

Jungfrauoch site report



NDACC IRWG Meeting
Toronto, ON
June 2015

E. Mahieu and
the Liège team

Overview

- Status and perspective (team@ULg, projects, funding status)
- HDF submission (added species)
- No scientific highlight: refer to talks & poster from the team:
 - Ethane: Bruno Franco (Thursday morning)
 - Methane: Whitney Bader (Friday morning)
 - OCS and HCHO: additional species' discussion (Friday morning)
 - Overview of recent and ongoing investigations at ULg: poster by Mahieu et al.

Current team composition

- Scientists (FTEs):
 - Permanent staff (2): Christian Servais and Manu Mahieu
 - Post-docs (1.5): Benoît Bovy, Bruno Franco
 - Phd ongoing (1): Bernard Lejeune
 - Phd finishing (1): Whitney Bader (defense this fall)
- Computing engineer (1): Olivier Flock
- Secretary (0.2): Diane Zander
- Support from retired people: Ginette Roland and Rudy Zander

Ongoing projects and funding status

- 1 Swiss project (2014-2017)
 - 1 Belgian project (end in 09/2015)
 - 1 Belgian project (end in 06/2017)
 - 1 PRODEX project (end in 12/2015)
- ⇒ 4 running projects, 2 ending very soon (in a few months)
- ⇒ 4 proposals currently under evaluation, 2 in preparation
- ⇒ pursuit of the ULg activities will depend on the success of these submissions

HDView

File Window Tools Help

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groundbased_fir.o3_ulg002_jungfraujoch_201309031065503z_20130920t160035z_004.hdf

DATETIME
LATITUDE.INSTRUMENT
LONGITUDE.INSTRUMENT
ALTITUDE.INSTRUMENT
SURFACE.PRESSURE.INDEPENDENT
SURFACE.TEMPERATURE.INDEPENDENT
ALTITUDE
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PRESSURE.INDEPENDENT
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O3.MIXING.RATIO.VOLUME.ABSORPTION.SOLAR
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	0	1	2	3	4	5	
0	0.2697149	0.1133254	0.1915053	1.294177	3.594999	8.760326	20.35
1	0.2697149	0.1133254	0.1915053	1.294177	3.594999	8.760326	20.35
2	0.2697149	0.1133254	0.1915053	1.294177	3.594999	8.759176	20.34
3	0.2697149	0.1133254	0.1915053	1.294231	3.595339	8.759751	20.34
4	0.2697149	0.1133254	0.1915053	1.294231	3.595339	8.761476	20.35
5	0.2697149	0.1133254	0.1915053	1.294213	3.594999	8.758601	20.33
6	0.2697149	0.1133254	0.1915053	1.294249	3.595339	8.762626	20.36
7	0.2697149	0.1133254	0.1915053	1.294231	3.595339	8.761476	20.35
8	0.2697149	0.1133254	0.1915135	1.294357	3.597042	8.778148	20.47
9	0.2697149	0.1133254	0.1915135	1.29441	3.597723	8.784472	20.52
10	0.2697149	0.1133254	0.1915135	1.294357	3.597382	8.779873	20.49
11	0.2697149	0.1133254	0.1915135	1.294321	3.596702	8.775849	20.46
12	0.2697149	0.1133254	0.1915053	1.294303	3.596702	8.776423	20.47
13	0.2681637	0.1124214	0.1895664	1.279001	3.549263	8.637678	20.08
14	0.2681637	0.1124214	0.1895664	1.279036	3.5496	8.642214	20.12
15	0.2681637	0.1124214	0.1895664	1.279019	3.5496	8.639379	20.10
16	0.2681637	0.1124214	0.1895664	1.279107	3.549936	8.641647	20.10
17	0.2681637	0.1124214	0.1895664	1.279125	3.550272	8.644482	20.12
18	0.2681637	0.1124214	0.1895664	1.279107	3.549936	8.642214	20.11
19	0.2681637	0.1124214	0.1895745	1.279143	3.550608	8.646183	20.13
20	0.2681637	0.1124214	0.1895664	1.279107	3.550272	8.643915	20.12

