

Steering Committee Meeting 2017 Report to IRWG

*Jim Hannigan, Thomas Blumenstock
&
Jeannette Wild*

SC Meeting in Boulder Nov 6-10 2017

Overview of 2017 Meeting:

- Short statement (or more) concerning each site
 - Funding, major issues & archive status from Site Report and SR forms
- Brief description of science presentations Update on upcoming satellite missions
 - MERLIN, IASI-NG, Sentinel-5 Precursor, MicroCarb, GeoCarb
- Update on FTIR Appendix-2
- Statement of IRWG publications (30 publications 2016 & 2017 to date)
- Update on Activities
 - H₂CO, Corinne
 - OCS, Jim
 - N₂O calibration cells, Frank
 - Global C₂H₆, Manu
 - TOAR / Lotus, Corinne
 - SSIRC Volcano response

1. Certification in process
 - a. [Addis Ababa, Ethiopia](#), Gizaw Mengistu Tsidu
 - i. Nicholas Jones, U Wollongong referee
 - b. [Paris, France](#), Dr Yao Te, LERMA
 - i. Corinne Vigouroux, BIRA referee
2. Ongoing interest
 - a. [Boulder](#), USA, J Hannigan
 - b. [Daejeon](#), S. Korea, Jeongsoon Lee, KRISS
 - c. [Hefei](#), China, Wei Wang, Youwen Sun, Anhui Institute of Optics and Fine Mechanics, Chinese Academy of Sciences
3. Recently introduced
 - a. Xianghe, China, Pucai Wang, Inst. of Atmos, Physics, Chinese Academy of Sci.
 - b. Xinglong, China, Pucai Wang
 - c. [Sodankyla](#), Finland, Rigel Kivi,
 - i. Submitted site report
4. Tsukuba, Japan, Isao Murata, Isamu Morino
 - a. Budget for operation/ now a bit unstable.
 - b. Not an official IRWG site
5. Temporary Site
 - a. Palau, Justus Notholt

Outstanding Issues

- CH₄ Line parameters
 - Sorely needed, current mix of linelists still exacerbate interference problems across sites (water vapor)
 - Currently reviewing recently released HITRAN 2016
 - G. Toon JPL, & M. Palm U Bremen
- HITRAN 2016 in general
 - All indications that we will adopt this list in 2018 (currently use HITRAN2008)
 - Will trigger a re-retrieval of all data
- Adoption of non-Voigt line profiles + parameters + incorporate into retrieval codes
 - Likely will necessitate an intercomparison of retrieval codes / workshop
- Roll of central processing
 - Loss of control of data & science & funding
 - Increase consistency, time for science, exploration especially for person-power limited groups
- Effects of budget cutting,
 - Continued mutual support
 - Search for opportunities
 - Upcoming satellite validation
 - Short term projects

Members:

- Anne Thompson re-elected co-chair
- Nis Jepsen replaces Neils Larson as Greenland representative
- Richard Querel replaces Paul Johnston as Lauder representative
- Amelie Driemel replaces Gert König-Langlo as BSRN representative
- Holger Schmithüsen replaces Gert König-Langlo as Neumayer representative
- Pucai Wang (IAP-CAS) and Tao Li (USTC) have accepted to be Chinese Representatives.

An EU and Korean representative are currently being sought

Updates on activities that affect NDACC & member groups:

- GAIA-CLIM - K Kreher
- ACTRIS / ARISE - Philippe Keckhut - *more later...*
- QA4ECV,
- C3S, Copernicus Climate Change Service
- IO3C - I Petropavlovskikh

- Licensing of Data: review of type Creative Commons License?
- Relationship with GAW
- Working Group reports
 - LIDAR WG - T Leblanc
 - Microwave WG - G Neholuha, Kämpher
 - UV-Vis - M Van Roozendaal, K Kreher
 - Sonde WG - B Johnson, D Hurst
 - Brewer-Dobson WG, I Petropavlovskikh, A Redondas
 - Theory & Analysis WG - S Strahan
 - Satellite WG - J-C Lambert, M Shiotani
 - Spectral UV - R Cordero
 - Water Vapor WG - H Voemel
- AGAGE, GRUAN, HATS, SHADOZ

NDACC-GAW MOU

- Long-lasting story...
- *There will not be a formal agreement (MOU) between NDACC and GAW as NDACC has not a legal entity. There may be a letter of endorsement signed.*
- There are already several NDACC SC members in SAG O3(R. Stubi, Alberto R., Sophie GB), Reactive Gases (Martine), UV solar radiation (R. Cordero, Gunther S.), in GHG (R. Weiss), **not in aerosol**
- The MOU invites NDACC to nominate representatives in GAW SAGs as a way to strengthen links

The following SAGs have been established under the GAW programme:

- | | |
|---|---|
| ▪  SAG on Ozone | ▪  SAG on Total Atmospheric Deposition |
| ▪  SAG on Greenhouse Gases | ▪  SAG on Aerosol |
| ▪  SAG on UV Solar Radiation | ▪  SAG GURME |
| ▪  SAG on Reactive Gases | ▪  SAG on Applications |

Brewer WG

- ATMOZ Izaña Ozone Campaign, Tenerife, Sep 12th - 30th, 2016
- Brewer, Dobson, Pandora, FTIR, UV-VIS DOAS, Quasume, UV-FT, Gigahertz, Phaethon, UV PFR, UV-PSR

Dobson WG

- Calibration Campaigns: Hohenpeissenberg, GR (5); Arosa, CH (3); Australia (4) & El Arenosillo, Spain (6)
- Application of Aus. BoM Dobson network (4)
- Pandora comparisons occurring Boulder

LIDAR WG

- O₃, Aerosol, temperature, H₂O
- Push for error analysis & archiving data from H₂O LIDARS

Microwave WG

- Intercomparison at Ny Ålesund with IAP & U Bern H₂O, O₃ and wind
- N Kämpfer U Bern will retire in 2018
- New site at Thule H₂O (Muscari), Candidate in Moscow (Solomonov et al)

Theory & Analysis

- New GMI output employing MERRA-2 available for all sites

Water Vapor WG

- Finalize and distribute the NDACC Water Vapor Measurement Strategy document. 8

UV-Vis WG

- CINDI-2 Max-DOAS Campaign at Cabauw, 36 instruments,
- 8 data products: NO₂ vis, NO₂ visSmall, NO₂ uv, O₄ vis, O₄ uv, HCHO, O₃ vis, O₃ uv
- Harmonization effort for QA4ECV – including algorithm comparison

