMD) – Weekly soundings since 1982.
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Mauna Loa, HI, USA (19.54°N, 155.58°W)

Dobson/Brewer	R. Evans and S. Oltmans (ESRL/GMD) – Daily Dobson #076 observations beginning December 1963, with about 20 Umkehr retrievals per month.
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Shading indicates activities that are no longer active

FTIR	<p>J. Hannigan and M. Coffey (NCAR) – Resumed measurements in 2009 with a new automated system and the same Bruker 120HR mentioned below.</p> <p>D. Murcray and R. Blatherwick (U. Denver) – Bomem DA8 (0.004 cm⁻¹ resolution) operated once per week from November 1991 to November 1995. Automated Bruker 120HR (0.0035 cm⁻¹ resolution) installed August 1995. Operations suspended in 2001, resumed briefly for 2003, then resumed intermittently from 2006 - 2009.</p>
Lidar (Aerosol and Temperature)	<p>I. S. McDermid, T. Leblanc, and T. D. Walsh (JPL) – Multi-wavelength system (ozone, temperature, and aerosol); deployed in July 1993.</p>
Lidar (Aerosol, Temperature, and Water Vapor)	<p>J. E. Barnes and D. J. Hofmann (ESRL/GMD) – Ruby and Nd:YAG systems; aerosol database extends back to 1974 for ruby system and April 1994 for Nd:YAG system; temperature retrievals began in June 1994. Ruby system ceased operations in January 1998. Nd:YAG system also retrieves water vapor and is a candidate NDACC measurement capability.</p>
Lidar (Ozone)	<p>I. S. McDermid, T. Leblanc, and T. D. Walsh (JPL) – Multi-wavelength system (ozone, temperature, and aerosol); deployed in July 1993.</p>
Microwave (Ozone)	<p>A. Parrish (Millitech & U. MA) and I. S. Boyd (NIWA) – One of two Millitech-built systems; installed in 1995 following testing and intercomparisons at Table Mountain Facility (34.4°N, 117.7°W). Participated in intercomparison at Mauna Loa in July 1995. Retrieving profiles from 20 to 64 km from July 1995 to April 1996 and continuing from August 1996.</p>
Microwave (Water Vapor)	<p>G. Nedoluha, R. Bevilacqua, and R. M. Gomez (NRL) – NRL Water Vapor Microwave Spectrometer #3 (WVMS3) operating since March 1996 following testing at Table Mountain Facility (34.4°N, 117.7°W).</p>
Spectral UV	<p>R. L. McKenzie and P. V. Johnston (NIWA) and D. J. Hofmann (ESRL/GMD) – Measurements of the spectral distribution of UV irradiance using a double monochromator initiated in 1995.</p>
UV/Vis. Spectrometer	<p>P. V. Johnston (NIWA) and D. J. Hofmann (ESRL/GMD) – NIWA system deployed in July 1996 for NO₂ and ozone; upgraded for BrO measurements in 1999. BrO instrument failed late 2003; restored with new, improved instrument June 2005.</p>

Shading indicates activities that are no longer active

Paramaribo, Surinam (5.75°N, 55.2°W)

Dobson/Brewer	M. Allaart (KNMI) and C. Becker (Met. Service, Paramaribo) – Continuous observations of total ozone and the UV spectrum, complemented by Umkehr zenith sky observations at dusk and dawn, have been made using a Brewer MkIII since April 1999.
Sondes (Ozone)	M. Allaart (KNMI) and C. Becker (Met. Service, Paramaribo) – Weekly balloon sondes launched year-round since September 1992, measuring profiles of ozone (ECC-6a cell), temperature, pressure, humidity, and wind (using GPS).

Tarawa, Kiribati Republic (1.4°N, 172.9°E)

UV/Vis. Spectrometer	A. Pazmino, F. Goutail, and J. P. Pommereau (LATMOS-IPSL) and P. V. Johnston (NIWA) – SAOZ system began operating in July 1992. Operations ceased in 1999. P. V. Johnston (NIWA) – NIWA system for NO ₂ and ozone operated beginning mid-1995. Measurements ceased in May 1999 due to a computer failure; future operations are uncertain.
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Shading indicates activities that are no longer active

Southern Hemisphere Subtropical and Tropical Stations (0°N - 30°S)

Natal, Brazil (5.83°S, 35.20°W)

Sondes (Aerosol)	J. Rosen (U. Wyoming) – Backscatter measurements of aerosol profiles available on a campaign basis for November 1995 to November 2003.
Sondes (Ozone)	F. J. Schmidlin (WFF) – Weekly ECC sondes since July 1967.

