

# ACTRIS Q&A

Q: The ACSM uses the "old" version of the fragmentation table. Is there a specific reason for that and are the rumors true that there will be a re-revised fragmentation table soon?

A: We've stuck with the 'old' version to stay consistent with old UMR spectra. The mass is conserved so from that point of view you get the same loadings. No new fragmentation table – Manjula will discuss later.

Q: Recently it was recommended to use the air beam instead of the faraday cup to monitor the gain. It is now also recorded during the IE calibration, but two groups who already tried the new routine reported that the airbeam value during the calibration was lower than before and after. Do you have a possible explanation for that?

A: A couple of possibilities

1. The compressed air supply has a different N<sub>2</sub> mass fraction.
2. Could total pressure be lower during calibration somehow? The pressure is recorded...

Q: In the calculation of the error matrix for the PMF the software asks for the gain. Since it is not anymore recommended to monitor this and since the measured gain value can be wrong due to a decay of the faraday cup signal it is not sure which value to enter there? Just stick to 20000 if the instrument was maintained at an airbeam of around  $1e-7$ ?

A: Yes, that's what I would recommend.

Another suggestion was to add the option to enter the CPC number concentration after recording the signal in the new calibration procedure to synchronize averages

This is a good suggestion – right now if you're entering CPC manually, you need to do it before you click the 'Start Averaging' button. The behavior should be that if you're not recording the CPC via the analog input, then you it doesn't do any averaging there. I'll fix this.

Q: One group experienced a drift of the heater bias voltage, do you have an idea how to avoid that. Could you please also clarify why there is a difference between the different heater bias displays. There is the field where you set the HB, then next to it the reading and in the Analog and Digital IO tab of the control panel there is another different value of the heater bias.

A: There is a 5V offset because the heater body never at ground; it is floating at 5V and the heater bias gets added on to that.

Q: Also the pressure readings at the pump statistics and in the digital I/O tab differ.

A: This difference is usually very small. The number in the DAQ software is the more trustworthy value and the value to use since it is recorded.

Q: How can I check if a change in the fit function of the ion transmission correction really is applied? When I change that function and close and reopen the relative ion transmission window the standard exponential fit is shown again.

A: I'd approach this by making a duplicate trace on the time series plot, then applying the ion transmission correction. The exponential will be drawn by default if you remake the graph, so don't kill the graph.

Q: Do you have any recommendation for the calibration solution of ammonium sulfate? Particle size and concentration range should be same/similar to  $\text{NH}_4\text{NO}_3$ ?

A: I typically use a similar conc. (~5mM) and 300nm particles. Since this is an RIE calibration, it doesn't really matter if you have some Q2s.

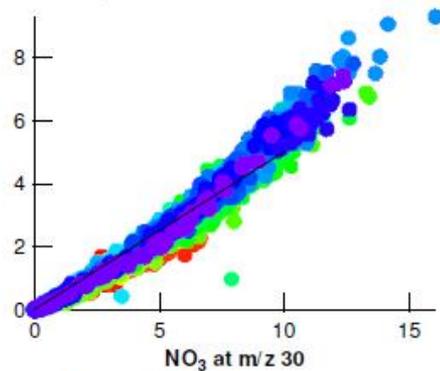
Q: Is it possible to extend the error calculation from only the organics matrix to all species?

A: Yes, but this is something I need to revisit. I have some code to do this, but the feedback I got from Jean-Eudes who tested this was that the errors seemed to small.

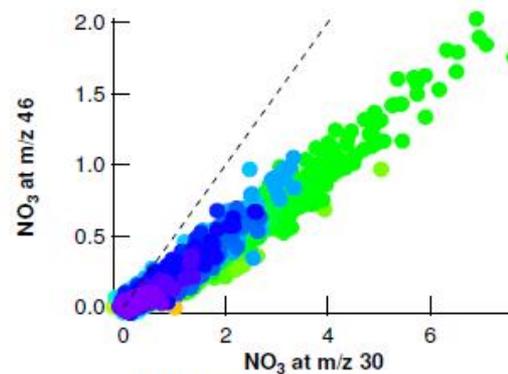
- The RF plot in the time series correction tab can be a bit misleading. When someone changes the RF shown there it is not applied to the dataset.
- I agree. This is a good place to have some general feedback on this panel.

Q: The nitrate fragmentation still seems to not be linear after the DAQ update. I attached fragmentation plots of several groups recorded with the new DAQ version. You see, that it improved but did not disappear. Can we somehow correct for this nonlinearity? Could you please again describe the reason for this nonlinearity?