Tropospheric Ozone Assessment Report

TOAR published in Elementa 2018 – as a collection of several papers

- IGAC project Lead by Owen Cooper, Audrey Gaudel, Martin Schultz
- Contributions from Sonde, LIDAR, Dobson-Brewer (Umkher), IRWG NDACC Working Groups
- 8 IRWG sites contributed data
- Corinne, Omaira, Jim drafted the IRWG sections
- Gaudel, A, et al. 2018. Tropospheric Ozone Assessment Report: Present-day distribution and trends of tropospheric ozone relevant to climate and global atmospheric chemistry model evaluation. Elem Sci Anth, 6: 39. DOI: <https://doi.org/10.1525/elementa.291>

NDACC Special Issue

- Twenty-five years of operations of the Network for the Detection of Atmospheric Composition Change (NDACC)
- (AMT/ACP/ESSD inter-journal SI)
- Editor(s): V.-H. Peuch, G. Brasseur, C. Zehner, H. Maring, and G. Stiller
- Open from Nov. 2015 to end of April 2017
- http://www.atmos-meas-tech.net/special_issue819.html
- 39 papers in total
- 17 papers with / from IRWG

NDACC Special Issue with FTIR data

- **Intro:** DeMaziere et al., AMT, 2018
- **Ozone:** Steinbrecht et al., ACP, 2017
- **CH4:** Bader et al. , ACP, 2017
- **C2H4:** Toon et al., ACP, 2018
- **OCS:** Toon et al., ACP, 2018
- **CH4:** Bader et al. , ACP, 2017
Hausmann et al., ACP, 2016
- **H2O & isotologues:**
Barthlott et al., ESSD, 2017
Hausmann et al., ACP, 2017
Weaver et al., AMT, 2017
- **CO2:** Baylon et al., AMT, 2017
- **CO:** Buchholz et al., AMT, 2017
Kiel et al., AMT, 2016
- **CFCs:** Vigouroux et al., AMT, 2016
- **Radiative** closure experiment:
Reichert et al., ACP, 2016 & AMT, 2016 , Sussmann et al., ACP, 2016

Thank you for
your effort!

NDACC Data Host Facility

- Data submission status
 - File updates
 - Required Species Status Check
- Rapid Delivery Data Status
- FTIR metadata file status



FTIR Data Submission Status

In following two slides note:

- Data sets that have data submitted up to May 2017 (data up to date) shows the **line in green.**
- Data sets with submissions this year, but not up to date **are in blue.**
- Data sets submitted in last two years, but not in the last year shows the **line in black.**
- Data significantly out of date shows the **line in red.**

Data statistics reflect status as of May 16, 2018. Submissions after that date are not reflected in this presentation.



FTIR Data Submission Status – Continuing Measurements

Site / PI	Ames	HDF	Instrument name (HDF)	Last archive date	Comments
Eureka / Strong		06 – 16	utoronto001	Dec 2017	
Ny Alesund / Notholt	92 – 09	92 – 17	awi001	May 2018	
Thule / Hannigan	99 – 07	99 – 17	ncar001	Feb 2018	
Kiruna / Blumenstock	96 – 07	96 – 18	kit001	May 2018	
Harestua / Mellqvist	94 – 15	NO HDF		May 2016	
St Petersburg / Makarova		09 – 17	spbu001	May 2018	
Bremen / Notholt	02 – 11	03 – 17	iup001	May 2018	
Zugspitze / Sussmann	95 – 05	95 – 18	ifu001	May 2018	
Jungfraujoch / Mahieu		92 – 17	ugl002	Feb 2018	
Toronto / Strong		02 – 16	utoronto002	Dec 2017	Full reprocess
Rikubetsu / Nagahama	95 – 04	95 – 18	unagoya001	May 2018	instrument name is same as at Moshiri site



FTIR Data Submission Status – Continuing Measurements

PI	Ames	HDF	Instrument name (HDF)	Last Archive Date	Comments
Izana / Blumenstock	99 – 07	99 – 18	kit002	May 2018	
Mauna Loa / Hannigan	95 – 07	95 – 17	ncar002	Apr 2018	
Altzomoni / Grutter		12 – 18	unam001	Apr 2018	overlapping dates in some files
Paramaribo / Warneke		04 – 16	awi019 & awi028	Mar 2017	
Maido / De Maziere		13 – 17	iasb003	Feb 2018	
Wollongong / Jones	95 – 08	96 – 17	uow001 & uow002	May 2018	
Lauder / Smale	90 – 09	90 – 17	niwa001 & niwa002	May 2018	
Arrival Heights / Smale	97 – 09	96 – 17	niwa003,4,5	May 2018	



FTIR Data Submission Status Continuing Measurements – Summary

Status classification

Number of datasets (of
19 active)

Up to date through at least 5/2017	13 (69 %)
Last submission within 1 year, but not up to date	5 (26 %)
Total ACTIVE Datasets (Green + Blue)	18 (95 %)
Data submitted in last 2 years, but not in past year (Black)	1 (5 %)
No submissions since more than 2 years	0 (0 %)
Total Non-Compliant Datasets (Black + Red)	1 (5 %)

- The Harestua data with no recent contributions also has not converted to HDF.
- Otherwise all submissions are HDF.



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FTIR Data Submission Status – Inactive Sites

Site / PI	Ames	HDF	Comments
Eureka / Fast	96 – 06		
Jungfrauoch / DeMoulin		89 – 03	ugl001
Moshiri / Nagahama	96 – 04	96 – 07	unagoya001
Mauna Loa / Murcray (Bomem)	91 – 95		
St Denis / De Maziere		02 – 13	iasb001 & iasb002 moved to Maidu
Arrival Heights / Smale (Bomem)	91 – 96		
Kitt Peak / Rinsland	78 – 05		



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FTIR Data Submission Status – Campaign Sites

Site / PI	Ames	HDF	Extension
Ny Alesund / Woods	5/1995		.wof
Sondre Stromfjord / Mankin	94, 95		.mwf
Harestua / Woods	9/1994		.wof
Aberdeen / Woods	94 – 95		.wof
Jungfraujoch / Woods	10/1992		.wof
Mt Barcroft (etc) / Toon	85 – 16		.tof (last archive Sept 2017)
Polarstern / Notholt	96, 99, 00, 02, 03		.nof

Is there more campaign data?
All Campaign data is archived in Ames.