Ciater/Bandung, Indonesia (6.4°S, 107.4°E)

UV/Vis. Spectrometer	Y. Kondo (Tokyo U.) and W. A. Matthews (NIWA) – NIWA system for NO ₂ and ozone operated from August 1994 to 1998.
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Cape Matatula, American Samoa (14.25°S, 170.56°W)

Dobson/Brewer	R. Evans and S. J. Oltmans (ESRL/GMD) – Daily Dobson #042 observations beginning December 1975.
Sondes (Ozone)	B. Johnson (ESRL/GMD) - Weekly ECC sondes since June 1991.

Reunion Island, France (20.9°S, 55.5°E)

FTIR	M. De Mazière (IASB-BIRA) – Bruker 120M operating on a campaign basis since 2002. Installed at the St. Denis campus in 2009 for quasi-permanent operation. Bruker 125HR installation planned for Spring 2010. One of the instruments will be moved to Maito when the new NDACC building is complete, probably by the end of 2011.
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Lidar (Aerosol)	Ph. Keckhut and C. David (LATMOS) – Measurements since April 1994 using Nd:YAG system similar to that at OHP. Raman and polarization channels were added in November 1997. Operations temporarily suspended at present.
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Lidar (Ozone)	J. Leclair de Bellevue (U. de la Réunion) and S. Godin-Beekmann (LATMOS-IPSL) – Stratospheric ozone DIAL system installed in May 2000. Year-round ozone profiles from 15 to 45 km. Instrumental problems from 2002 to 2009.
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Shading indicates activities that are no longer active

Lidar (Temperature)	H. Bencherif (U. de la Réunion) and Ph. Keckhut (LATMOS-IPSL) – Measurements since April 1994 using Nd:YAG system similar to that at OHP. Raman and polarization channels were added in November 1997.
Sondes (Ozone)	F. Posny (U. de la Réunion) – Measurements since September 1992. Once every 2 weeks from 1992 – 1999; once per week since 1999. Receiving equipment and acquisition software replaced for Meteo Modem system in August 2007.
UV/Vis. Spectrometer	A. Pazmino, F. Goutail, and J. P. Pommereau (LATMOS-IPSL) – SAOZ system for NO ₂ and ozone operating since August 1993; upgraded with a new detector in 1997.

Bauru, Brazil (22.3°S, 49.0°W)

UV/Vis. Spectrometer	A. Pazmino, F. Goutail, and J. P. Pommereau (LATMOS-IPSL) and G. Held (UNESP) – SAOZ system for NO ₂ and ozone operating since November 1995; upgraded with a new detector in February 2001.
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Alice Springs, Australia (23.80°S, 133.87°E)

Spectral UV	R. L. McKenzie (NIWA) – Measurements of the spectral distribution of UV irradiance since 2005.
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Southern Hemisphere Midlatitude Stations (30° S - 60° S)

Wollongong, Australia (34.45°S, 150.88°E)

FTIR N. Jones and D. Griffith (U. Wollongong) – Operation of a Bruker HR 125 (0.004 cm⁻¹ from January 2008 to present. Operation of a Bomem DA8 (0.004 cm⁻¹ resolution) from May 1996 to January 2008. Measurements using a Bomem DA3 (0.02 cm⁻¹ resolution) from December 1994 to May 1996.

Lauder, New Zealand (45.04°S, 169.68°E)

Dobson/Brewer A. Thomas (NIWA) and R. Evans (ESRL/GMD) – Daily Dobson #072 observations beginning January 1987.

FTIR S. Wood (NIWA) – Bruker 120M (0.004 cm⁻¹ resolution) operating since August 1990; Bruker 120HR (0.0028 cm⁻¹ resolution) added in August 2000.

Lidar (Aerosol) B. Liley (NIWA) – Mobile Nd:YAG system operated extensively at Tsukuba (36.05°N, 140.13°E) for retrievals from 6 to 36 km; deployed at Lauder in November 1992. Operated weekly.

B. Liley (NIWA) – System used initially at Dumont d’Urville (66.67°S, 140.01°E). Aerosol profile data (5 to 35 km) available from 1994 to 1997. Operated weekly, but laser is failing. Data revision and update to follow that for Japanese lidar (see previous entry).

Lidar (Ozone, Aerosol, and Temperature) D. P. J. Swart (RIVM) and G. Bodeker (NIWA) – Installed November 1994. Participated in OPAL and TOPAL intercomparison campaigns with GSFC mobile lidar, LaRC microwave ozone radiometer, and ozonesondes in 1995 and 2002, respectively. New laser installed and retrieval software updated in 2007; all data reprocessed. Retrieving ozone from 8 to 50 km year-round. Also retrieves aerosols (8 to 25 km) and temperature (8 to 70 km) profiles.

