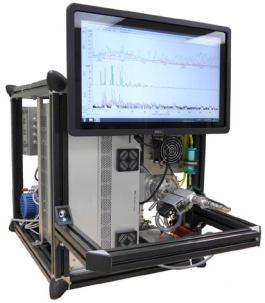
WP3: Task is to provide on line measurements of aerosol chemical composition with high time resolution.

WP Andre Prevot, PSI

Evelyn Freney (ACMCC/LaMP/CNRS)



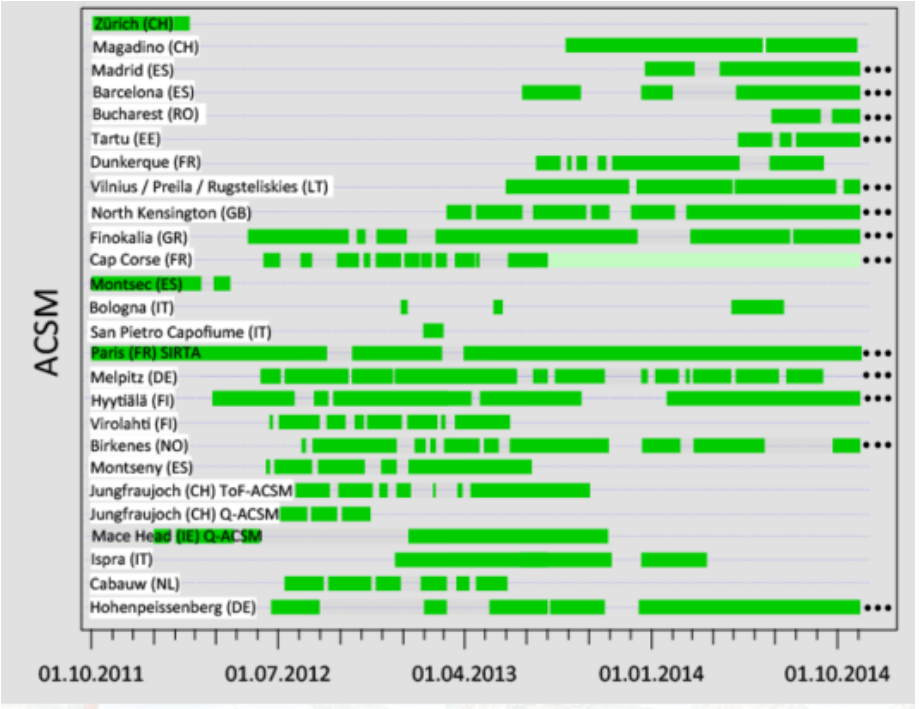
ACTRIS-2 WP3 / WP8 / WP11 Technical Meeting

Athens, Greece

November 10-12, 2015

ACTRIS ACSM stations

26 stations (2014):