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FTIR Reported Species in HDF files

In following slide note:

- Each of the 10 required species are displayed in **GREEN**
- Each Station / PI reporting **all 10** required species is shown in **GREEN**
- Each Station / PI reporting with **8-9** required species is shown in **BLUE**
- Each Station / PI reporting **5 or less** required species is shown in **RED**



FTIR Reported Species in HDF files

Site / PI	C2H6	CH4	CIONO2	CO	HCl	HCN	HF	HNO3	N2O	O3	Other	Improved?
Eureka / Strong	x	x	x	x	x	x	x	x	x	x	x	
Ny Alesund / Notholt	x	x	x	x	x	x	x	x	x	x	x	
Thule / Hannigan	x	x	x	x	x	x	x	x	x	x		
Kiruna/ Blumenstock	x	x	x	x	x	x	x	x	x	x	x	
St. Petersburg/ Makarova	x	x		x	x	x	x	x	x	x		6 more required
Bremen / Notholt	x	x		x	x	x	x	x	x	x		
Zugspitze / Sussmann	x	x	x	x	x	x	x	x	x	x		1 more required
Jungfraujoch / Mahieu	x	x	x	x	x	x	x	x	x	x	x	
Jungfraujoch / DeMoulin					x		x				x	
Moshiri / Nagahama					x		x	x		x		
Toronto / Strong	x	x		x	x	x	x	x	x	x	x	
Rikubetsu / Nagahama	x	x	x	x	x	x	x	x	x	x		
Izana / Blumenstock	x	x	x	x	x	x	x	x	x	x	x	
Mauna Loa / Hannigan	x	x	x	x	x	x	x	x	x	x		1 more required
Altzomoni / Grutter	x	x		x	x		x	x	x	x		
Paramaribo / Warneke	x	x		x	x	x		x	x	x	x	
Reunion St Denis / DeMaziere	x	x		x	x	x	x	x	x	x		
Reunion Maito / De Maziere	x	x		x	x	x	x	x	x	x		
Wollongong / Jones	x	x		x	x	x			x	x		
Lauder / Smale	x	x	x	x	x	x	x	x	x	x		
Arrival Heights / Smale	x	x	x	x	x	x	x	x	x	x		

FTIR Reported Species in HDF files

Of the 21 Active and Inactive datasets reported in HDF:

- **12 (57%)** report all 10 required species. This is an increase of 2 from last year.
- **6 (29%)** report 8 or 9 required species. One of these was new last year and added 6 species in that time.
- **1 (5 %)** reports 7 of 10 required species.
- **2 (9%)** reports 5 or less required species. Both of these are from inactive instruments.

CIONO2 is the least reported species (reported by 11 of 21).

HCl is the only specie reported by all instrument teams.

C2H6, CH4, CO, N2O and O3 are reported by all active teams.



Rapid Delivery (RD) Data Considerations

What is the intent of RD (Rapid Delivery)?

- **RD data is NOT NDACC data.**
- RD data can come from non-NDACC affiliated instruments, or it can be NDACC affiliated data before it is fully Quality Controlled.
- RD data does not appear inside the NDACC database. It is held in a separate directory.

When should I submit data with the RD flag?

- **Only use the RD flag** if the data is not yet quality controlled, or if it is not at an NDACC affiliated site.
- Data submitted to the traditional **NDACC catalog will still count for CAMS** obligations, and will be subject to the additional screening if from a CAMS associated instrument.

What should I do when I submit data to the NDACC database that overlaps in time to the RD datasets?

- When you submit data to the NDACC catalog that overlaps in time with data in the RD directories,
 - **> send and email to the DHF to have the RD data removed.**
- **Data for a single date should not be in both places.** It is NDACC policy that there be only one version of data available to users.
- Do not submit data to both NDACC catalog and to the RD directories at the same time.

Submit data directly (and only) to the NDACC catalog with no RD flag if the data is final.



Rapid Delivery (RD) Data Considerations

Datasets with data in RD directories before 2017:

Site/PI RD Species	NDACC Standard Data		RD Data		Timestamp overlap?	Comments
	Version #	Dates	Version #	Dates		
Ny Alesund Notholt CH4	004	No 2014 data in NDACC database for CH4. There is 2013 and 2016 data.	003	7-9/2014	No	Is there a reason why the 2014 CH4 data is not yet moved to NDACC?
Bremen Notholt CH4, CO, O3	001, 004, 005	Through 2016. Multiple versions exist for the same dates.	003	8-11/2014	YES	Should RD version be removed?
Reunion Maïdo De Maziere HCl, HNO3, NO2	002 (HCl, NO2) 001, 003 (HNO3)	2013 (HCl, NO2) 2013 onward Multiple versions for a single time period.	001	2/2014 onward	YES for HNO3	In NDACC data, multiple versions for the same dates.

- In some cases issues with multiple files for a time period have returned, in both RD vs Consolidated. Sometimes multiple versions of data in just the consolidated area.
- Please **notify NDACC DHF** when you replace RD files with consolidated so RD files can be removed from public view.
- The goal is to make it clear to a user which dataset to use. And easy to find the most current dataset.



More About Metadata Files

Visibility

With redesign of NDACC Web Pages the dataset level metadata files are now easily discoverable by the user.

NDACC Home STATIONS INSTRUMENTS SEARCH ABOUT NDACC

Home / Stations / Greenbelt, MD, United States

Stations

- › N.H. High Latitude
- › N.H. Mid-Latitude
- › N.H. Subtropics and Tropics
- › S.H. Subtropics and Tropics
- › S.H. Mid-Latitude
- › S.H. High-Latitude

Greenbelt, MD, United States

Latitude: 38.9° N
Longitude: 76.9° W
Elevation: 50 m asl

Status: Campaign

NDACC Measurements at the Greenbelt, MD, United States Station

Instrument	Period	Parameter	Cooperating Institutions	Comments	Data link	Metadata link
Lidar STROZ	1993– present	Aerosol, Ozone, Temperature, Water Vapor	GSFC, MD, USA SSAI, MD, USA	Campaign, File parameter, extension .mgl	Ames	Metadata
Lidar AT	1997– present 2007– 2009	Aerosol, Temperature, Water Vapor	GSFC, MD, USA SSAI, MD, USA	Campaign, File parameter, extension .mgl	Ames	Metadata

One click to metadata file

NDACC Mobile Stratospheric Ozone Lidar
Home Location: Goddard Space Flight Center
Greenbelt, MD 20771

Principal Investigator: Thomas J. McDee
Code 910
NASA GSFC
Greenbelt, MD 20771
301-614-5988 Voice
301-614-5903 FAX
mcdee@leolus.gsfc.nasa.gov

Co-Investigators: Laurence Tully
Emergent Technologies, Inc.
301-614-5700 Voice
301-614-5903 FAX
tully@aurora.gsfc.nasa.gov

Grant Sumich
RTSS
301-614-6001 Voice
301-614-5903 FAX
sumich@leolus.gsfc.nasa.gov

Data Products

- Ozone - vertical profile from 10 km - ~48 km
- Temperature - vertical profile from ~18 km to ~70 km
- Aerosol lidar ratio - vertical profile from 10 km - ~30 km

Instrument Description

The Goddard Stratospheric Ozone Lidar has been a participant in the NDACC since its inception. It began development with funding from the NASA Upper Atmosphere Program in 1985. The instrument is housed in a 40' trailer allowing for transport around the world. The instrument is a combination Differential Absorption Lidar (DAL), for the measurement of ozone; and a Raman and elastic backscatter lidar (for temperature and aerosol measurements). The lidar instrument transmits two wavelengths, 308 nm from a XeCl excimer laser, and 351 nm from a XeF excimer laser. The repetition rate for each of the lasers is 200 Hz, and the lasers are triggered so that the pulses are transmitted 2.5 msec apart. This removes the potential for any optical cross-talk between the channels. Backscattered radiation is collected with a 30" Dall-Kirkham telescope; spectral separation is accomplished using beam splitters and interference filters. Four return wavelengths are recorded: the two transmitted wavelengths and the 0.2 Raman

Submit new files via email to DHF.