Data archiving status (hdf; consolidated data)

- Overall, in good shape, with several missing species (after the change of template) added over the last year (C_2H_6 , HCl, HF)
- Ongoing: HNO_3
- NRT archiving (within 1-2 weeks after observation) halted due to lack of funding (end of NORS project)

Cataloged File Names for x

www.ndsc.ncep.noaa.gov/cgi-bin/pi/query_data/query_data.pl

Network for the Detection of Atmospheric Composition Change
Website hosted by NOAA's National Weather Service

Home NWS News NWS Organization Search NOAA Search

Home > Cataloged File Names for Specified Criteria

Cataloged File Names for Specified Criteria

Site	Instrument	Specie	Meas. Investigator
JUNGFRAUJOCH	FTIR	All	All

Start Date	End Date	Cataloged After	Data Format
All	All	All	CON

Min. Lat.	Max. Lat.	Min. Lon.	Max. Lon.
-90	90	0	360

Found 257 Names Matching Specified Criteria

Exit Perform Another Query Download an Archive Containing These Files

No.	Filename	Catalog Date	File Options
1	groundbased_fir.c2h2_ulg002_jungfraujoch_19970111t124505z_19971222t114434z_004.hdf	2014-07-07	view/download
2	groundbased_fir.c2h2_ulg002_jungfraujoch_19980122t081700z_19981223t094409z_004.hdf	2014-07-07	view/download
3	groundbased_fir.c2h2_ulg002_jungfraujoch_19990106t093914z_19991217t121349z_004.hdf	2014-07-07	view/download
4	groundbased_fir.c2h2_ulg002_jungfraujoch_20000107t094716z_20001128t132150z_004.hdf	2014-07-07	view/download
5	groundbased_fir.c2h2_ulg002_jungfraujoch_20010109t094559z_20011220t100843z_004.hdf	2014-07-07	view/download
6	groundbased_fir.c2h2_ulg002_jungfraujoch_20020108t095711z_20021219t133228z_004.hdf	2014-07-07	view/download
7	groundbased_fir.c2h2_ulg002_jungfraujoch_20030107t094412z_20031212t131854z_004.hdf	2014-07-07	view/download
8	groundbased_fir.c2h2_ulg002_jungfraujoch_20040131t101503z_20041216t112300z_004.hdf	2014-07-07	view/download
9	groundbased_fir.c2h2_ulg002_jungfraujoch_20050108t083723z_20051221t133918z_004.hdf	2014-07-07	view/download
10	groundbased_fir.c2h2_ulg002_jungfraujoch_20060109t092826z_20061210t135013z_004.hdf	2014-	view/download

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Brewer (@U Manchester)
FTIR (@NCAR)
Lidar (off site)
Microwave (@U Bern)
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Sondes (@U Wyoming)
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Observation statistics

Poor in 2014, because of recurrent problems with the remote operation of the detector cooling system:

- 92 days in 2014
- 130 on average over 2009-2013
- 43 for 2015 [Jan.-May]

hdf archiving status

	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	Comment
CH4																									Update of Angelbratt et al., 2011
C2H6																									Franco et al., 2015
ClONO2																									Update of Kohlhepp et al., 2012
CO																									Update of Kerzenmacher et al, 2011
HCl																									Mahieu et al., 2014
HF																									Update of Duchatelet et al., 2011
HCN																									Duflot et al., 2015
HNO3																									
N2O																									Update of Angelbratt et al., 2011
O3																									Vigouroux et al., 2015
C2H2																									Duflot et al., 2015
H2O																									Update of Sussmann et al., 2009
NO2																									Update of Hendrick et al., 2012

Next regular upload: archiving of 1st semester 2015 around mid-July

Ongoing investigations and foreseen publications

- NH_3 from gb-FTIR solar spectra, by Dammers et al.
- OCS, optimization of the retrieval strategy, in preparation by Lejeune et al., see new species discussion
- Seeking for the causes of recent methane increase (NDACC & GEOS-Chem), in preparation by Bader et al
- Long-term trend and diurnal variation of HCHO at the Jungfraujoch, in preparation by Franco et al
- Retrieval of CH_3Cl from the Jungfraujoch and Reunion, in preparation by Mahieu, Vigouroux et al.