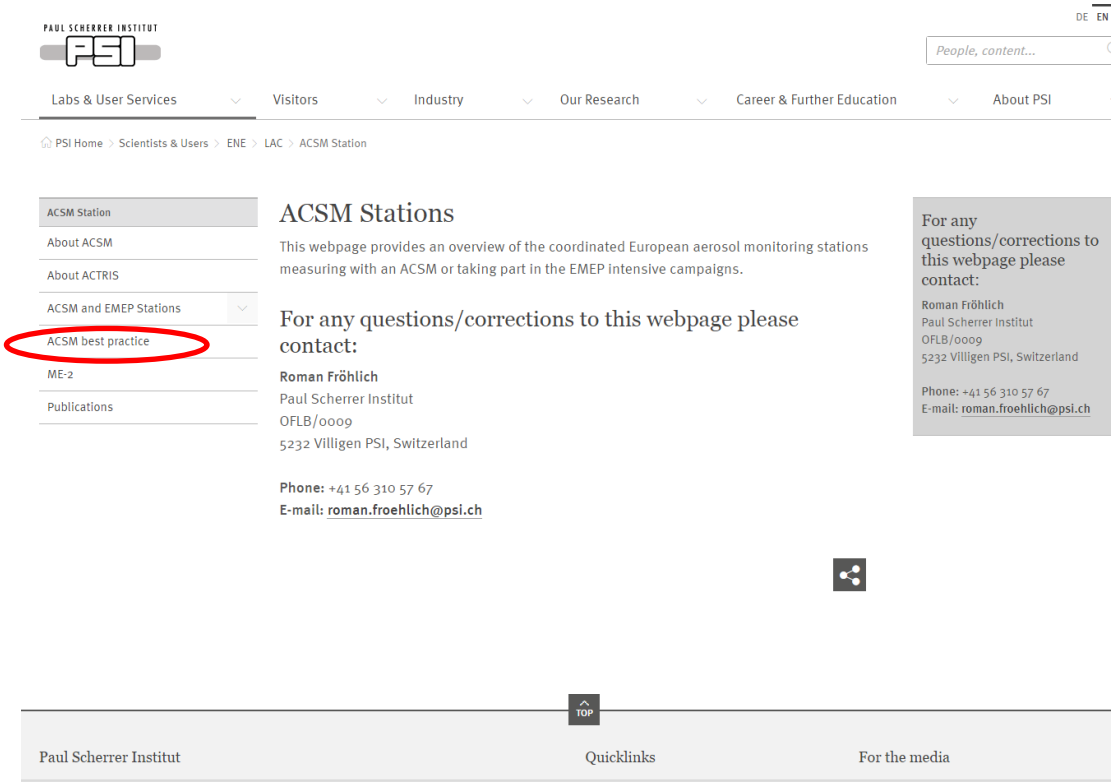


Outline: Task 3.2.1

Development of a measurement standardization and data submission protocol for aerosol particle mass spectroscopy based on Aerosol Chemical Speciation Monitor (ACSM) products (CNRS, PSI)

- Homogenous quality-controlled ACSM datasets at a European scale and
- Homogenize calibration and data processing and in particular the source apportionment of organic aerosol data.
- Precision and accuracy of these measurements will be evaluated with various co-located instruments from such as TEOM-FDMS, SMPS, OC-EC Sunset Field analyzer, PILS-IC, filter sampling …).

User information



PSI ACTRIS ACSM page
https://www.psi.ch/acsm-stations/acsm-station

Aerodynes ACSM page
http://sites.google.com/site/ariacsm

ToF-AMS wiki page
http://cires.colorado.edu/jimenez-group/wiki/index.php?title=ToF-AMS_Main

Send an email to "Sosedova Yuliya (PSI)" (Yuliya.Sosedova@psi.ch) To update site information and/or publications

→ PSI "Best practices" document

- Sampling lines should be diagrammed: Sampling line length, diameters, materials, flow rates
- Axillary flow rate of at least 3 l/min (recommended by Aerodyne).
- Sampling lines should be INOX rather than black tubing
- Reduce sample line loses: Have other instruments sampling along the line of the ACSM
- Drying: Essential that aerosol is dried prior to sampling (Nafion/ Diffusion)

→Flow calibration

→Should be preformed each time orifice is changed/cleaned or instrument is moved.

→Use a larger orifice if sampling at altitude

e.g. At altitudes < 500 m orifice of 100 microns

At altitudes > 1000 m orifice of 120/130 microns (Puy de Dome, Jungfraujoch).

Ionization efficiency calibration:

Recommended to preform this calibration initially every 2 months, then 3 to 4 months:

Ammonium nitrate solution 5mM → Atomizer → Dryer → Diluter → DMA → CPC/ACSM

300 nm

Important to avoid double charge particles

For a multi-point calibration

Verify the size distribution with an SMPS (> 500 nm)

Keep record of IE value for reference

ACMCC: Aerosol Chemical Monitor Calibration Centre: A new facility for the quality control of ACTRIS-2 Aerosol Chemical Speciation Monitor (ACSM) measurements

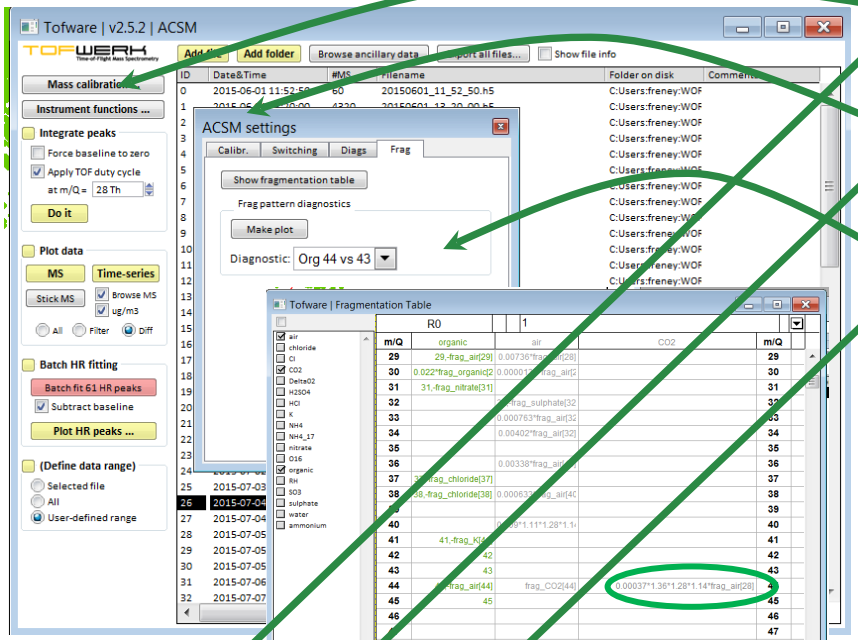
Laboratoire des Sciences du Climat et de l'Environnement
LSCE (UMR 8212)

Participate in at least one ACSM calibration intercomparison exercise.