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Metadata Status – Continuing Measurements

Site / PI	PI	File Year
Eureka / Strong	x	16
Ny Alesund / Notholt	x	15
Thule / Hannigan	x	16
Kiruna/ Blumenstock	x	15
Harestua / Mellqvist		
St. Petersburg/ Makarova	x	17
Bremen / Notholt	x	15
Zugspitze / Sussmann	x	06
Jungfraujoch / Mahieu	x	17
Toronto / Strong	x	16
Rikubetsu / Nagahama	old	01
Izana / Blumenstock	x	15
Mauna Loa / Hannigan	x	16
Altzomoni / Grutter		
Paramaribo / Warneke	x	18
Reunion Mado / De Maziere		
Wollongong / Jones	old	99
Lauder / Smale	x	17
Arrival Heights / Smale	x	17
Mt Barcroft (etc) / Toon	x	03



FTIR Metadata File Status

Document, document, document

Comments:

- 3 of 20 are missing
- 4 of 20 are more than 10 years out of date, some with a former PI listed.
- 5 of 20 updated since the last WG meeting
- Current files are in <ftp://ftp.cpc.ncep.noaa.gov/ndacc/meta/ftir/>
- Email updates to Jeannette.Wild@noaa.gov



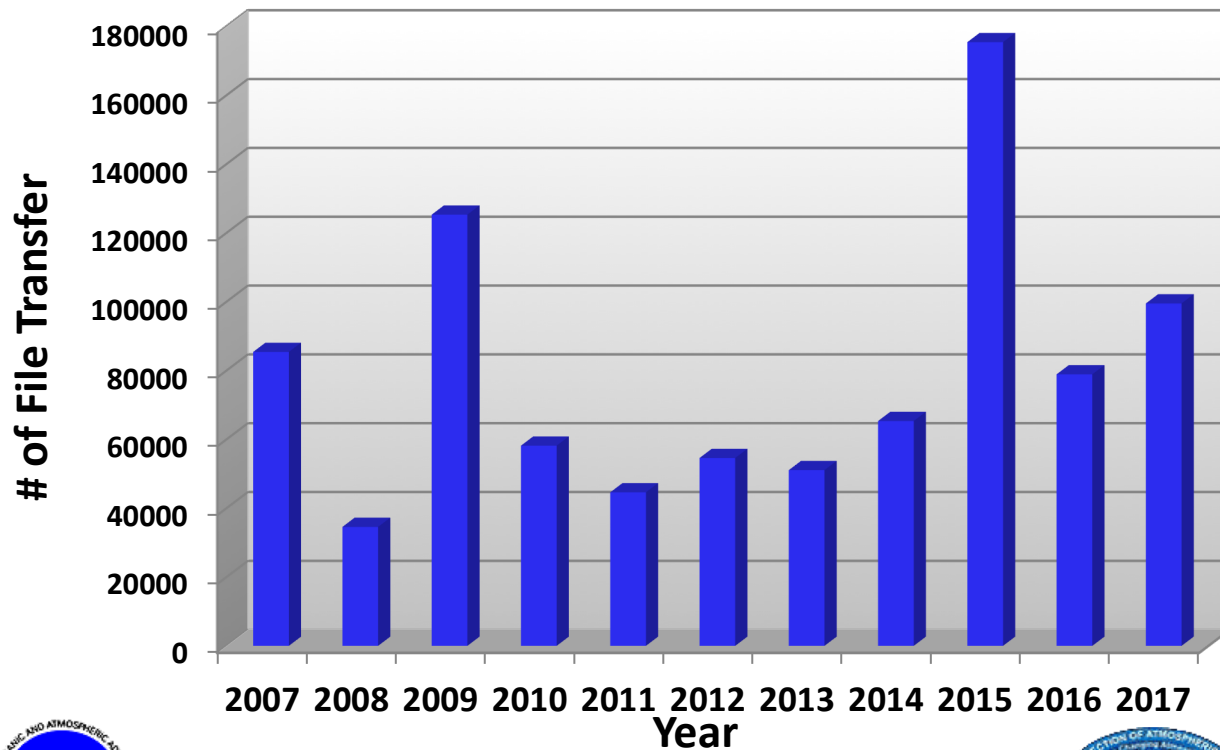
Data Retrieval File Counts



FTIR WG meeting – June 2018



NDACC Transfer Count Monthly Average



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# files in database			# file transfers					
Instr.	# files		Web (Private)			Anon ftp		
	2016	2017	2015	2016	2017	2015	2016	2017
Bksnde	426	426	9	0	0	4877	1749	651
Brewer	2199	2329	32	7	1	19256	9568	4469
Dobson	4833	4875	38	341	1	41690	21128	27895
Dustsonde	375	375	1	0	1	4249	1501	59
FTIR	4075	4584	1291	1194	143	76190	36341	55832
Lidar	14070	14774	722	787	930	93725	73588	109861
Mwave	23412	24035	15056	11332	5454	252168	106352	197683
O3sonde	38386	40219	2388	1918	1180	444097	162408	140809
Spt UV	3084	3176	37	7	0	25618	11458	3316
UV Vis	36108	32470	29	18	288	492322	183595	343760
WVsonde		949			5			3167
Total	126968	128212	19603	15604	8003	1454192	607688	887502

Top 2016 Data Users:

Rank	Count	Institution	Rank	Count	Institution
1	403659	www.primevision.nl	13	6096	Indian Institute of Technology
2	35447	Obs. Midi-Pyrenees	14	5966	France, Telecom
3	26531	FMI - Helsinki	15	5873	NERC – Polaris House
4	25928	Indian Institute of Technology	16	4809	Bundesamt fuer Meteorologie und Klimatologi
5	20391	Alfred Wegener Institute	17	4458	Athens, Telecom
6	19454	CNRS - Orleans	18	4451	GSFC
7	17340	China UNICOM	19	4063	Telecom, Spain
8	13441	ECMWF	20	3648	Swiss federal Institute of Technology
9	7965	Indian Institute of Technology	21	3647	NERC – Polaris House
10	7939	NOAA Boulder	22	3401	Rutherford Appleton Lab
11	6509	FMI-Sodankyla	23	3340	Norway, Telecom
12	6493	Universitaet Bern	24	3061	Comcast (Cable), Denver


NDACC Web Pages

www.ndacc.org

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Measurement Stations

Select a station on the map or in the list to access its public data.