Recent publications (2014-2015)

- Bader, W., Stavrakou, T., Muller, J.-F., Reimann, S., Boone, C. D., Harrison, J. J., Flock, O., Bovy, B., Franco, B., Lejeune, B., Servais, C. and Mahieu, E.: Long-term evolution and seasonal modulation of **methanol** above Jungfraujoch (46.5° N, 8.0° E): optimisation of the retrieval strategy, comparison with model simulations and independent observations, *Atmospheric Measurement Techniques*, 7(11), 3861–3872, doi:10.5194/amt-7-3861-2014, 2014.
- Mahieu, E., Chipperfield, M. P., Notholt, J., Reddmann, T., Anderson, J., Bernath, P. F., Blumenstock, T., Coffey, M. T., Dhomse, S. S., Feng, W., Franco, B., Froidevaux, L., Griffith, D. W. T., Hannigan, J. W., Hase, F., Hossaini, R., Jones, N. B., Morino, I., Murata, I., Nakajima, H., Palm, M., Paton-Walsh, C., Russell, J. M., Schneider, M., Servais, C., Smale, D. and Walker, K. A.: Recent Northern Hemisphere stratospheric **HCl increase** due to atmospheric circulation changes, *Nature*, 515(7525), 104–107, doi:10.1038/nature13857, 2014a.
- Mahieu, E., Zander, R., Toon, G. C., Vollmer, M. K., Reimann, S., Mühle, J., Bader, W., Bovy, B., Lejeune, B., Servais, C., Demoulin, P., Roland, G., Bernath, P. F., Boone, C. D., Walker, K. A. and Duchatelet, P.: Spectrometric monitoring of atmospheric carbon tetrafluoride (**CF₄**) above the Jungfraujoch station since 1989: evidence of continued increase but at a slowing rate, *Atmospheric Measurement Techniques*, 7(1), 333–344, doi:10.5194/amt-7-333-2014, 2014b.
- Vander Auwera, J., Fayt, A., Tudorie, M., Rotger, M., Boudon, V., Franco, B. and Mahieu, E.: Self-broadening coefficients and improved line intensities for the v7 band of **ethylene** near 10.5 μm , and impact on ethylene retrievals from Jungfraujoch solar spectra, *Journal of Quantitative Spectroscopy and Radiative Transfer*, 148, 177–185, doi:10.1016/j.jqsrt.2014.07.003, 2014.
- Barthlott, S., Schneider, M., Hase, F., Wiegeler, A., Christner, E., González, Y., Blumenstock, T., Dohe, S., García, O. E., Sepúlveda, E., Strong, K., Mendonça, J., Weaver, D., Palm, M., Deutscher, N. M., Warneke, T., Notholt, J., Lejeune, B., Mahieu, E., Jones, N., Griffith, D. W. T., Velasco, V. A., Smale, D., Robinson, J., Kivi, R., Heikkinen, P. and Raffalski, U.: Using **XCO₂** retrievals for assessing the long-term consistency of NDACC/FTIR data sets, *Atmospheric Measurement Techniques*, 8(3), 1555–1573, doi:10.5194/amt-8-1555-2015, 2015.
- Duflot, V., Wespes, C., Clarisse, L., Hurtmans, D., Ngadi, Y., Jones, N., Paton-Walsh, C., Hadji-Lazaro, J., Vigouroux, C., De Mazière, M., Metzger, J.-M., Mahieu, E., Servais, C., Hase, F., Schneider, M., Clerbaux, C. and Coheur, P.-F.: **Acetylene (C₂H₂) and hydrogen cyanide (HCN) from IASI** satellite observations: global distributions, validation, and comparison with model, *Atmospheric Chemistry and Physics Discussions*, 15(10), 14357–14401, doi:10.5194/acpd-15-14357-2015, 2015.