Shading indicates activities that are no longer active

Microwave (Ozone)	A. Parrish (Millitech and U. MA), and I. S. Boyd and B. J. Connor (NIWA) – Retrieving profiles from 20 to 65 km from November 1992 to April 1993 and continuing from September 1993. Instrument is identical to Mauna Loa system and participated in intercomparisons at Table Mountain Facility (34.4°N, 117.7°W) in July 1989. Observatoire Haute Provence (43.94°N, 5.71°E) in July 1992, and Lauder in April 1995. This instrument also operated at Table Mountain Facility from July to November 1989 and from May 1990 to June 1992.
Microwave (Water Vapor)	G. Nedoluha, R. Bevilacqua, R. M. Gomez (NRL), and B. J. Connor (NIWA) – NRL WVMS1 deployed from November 1992 to April 1993 and January 1994 to present following tests and intercomparisons at Table Mountain Facility (34.4°N, 117.7°W); presently retrieving from 40 to 80 km.
Sondes (Aerosol)	J. Rosen (U. Wyoming) and B. Liley (NIWA) – Backscatter measurements of aerosol profiles (0 to 34 km) monthly from February 1994 – 1998; two to three times per year beginning in 1999. No current activity; funding ceased in 1999.
Sondes (Ozone)	A. Thomas (NIWA) – Weekly ECC sondes year-round since August 1986 for obtaining profiles of ozone, temperature, pressure, and winds from 0 to 32 km.
Spectral UV	R. L. McKenzie and P. V. Johnston (NIWA) – Measurements of the spectral distribution of UV irradiance using a double monochromator since December 1989. In November 1993, the original UVL spectrometer (JYDH10), which allowed observations only in fair-weather conditions, was replaced by the UVM spectrometer (Bentham DM300). In September 1998, the integrating sphere on this instrument was replaced by a PTFE diffuser to allow all-weather observations, including rain. There have been occasional periods of spectral sky radiance and spectral actinic flux observations. The latter also may be derived from spectral irradiance measurements. A variety of filter radiometers also have been used since 1992. Information regarding specific instruments and deployments are available from the PIs.
UV/Vis. Spectrometer	K. Kreher and P. V. Johnston (NIWA) – Zenith measurements of NO ₂ and ozone database extends back to 1980; BrO/OCIO since 1995; direct sun from 2001; MAXDOAS from 2004.

Shading indicates activities that are no longer active

Kerguelen Island (49.3°S, 70.3°E)

UV/Vis. Spectrometer A. Pazmino, F. Goutail, and J. P. Pommereau (LATMOS-IPSL) – SAOZ system for NO₂ and ozone operating since December 1995; upgraded with a new detector in January 2000.

Rio Gallegos, Argentina (51.60°S, 69.32°W)

Lidar (Ozone) E. Quel (CEILAP) – Ozone DIAL system with periodic measurements going back to 2005. Began official NDACC operations in 2008.

UV/Vis. Spectrometer A. Pazmino, F. Goutail, and J. P. Pommereau (LATMOS-IPSL) and E. Quel (CEILAP) – SAOZ system for NO₂ and ozone operating since March 2008.

Macquarie Island, Australia (54.50°S, 158.95°E)

UV/Vis. Spectrometer K. Kreher and P. V. Johnston (NIWA) – NIWA system for NO₂ and ozone moved to this location from Campbell Island, NZ (53.4°S, 169.0°E) in September 1995.

Ushuaia, Argentina (54.82°S, 68.32°W)

Spectral UV G. Bernhard and C. Booth (Biosperical Instr.) – Measurements of UV spectroradiometer irradiance, with an SUV-100 and GUV-511, initiated in November 1988.

Shading indicates activities that are no longer active

Southern Hemisphere High-Latitude Stations (60°S - 90°S)

Palmer, Antarctica (USA) (64.77°S, 64.05°W)

Spectral UV G. Bernhard and C. Booth (Biosperical Instr.) – Measurements of UV spectroradiometer irradiance, with an SUV-100 and GUV-511, initiated in May 1988.

Faraday, Antarctica (Ukraine) (65.25°S, 64.27°W)

UV/Vis. Spectrometer H. Roscoe (BAS) – SAOZ system for NO₂ and ozone operated at this location from January 1990 until the station closed in December 1995. System operating at Rothera, Antarctica (67.57°S, 68.13°W) since January 1996.

Dumont d'Urville, Antarctica (France) (66.67°S, 140.01°E)

Lidar (Aerosol) C. David (LATMOS-IPSL) and M. Snels (ISAC-CNR) – Operated from March through November from 1989. Data archived through 1998. Data from 1999 to 2002 poor quality due to instrument degradation. Instrument inactive since 2002. New lidar installed in January 2005. Operational since 2006.

Lidar (Ozone) M. Marchand (LATMOS-IPSL) and F. Cairo (ISAC- CNR) – Operated from 1991 to 2001 (data are archived under the responsibility of S. Godin-Beekmann). Operations ceased in 2001 due to instrument degradation. New lidar installed January 2005. System stopped in 2006 and 2007 due to failures; operational from March to November since 2008.