Filter by:

HEMISPHERE

☐ Northern Hemisphere

☐ Southern Hemisphere

LATITUDINAL BAND

☐ Subtropics and Tropics

☐ Mid Latitude

☐ High Latitude

STATUS

☐ Active

☐ Inactive

☐ Campaign

INSTRUMENT

☐ Brewer

☐ Dobson

☐ FTIR Spectrometer

☐ Lidar

☐ Microwave Radiometer

☐ Sonde

☐ UV Spectroradiometer

☐ UV/Visible Spectrometer

[Clear all](#)

1282px

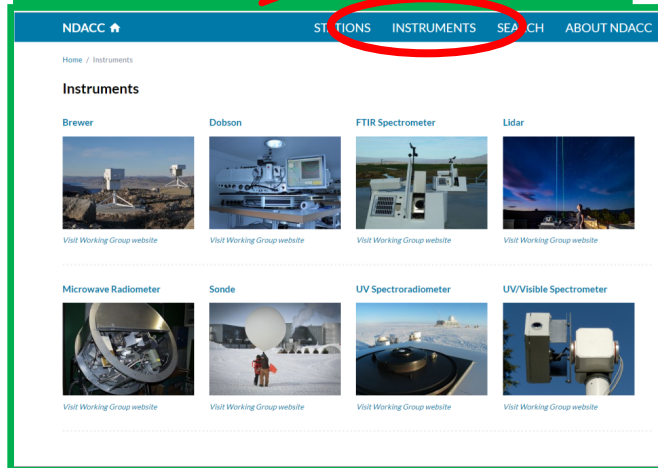
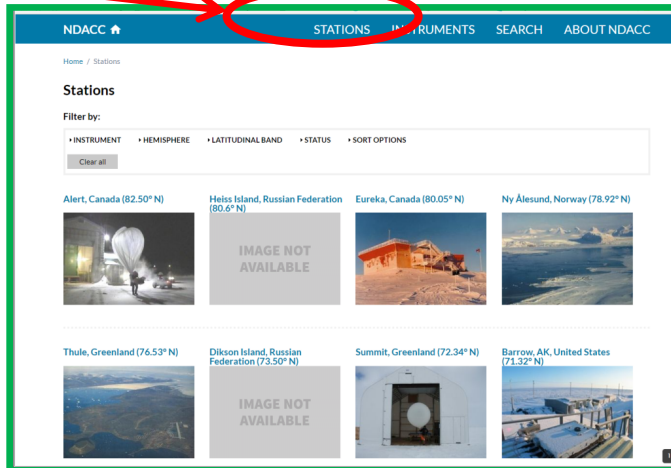
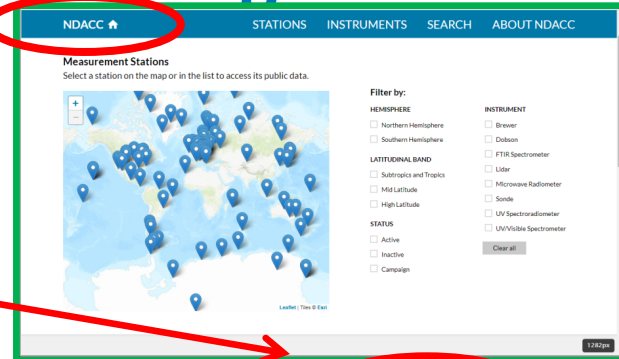


NDACC Web Pages

Direct Data Access:

Three paths to the data:

- 1) Home Page Map
- 2) Station Tab
- 3) Instrument Tab



NDACC Web Pages

Home Page Map (Path 1):

Zoom as you like with mouse clicks or wheel

Filter by region, and/or instrument

Click on the station balloons to find that station you want

When ready, click on the Station name

NDACC

STATIONS INSTRUMENTS SEARCH ABOUT NDACC

Measurement Stations
Select a station on the map or in the list to access its public data.

Filter by:

HEMISPHERE

- ☐ Northern Hemisphere
- ☐ Southern Hemisphere

LATITUDINAL BAND

- ☐ Subtropics and Tropics
- ☐ Mid Latitude
- ☐ High Latitude

STATUS

- ☐ Active
- ☐ Inactive
- ☐ Campaign

INSTRUMENT

- ☐ Brewer
- ☐ Dobson
- ☐ FTIR Spectrometer
- ☐ Lidar
- ☐ Microwave Radiometer
- ☐ Sonde
- ☐ UV Spectroradiometer
- ☐ UV/Visible Spectrometer

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Stations

- ▶ N.H. High Latitude
- ▶ N.H. Mid-Latitude
- ▶ N.H. Subtropics and Tropics
- ▶ S.H. Subtropics and Tropics
- ▶ S.H. Mid-Latitude
 - [Mildura, Australia](#)
 - [Wollongong, Australia](#)
 - [Lauder, New Zealand](#)
 - [Kerguelen Island, France](#)
 - [Rio Gallegos, Argentina](#)
 - [Macquarie Island, Australia](#)
 - [Ushuaia, Argentina](#)
- ▶ S.H. High-Latitude


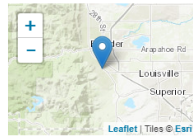
Boulder, CO, United States

Latitude: 39.99° N
Longitude: 105.26° W
Elevation: 1634 m asl

Status: Active

Website(s):
[Station Page](#)

Station Representative(s):
Dr. Russell C. Schnell
Global Monitoring Division
NOAA Earth System Research Laboratory
Colorado, USA



NDACC Measurements at the Boulder, CO, United States Station

Instrument	Period	Parameter	Cooperating Institutions	Comments	Data link	Metadata link
Dobson D061	1966—present	Ozone	NOAA/ESRL, USA		Amos	Metadata
Lidar Nd:Yag	2000—present	Aerosol	NOAA/ESRL, USA		Amos	Metadata
Sonde ECC	1991—present	Ozone	NOAA/ESRL, USA	Weekly soundings	Amos	

Single Station Page:

Web Navigation Tools

Zoomable Map

Station Photo

Ability to navigate to other stations with zone drop down lists and links to other stations

Instrument Table with links to data and metadata

NDACC Web Pages

Station Tab – Path 2:

Drop down filters
and sort options


Filter by region,
instrument type,
active/inactive/
campaign.