Recent publications (2014-2015)

- Franco, B., Bader, W., Toon, G. C., Bray, C., Perrin, A., Fischer, E. V., Sudo, K., Boone, C. D., Bovy, B., Lejeune, B., Servais, C. and Mahieu, E.: Retrieval of **ethane** from ground-based FTIR solar spectra using improved spectroscopy: Recent burden increase above Jungfraujoch, *Journal of Quantitative Spectroscopy and Radiative Transfer*, 160, 36–49, doi:10.1016/j.jqsrt.2015.03.017, 2015a.
- Franco, B., Hendrick, F., Van Roozendael, M., Müller, J.-F., Stavrakou, T., Marais, E. A., Bovy, B., Bader, W., Fayt, C., Hermans, C., Lejeune, B., Pinardi, G., Servais, C. and Mahieu, E.: Retrievals of **formaldehyde** from ground-based FTIR and MAX-DOAS observations at the Jungfraujoch station and comparisons with GEOS-Chem and IMAGES model simulations, *Atmospheric Measurement Techniques*, 8(4), 1733–1756, doi:10.5194/amt-8-1733-2015, 2015b.
- Van Geffen, J. H. G. M., Boersma, K. F., Van Roozendael, M., Hendrick, F., Mahieu, E., De Smedt, I., Sneep, M. and Veefkind, J. P.: Improved spectral fitting of **nitrogen dioxide from OMI** in the 405–465 nm window, *Atmospheric Measurement Techniques*, 8(4), 1685–1699, doi:10.5194/amt-8-1685-2015, 2015.
- Harris, N. R. P., Hassler, B., Tummon, F., Bodeker, G. E., Hubert, D., Petropavlovskikh, I., Steinbrecht, W., Anderson, J., Bhartia, P. K., Boone, C. D., Bourassa, A., Davis, S. M., Degenstein, D., Delcloo, A., Frith, S. M., Froidevaux, L., Godin-Beekmann, S., Jones, N., Kurylo, M. J., Kyrölä, E., Laine, M., Leblanc, S. T., Lambert, J.-C., Liley, B., Mahieu, E., Maycock, A., de Mazière, M., Parrish, A., Querel, R., Rosenlof, K. H., Roth, C., Sioris, C., Staehelin, J., Stolarski, R. S., Stübi, R., Tamminen, J., Vigouroux, C., Walker, K., Wang, H. J., Wild, J. and Zawodny, J. M.: **Past changes in the vertical distribution of ozone** – Part 3: Analysis and interpretation of trends, *Atmospheric Chemistry and Physics Discussions*, 15(6), 8565–8608, doi:10.5194/acpd-15-8565-2015, 2015.
- Scheepmaker, R. A., Frankenberg, C., Deutscher, N. M., Schneider, M., Barthlott, S., Blumenstock, T., Garcia, O. E., Hase, F., Jones, N., Mahieu, E., Notholt, J., Velasco, V., Landgraf, J. and Aben, I.: **Validation of SCIAMACHY HDO/H₂O measurements** using the TCCON and NDACC-MUSICA networks, *Atmospheric Measurement Techniques*, 8(4), 1799–1818, doi:10.5194/amt-8-1799-2015, 2015.
- Vigouroux, C., Blumenstock, T., Coffey, M., Errera, Q., García, O., Jones, N. B., Hannigan, J. W., Hase, F., Liley, B., Mahieu, E., Mellqvist, J., Notholt, J., Palm, M., Persson, G., Schneider, M., Servais, C., Smale, D., Thölix, L. and De Mazière, M.: **Trends of ozone** total columns and vertical distribution from FTIR observations at eight NDACC stations around the globe, *Atmospheric Chemistry and Physics*, 15(6), 2915–2933, doi:10.5194/acp-15-2915-2015, 2015.

HBr cell measurements

- No results to show this year: all HBr spectra will soon be reanalyzed with the latest version of LINEFIT (consistency is critical)
- Of course, cell measurements have been performed over the last year (4 batches in 2014, 2 in 2015)