Upcoming intercomparison exercise: March 2016, (Details will be presented Thursday morning).
Second intercomparison exercise: Autumn 2017

→ Training benefits: Interactions with other users, discussion and suggestions from Aerodyne
→ ACTRIS validated data.
→ Highlights any instrument malfunctions.

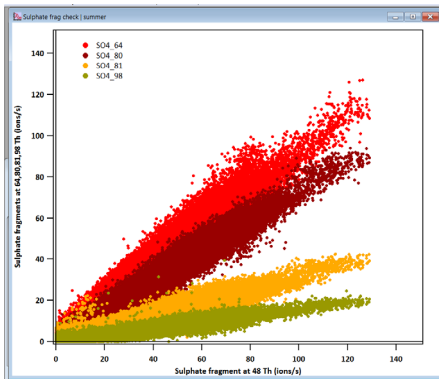
Homogenize calibration and data processing and in particular the source apportionment of organic aerosol data.

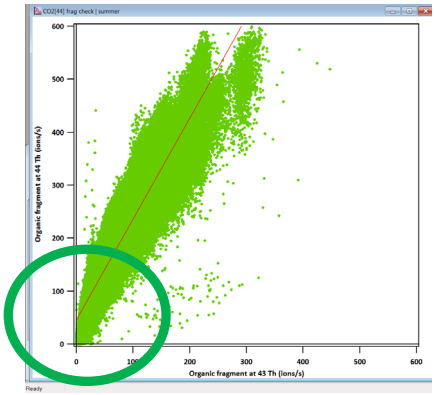


Same software package is available to all users.

Data analysis checks are supplied in the software panel.

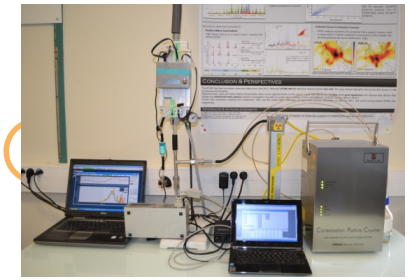
These checks are used so that we can very that all fits pass through zero. If not adjustments to the fragmentation table need to be made.





Detailed info → http://cires1.colorado.edu/jimenez-group/wiki/index.php/Field_Data_Analysis_Guide

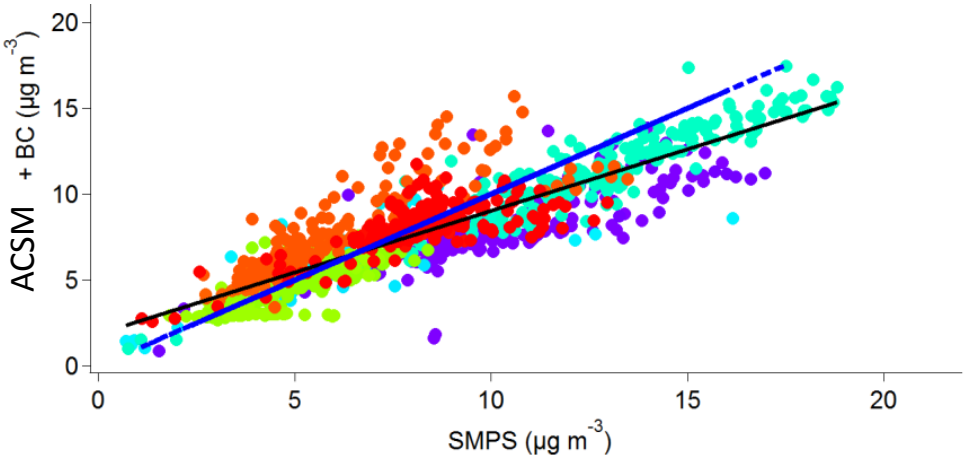
Precision and accuracy of these measurements will be evaluated with various co-located.