List in geographical
or alphabetical
order

When ready, click on
the Station name

The screenshot shows the NDACC website's 'Stations' page. The navigation bar at the top includes 'NDACC', 'STATIONS' (highlighted with a red circle), 'INSTRUMENTS', 'SEARCH', and 'ABOUT NDACC'. Below the navigation bar, the page title is 'Stations'. A 'Filter by:' section contains several filters: 'INSTRUMENT', 'HEMISPHERE', 'LATITUDINAL BAND' (with checkboxes for Subtropics and Tropics, Mid Latitude, and High Latitude), 'STATUS', and 'SORT OPTIONS' (with dropdowns for 'Sort by' (Latitude), 'Order' (Order), and 'Desc' (Desc)). Below the filters, there is a grid of station cards. Each card displays the station name, latitude, and a photograph. The stations shown are: Alert, Canada (82.50° N), Heise Island, Russian Federation (80.6° N), Eureka, Canada (80.05° N), Ny Ålesund, Norway (78.92° N), Thule, Greenland (76.53° N) (highlighted with a red circle), Dikson Island, Russian Federation (73.50° N), Summit, Greenland (72.34° N), and Barrow, AK, United States (71.32° N). Some cards show 'IMAGE NOT AVAILABLE'.

NDACC Web Pages

NDACC 

STATIONSINSTRUMENTSSEARCHABOUT NDACC

Home / Stations / Thule, Greenland

Stations

- › N.H. High Latitude
- › N.H. Mid-Latitude
- › N.H. Subtropics and Tropics
- › S.H. Subtropics and Tropics
- › S.H. Mid-Latitude
- › S.H. High-Latitude


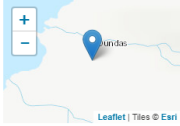
Thule, Greenland

Latitude: 76.53° N
Longitude: 68.74° W
Elevation: 30-220 m asl

Status: Active

Website(s):
<http://ndacc.dmi.dk/>

Station Representative(s):
Dr. Niels Larsen
Danish Climate Center
Danish Meteorological Institute
Copenhagen, Denmark



NDACC Measurements at the Thule, Greenland Station

Instrument	Period	Parameter	Cooperating Institutions	Comments	Data link	Metadata link
FTIR Spectrometer Bruker	1999–present	Column - multiple species, Profile - multiple species	NCAR, USA		Ames HDF	Metadata
Lidar	1991–1996	Aerosol	U. Rome, Italy		Ames	Metadata

Single Station Page:

Same as before.



NDACC Web Pages

Instrument Tab – Path 3:


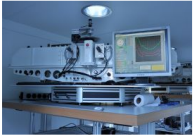

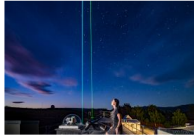


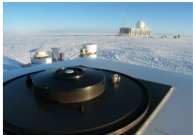

Link to in house
information on each
instrument group

Link to home page
(off site) for each
instrument group

NDACC [↑](#) STATIONS **INSTRUMENTS** SEARCH ABOUT NDACC

Home / Instruments

Instruments

Brewer  Visit Working Group website	Dobson  Visit Working Group website	FTIR Spectrometer  Visit Working Group website	Lidar  Visit Working Group website
Microwave Radiometer  Visit Working Group website	Sonde  Visit Working Group website	UV Spectroradiometer  Visit Working Group website	UV/Visible Spectrometer  Visit Working Group website

NDACC Web Pages

Instrument Tab:

This tab still under construction, so still needs beautification, but is functional.

Navigation menu to go to other instruments

Descriptive paragraph for the instrument group

List of sites with the chosen instrument

Click on a site for a drop down list of each measurement available

Access to data and metadata

The screenshot shows the NDACC website's 'Instruments' section for the 'Microwave Radiometer'. The page has a blue header with navigation links: NDACC, STATIONS, INSTRUMENTS, SEARCH, and ABOUT NDACC. Below the header, a breadcrumb trail reads 'Home / Instruments / Microwave Radiometer'. On the left, a sidebar titled 'Instruments' lists: Brewer, Dobson, FTIR Spectrometer, Lidar, Microwave Radiometer (highlighted), Sonde, UV Spectroradiometer, and UV Visible Spectrometer. The main content area for 'Microwave Radiometer' includes a yellow note: 'Note: Instrument pages are currently under construction. Thank you for your patience.' A descriptive paragraph follows: 'Microwave instruments in the NDACC provide measurements of the vertical profiles of O3, H2O, and ClO in the stratosphere and mesosphere. The vertical profile information is derived from the change in pressure broadening as a function of altitude. These instruments can operate nearly continuously, and provide information on tracer variations on timescales from diurnal to multi-decadal.' Below this is a link to 'Visit Working Group website'. The 'Locations' section lists: Mauna Kea, HI, United States (19.83° N, 155.48° W) and Mauna Loa, HI, United States (19.54° N, 155.58° W). Three parameter sections are shown: 'Parameter: ClO' with a comment 'Moved from Mauna Kea in 2016.' and buttons for 'Aerosols' and 'Metadata'; 'Parameter: Ozone' with buttons for 'Aerosols' and 'Metadata' (circled in red); and 'Parameter: Water Vapor'. A final list of locations includes: Ny Ålesund, Norway (78.92° N, 11.93° E), Scott Base, Antarctica (77.85° S, 166.75° E), Thule, Greenland (76.53° N, 68.74° W), Bern, Switzerland (46.95° N, 7.45° E), and Lauder, New Zealand (45.04° S, 169.68° W).

NDACC Web Pages

Index of /ndacc/station/thule/ames/ftir/

[parent directory]

Name	Size	Date Modified
thtc0002.cmf	5.4 kB	12/19/05, 7:00:00 PM
thtc0103.cmf	13.2 kB	12/19/05, 7:00:00 PM
thtc0202.cmf	15.3 kB	12/19/05, 7:00:00 PM
thtc0303.cmf	19.2 kB	12/19/05, 7:00:00 PM
thtc0403.cmf	15.2 kB	12/19/05, 7:00:00 PM
thtc0504.cmf	14.1 kB	12/19/05, 7:00:00 PM
thtc0603.cmf	28.2 kB	11/6/07, 7:00:00 PM
thtc0703.cmf	24.2 kB	8/25/08, 8:00:00 PM
thtc9910.cmf	4.4 kB	12/19/05, 7:00:00 PM

Index of /ndacc/station/thule/hdf/ftir/

[parent directory]