Lidar (Temperature) P. Keckhut (LATMOS-IPSL) – New instrument installed January 2005 (as above). Presently not NDACC affiliated.

Sondes (Ozone) M. Marchand (LATMOS-IPSL) – Approximately 25 soundings per year. Database extends back to 1990.

UV/Vis. Spectrometer A. Pazmino, F. Goutail, and J. P. Pommereau (LATMOS-IPSL) – SAOZ system for NO₂ and ozone operating since January 1988; upgraded with a new detector in 1994.

Shading indicates activities that are no longer active

Rothera, Antarctica (United Kingdom) (67.57°S, 68.13°W)

UV/Vis. Spectrometer H. Roscoe (BAS) – SAOZ system operated at Faraday (UK Antarctic Station: 65.25°S, 64.27°W) from January 1990 until the station closed in December 1995. System operating at this location since January 1996.

Syowa Base, Antarctica (Japan) (69.01°S, 39.59°E)

UV/Vis. Spectrometer Y. Kondo (Tokyo U.) and W. A. Matthews (NIWA) – NIWA system for NO₂ and ozone operated from 1990 - 1995.

Neumayer Station, Antarctica (Germany) (70.62°S, 8.37°E)

Sondes (Ozone) G. König-Lango and O. Schrems (AWI) – Vaisala ECC-6a sondes launched weekly since 1992, with increased frequency during Austral spring.

UV/Vis. Spectrometer U. Friess, and U. Platt (U. Heidelberg) - Dual-channel DOAS spectrograph installed in January 1999 for measuring ozone, NO₂, OClO, and BrO.

Dôme C/ Concordia, Antarctica (France) (75.1°S, 123.35°E)

UV/Vis. Spectrometer A. Pazmino, F. Goutail, and J. P. Pommereau (LATMOS-IPSL) – SAOZ system for NO₂ and ozone operating since January 2007.

Arrival Heights, Antarctica (New Zealand) (77.82°S, 166.65°E)

Dobson/Brewer S. Nichol and S. Wood (NIWA) – Daily Dobson #017 (sun and moon) observations beginning January 1988.

FTIR S. Wood (NIWA) – Bruker 120M (0.004 cm⁻¹ resolution) installed in December 1996; lunar operation upgrade in 1999. Earlier measurements dating back to 1987 were made using a Bomem DA2 (0.02 cm⁻¹ resolution) and an Eocom (0.06 cm⁻¹ resolution).

Sondes (Aerosol) J. Rosen (U. Wyoming) – Backscatter measurements of aerosol profiles available for November – December 1993.

Shading indicates activities that are no longer active

UV/Vis. Spectrometer K. Kreher (NIWA) – NIWA system with an NO₂ and ozone database extending back to 1982; OCIO since 1993; BrO since 1995; MAXDOAS since 2001.

McMurdo Station, Antarctica (USA) (77.85°S, 166.63°E)

Lidar (Aerosol) M. Snels (ISAC-CNR), F. Cairo (ISAC-CNR), and G. Di Donfrancesco (ENEA) – Database extends back to 1990. Measurements are made presently from February through October; year-round operations are being explored.

Sondes (Ozone) T. Deshler (U. Wyoming) – Database dates back to 1986; twice per week springtime measurements only except for 1994 when operations were conducted in the winter period as well.

Spectral UV G. Bernhard and C. Booth (Biospherical Instr.) – Measurements of UV spectroradiometer irradiance, with an SUV-100 and GUV-511, initiated in March 1988.

UV/Vis. Spectrometer S. Solomon (ESRL/CSD) – Database taken by R. Sanders (deceased) from February 1991 through February 1994 in the NDACC archive.

Scott Base, Antarctica (New Zealand) (77.85°S, 166.78°E)

Microwave (ClO) B. Connor and J. Koda (SUNY) – Millitech instrument deployed in January 1996 following measurements and intercomparisons at Mauna Kea (19.83°N, 155.48°W).

South Pole Station, Antarctica (USA) (90.00°S)

Dobson/Brewer R. Evans and S. Oltmans (ESRL/GMD) – Daily Dobson observations beginning November 1961. In 2004, Dobson No. 80 temporarily replaced Dobson No. 82, which will be recalibrated. No. 82 is scheduled for reinstallation in 2008.

Sondes (Ozone) B. Johnson and S. Oltmans (ESRL/GMD) – Approximately 75 soundings per year since 1986.

Shading indicates activities that are no longer active

Spectral UV

G. Bernhard and C. Booth (Biosperical Instr.) – Measurements of UV spectroradiometer irradiance, with an SUV-100 and GUV-541, initiated in February 1988.