SMPS + OPC

TEOM - FDMS

Useful way to validate ACSM collection efficiency (CE=1)



→SMPS will be validated using the traveling CPC under Task 3.3.1

→Indirect validation the ASCM absolute number concentrations

Data upload to EBAS

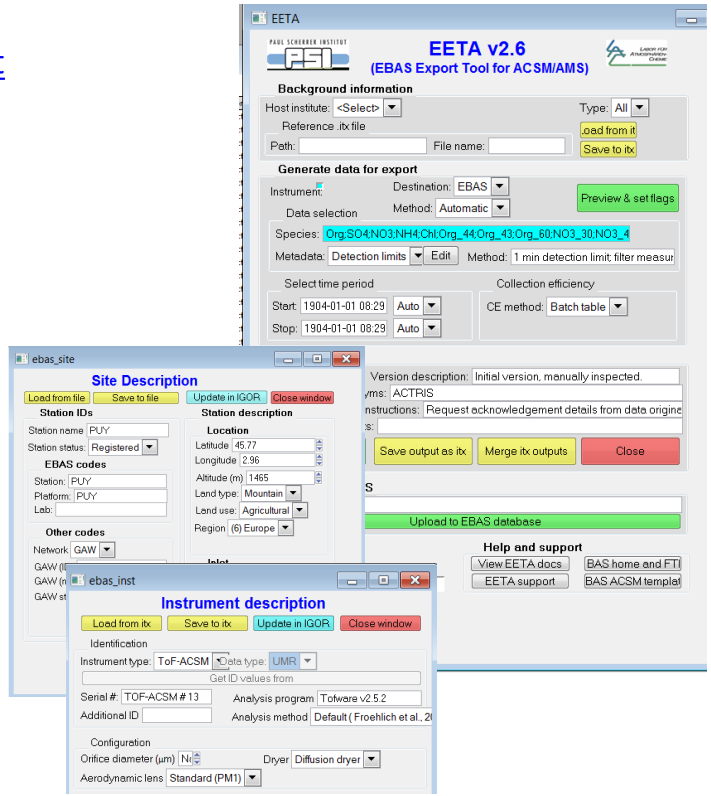
Data for 2015/2016 needs to be uploaded by 31 July 2016

http://www.actris.eu/Portals/46/Publications/DataCentre/ACTRIS_Data_Management_Plan.pdf

Recommended to upload data earlier (every 3 months?):

→Allows any issues with the data to be addressed
→Avoids back logs of everyone uploading at the last minute

Jay Slowik recently provided an updated IGOR procedure file **EETA v2.6** to prepare the ACSM data as well as links to upload this data to the EBAS data base.



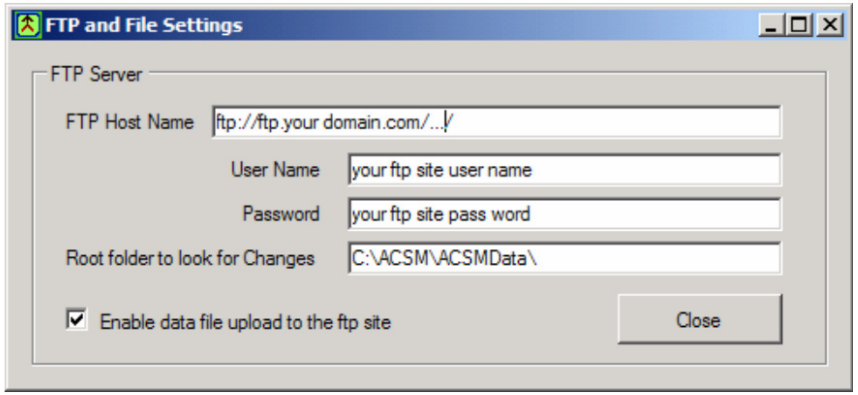
Real-time data upload

Aerodyne have made available an ftp uploader for real time upload of data.

https://sites.google.com/site/ariacsm/mytemplate-sw/FTP_Utility_Setup_V13.msi?attredirects=0&d=1

Prerequisites for use of this program:

- The ACSM data acquisition computer is connected to the internet.
- The ACSM data acquisition computer must be running .NET Frame Work 2.0 or higher (this will be true since the ACSM_DAQ also requires this).
- The ACSM computer is actively saving data.
- The user must have read/write access to an ftp site.



Ongoing publications and upcoming meetings

Crenn et al: 2015 First intercomparison exercise

Accepted for Atmospheric Measurement Techniques

Current status of JRC overview paper / *M.Bressi*

- Focus of the paper: European phenomenology of (NR-)PM1 aerosols, spatial distributions, relative contributions, diurnal patterns.

PMF analysis on ACTRIS ACSM datasets / Yuliya Sosedova

Upcoming meetings

- SOFI workshop in Bad Zurzach in the spring. To be confirmed.