Name	Size	Date Modified
groundbased_ftir_c2h6_ncar001_thule_19991010t142041z_19991012t140911z_003.hdf	197 kB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20000426t171351z_20000921t172709z_003.hdf	170 kB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20010309t152916z_20010903t185050z_003.hdf	1.0 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20020301t142736z_20021005t175314z_003.hdf	1.4 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20030306t161117z_20031007t154654z_003.hdf	3.3 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20040307t150220z_20040804t154754z_003.hdf	1.3 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20050501t154811z_20051003t150955z_003.hdf	2.3 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20060303t170341z_20061009t164006z_003.hdf	3.8 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20070307t135219z_20071002t181956z_003.hdf	5.2 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20080305t153713z_20080824t13937z_003.hdf	2.5 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20090228t165408z_20091016t162156z_003.hdf	6.9 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20100311t175921z_20100902t184209z_003.hdf	3.1 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20110309t162754z_20111014t15243z_003.hdf	3.8 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20120225t163706z_20121002t182105z_003.hdf	3.6 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20130401t154925z_20131008t170054z_003.hdf	2.3 MB	10/20/14, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20140324t170650z_20140930t134502z_003.hdf	1.1 MB	4/4/16, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20150503t182514z_20150902t185429z_003.hdf	3.4 MB	4/4/16, 8:00:00 PM
groundbased_ftir_c2h6_ncar001_thule_20160308t194345z_20161010t174702z_003.hdf	10.0 MB	7/21/17, 4:00:00 AM
groundbased_ftir_ch4_ncar001_thule_19991010t142041z_19991012t140911z_003.hdf	225 kB	10/20/14, 8:00:00 PM
groundbased_ftir_ch4_ncar001_thule_20000426t171351z_20000921t185028z_003.hdf	197 kB	10/20/14, 8:00:00 PM
groundbased_ftir_ch4_ncar001_thule_20010309t152916z_20010903t185050z_003.hdf	1.3 MB	10/20/14, 8:00:00 PM
groundbased_ftir_ch4_ncar001_thule_20020301t142736z_20021018t162232z_003.hdf	1.2 MB	10/20/14, 8:00:00 PM

Direct to the public directories for that instrument type, station and format.

File: jh_thule_20160901.txt

Data Set Description:

 PI : James W. Hannigan
 Instrument : Bruker 125HR Fourier Transform Interferometer
 Site(s) : South Mountain, Thule, Greenland 76.52N, 68.77W, 225masl
 Measurement Quantities : Column Density [molec/cm²] N2O, O3, HCl, HF, HNO3, CO, CLONO2, CH4, H2O, N2
 : Volume mixing ratios [vmr] N2O, O3, HCl, HF, HNO3, CO, CH4, H2O

Contact Information:

 Name: James W. Hannigan
 Address: NCAR
 POBox 3000
 Boulder, CO USA 80303
 Phone: +01 303 497 1853
 FAX: +01 303 497 1492
 Email: james@ucar.edu

Reference Articles:

 "Network for the Detection of Stratospheric Change Fourier transform Infrared Intercomparison at Table Mountain Facility, November 1996", A. Goldman et al., J. Geophys. Res., Vol. 104, No. D23, pp38481-38503, 20 Dec 1999

"Semiautonomous FTS Observation System for Remote Sensing of Stratospheric and Tropospheric Gases." J. W. Hannigan, M. T. Coffey, and A. Goldman. Journal of Atmospheric and Oceanic Technology, 26:1814ܤ, March 2009. doi: 10.1175/2009JTECH1230.1.

Instrument Description:

 This meta-data file describes data taken at South Mountain 225masl at Thule Air Base, Greenland. The instrument has been blind intercompared as per the

Data link

Metadata link

Ames

HDF

Metadata



NDACC Web Pages – Old

Index of /ndacc/meta/ftir/

[parent directory]

Name	Size	Date Modified
dg_wollongong_ftir.txt	11.1 kB	9/20/99, 8:00:00 PM
ds_arrival_ftir_20171003.txt	14.2 kB	10/4/17, 1:22:00 PM
ds_lauder_ftir_20171003.txt	20.0 kB	10/4/17, 1:22:00 PM
em_jungfraujoeh_FTIR.txt	7.3 kB	10/4/17, 1:22:00 PM
gt_multi_ftir.txt	11.1 kB	8/24/03, 8:00:00 PM
jh_mlo_20160901.txt	4.4 kB	9/20/16, 8:00:00 PM
jh_thule_20160901.txt	4.2 kB	9/20/16, 8:00:00 PM
jn_bremen_ftir.txt	2.8 kB	6/29/15, 8:00:00 PM
jn_nyalesund_ftir.txt	10.3 kB	6/29/15, 8:00:00 PM
jn_polarstern_ftir.txt	4.4 kB	6/29/15, 8:00:00 PM
kr_kittpeak_ftir.txt	6.2 kB	9/16/04, 8:00:00 PM
ks_eureka_ftir_20161110.txt	12.2 kB	11/9/16, 7:00:00 PM
ks_toronto_ftir_20161110.txt	13.1 kB	11/9/16, 7:00:00 PM
mc_thule_ftir.txt	2.5 kB	6/12/03, 8:00:00 PM
rs_zugspitze_ftir.txt	4.7 kB	7/4/06, 8:00:00 PM
tb_izana_ftir_2015.txt	9.9 kB	9/30/15, 8:00:00 PM
tb_kiruna_ftir_2015.txt	10.3 kB	9/30/15, 8:00:00 PM
wm_sondrestrom_ftir.txt	2.2 kB	5/9/01, 8:00:00 PM
yk_multi_ftir.txt	4.9 kB	6/4/01, 8:00:00 PM

The only previous link to the metadata was to a directory of files.

Thule (77°N, 69°W)	FTIR	Total Column: CCl ₂ F ₂ , CH ₄ , CHF ₂ Cl, ClONO ₂ , CO, CO ₂ , COF ₂ , HCl, HF, HNO ₃ , N ₂ O, O ₃ , OCS	Coffey		99 - 07	Yes
		Total Column: ClONO ₂ , Profiles: O ₃ , HCl, HF, N ₂ O, CO, CH ₄ , C ₂ H ₆ , HCN, HNO ₃	Hannigan	HDF format	99 - 16	Yes
	Lidar	Temperature Profiles	Flocco	Seasonal	93 - 97 02 - 03 06 - 07	

Index of /ndacc/station/thule/

[parent directory]

Name	Size	Date Modified
ames/		10/16/17, 4:15:00 AM
hdf/		10/16/17, 4:17:00 AM

Previously the Data Table only linked the Station page in the public ftp directories, and the user had to dive into the directories.



NDACC Web Pages – New

NDACC Measurements at the Izaña, Tenerife, Spain Station

Instrument	Period	Parameter	Cooperating Institutions	Comments	Data link	Metadata link
Brewer B157	1991–present	Ozone	AEMET, Spain	Mark II: 1991-1998; B157: 1998-	Ames	
FTIR Spectrometer Bruker 120M/125HR	1999–present	Column - multiple species, Profile - multiple species	KIT-IMK, Germany AEMET, Spain	Bruker 120M: 1999-2005; Bruker 125HR: 2005-	Ames HDF	Metadata
Sonde ECC	1986–present	Ozone	AEMET, Spain	Weekly	Ames	
UV/Visible Spectrometer Bruker 120M/125HR	1992–present	Column - multiple species, Profile - multiple species	INTA, Spain	O3, NO2	Ames HDF	Metadata

AEMET: Agencia Estatal de Meteorología

KIT-IMK: Karlsruher Institut für Technologie - Institut für Meteorologie und Klimaforschung (Institute of Meteorology and Climate Research)

INTA: Instituto Nacional de Técnica Aeroespacial

Metadata

Metadata files are now very visible.

It is obvious when they are missing.

Data links go directly to the data directory for the instrument and format type.



NDACC Web Pages

Outstanding needs – Station Photos:

Heiss Island, Russia	Kiso, Japan
Resolute, Canada	Kitt Peak, AZ
Dikson Island, Russia	San Jose, Costa Rica
Fairbanks, Alaska, US	Ciater/Bandung, Indonesia
Arkhangel'sk, Russia	Mildura, Australia
Lerwick, UK	Punta Arenas, Chile
Aberdeen, UK	Ushuaia, Argentina
Prestwick, UK	Marambio, Antarctica
Minneapolis, Minnesota, US	Faraday, Antarctica
Obs. Bordeaux, France	Syowa Base, Antarctica
Laramie, Wyoming, US	Belgrano II Station, Antarctica
Mt. Barcroft, California, US	

Outstanding needs – Updated Metadata files



NDACC Web Pages

Legacy Site – is at the bottom, but is no longer up to date



www.ndacc.org – always will take you to the correct website.



IRWG Line Parameter Lists

- We need to review / update our line parameter list. We need to test and agree on the listings for each window for the 10 primary species.
- This would need to be done by all groups in unison with a fairly strict timeline.
- We would like to decide on the method and implement it in the coming year.

DOI & Data Policy

- The data policy was updated a few years ago but given recent publications using IRWG data we need to revisit it. If we agree, we will bring back to the SC some recommendations for a revised policy.
- *Please review [ndacc.org data pages/docs](http://ndacc.org/data/pages/docs) for Discussion*
- DOI's have perennially been discussed and with a revised line list this may be an opportune time for the IRWG to create a more official version amenable for a IRWG wide DOI. Or not, so to be discussed.

Visions for NDACC future

- Would it be useful to have an NDACC Strategy & Implementation Plan?
- There was a fairly open discussion at the SC about NDACC future directions. The request is from the SC to all members for input on any topic that might affect his or her view of business as usual of the NDACC.
- There was not an expectation that we should change or concern that about the current direction of the NDACC. Rather extending an invitation for new ideas, inclusion, not missing issues of import from the experience of the membership.
- Instrumentation, data protocols or policies, membership, affiliated groups etc.

Done.

Summary of publications:

30 publications 2016 & 2017 to date





#	<u>Focus area</u>
6	Satellite
4	Instruments/Retrievals/Technologies
6	Intercomparisons
12	Geophysical Analysis

Species targeted - NDACC required

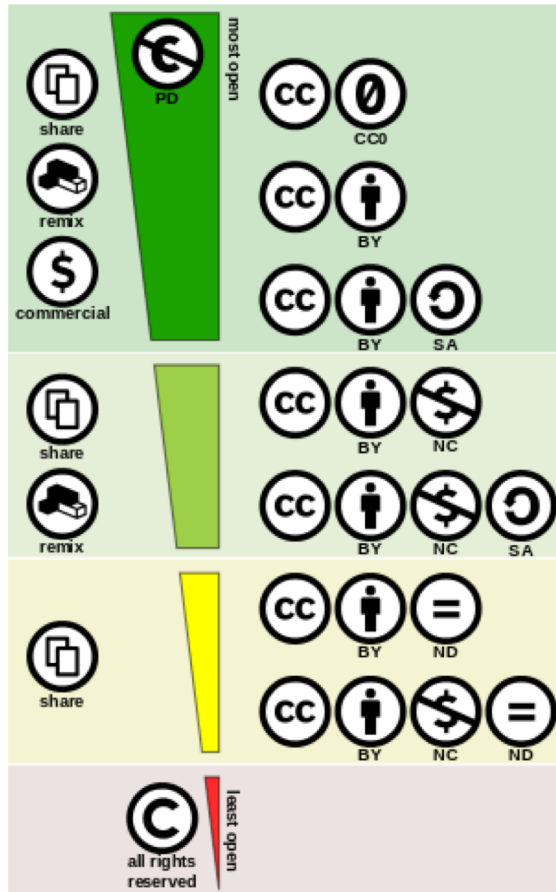
CFC-11 & -12, HCFC-22, NH₃, C₂H₆, SO₂/SiF₄ Volcano, HCN, NO₂, H₂O/HDO, O₃, HNO₃, CH₄, OCS, CCl₄, CO₂

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- CC licences is one of several public **open** licences placing few restrictions (with the 'copyright' being the most restricting).
- Several types of CC licences exist, the different CC licences condition the terms of distribution and are based on four conditions:

Icon	Licencee Right	Description
	BY	Attribution: allows to copy, distribute, <i>make</i> derivative work, remix work if credits are given to the author or licencor (in manner specified)
	SA	Share-alike: allow to <i>distribute</i> derivate work under an identical licence ("not more restrictive").
	NC	Non-commercial: allows to copy, distribute, make derivative work, remix only for non-commercial purposes.
	ND	No derivative works: allows to copy, distribute, and display but not to make derivate work or remix work.

CC licence spectrum



most open

- Commonly used are 7 CC licences (combination of conditions)
- Most open: **CC0** (public domain waiver)
- Least open: „all rights reserved“ (copyright owner hold all rights for own use)

- **CC-BY-NC-ND**: share only, credits required, non commercial use, no modification

- **CC BY-NC**: credits required, allows to share and remix, non-commercial only

- **CC BY-SA**: credits required, allows to share and remix, same legal conditions

- **CC BY 4.0** (Attribution 4.0 International): latest version of CC licences, applicable to most jurisdictions: allows to

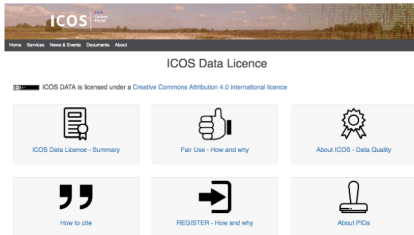
- to copy and redistribute the material in any medium or format,

- Remix, transform, and build upon the material for any purpose, even commercially.

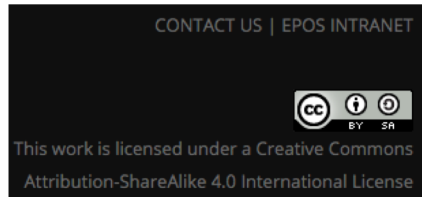
least open

Data licences in ENV RIs

- ICOS data is licenced under CC BY 4.0



- EPOS data is licenced under CC BY 4.0



- LTER data is released under CC BY or CC0