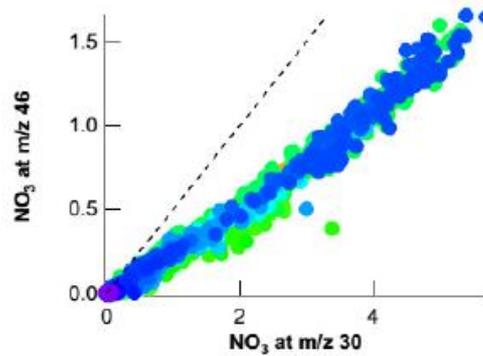
Ispra, Italy



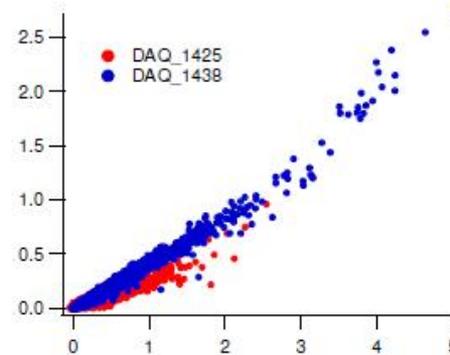
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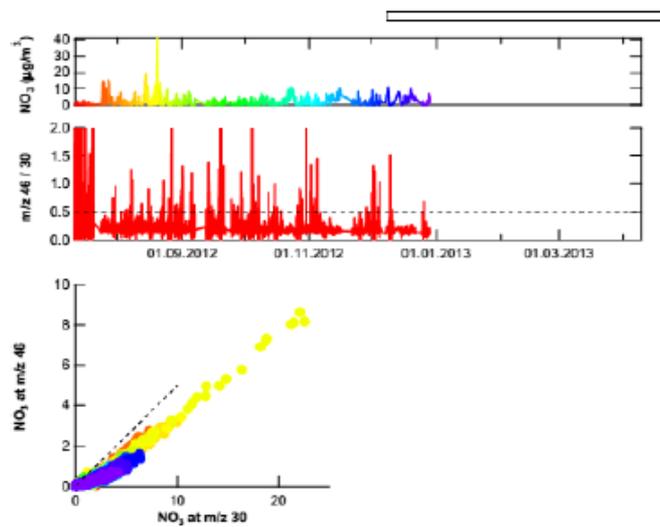
Mace Head, Ireland



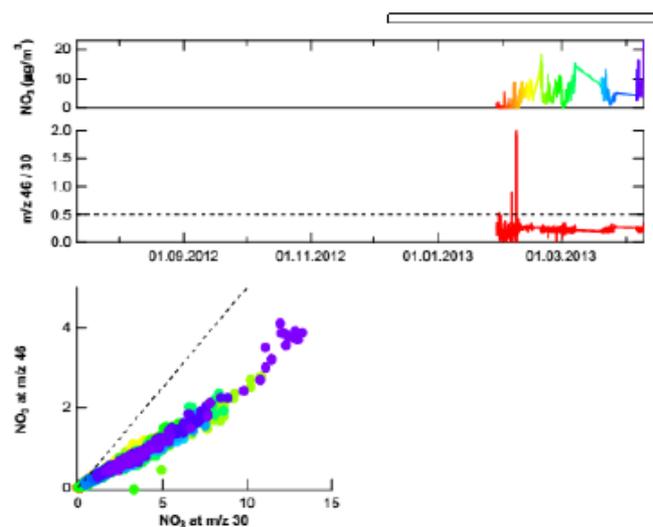
Montseny, Spain



## Cabauw, the Netherlands

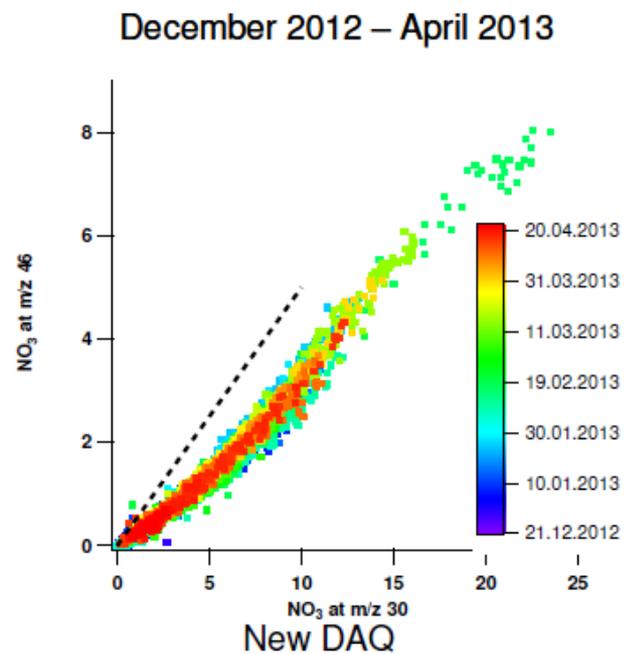
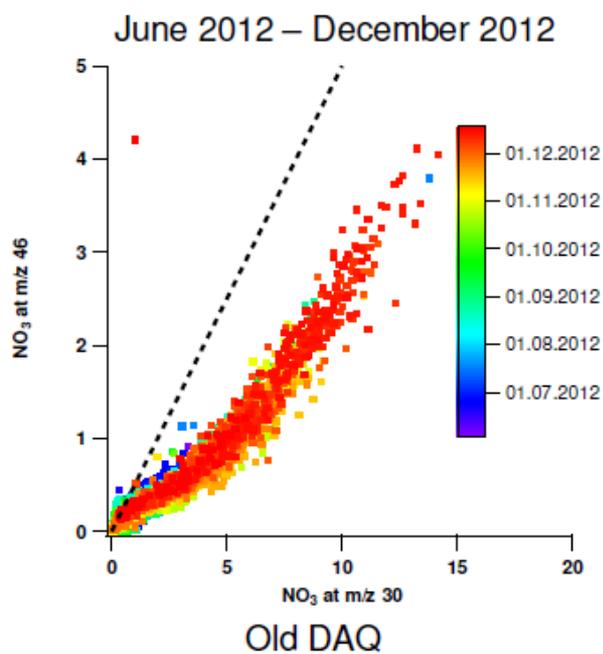


DAQ Version 1.425



DAQ Version 1.438

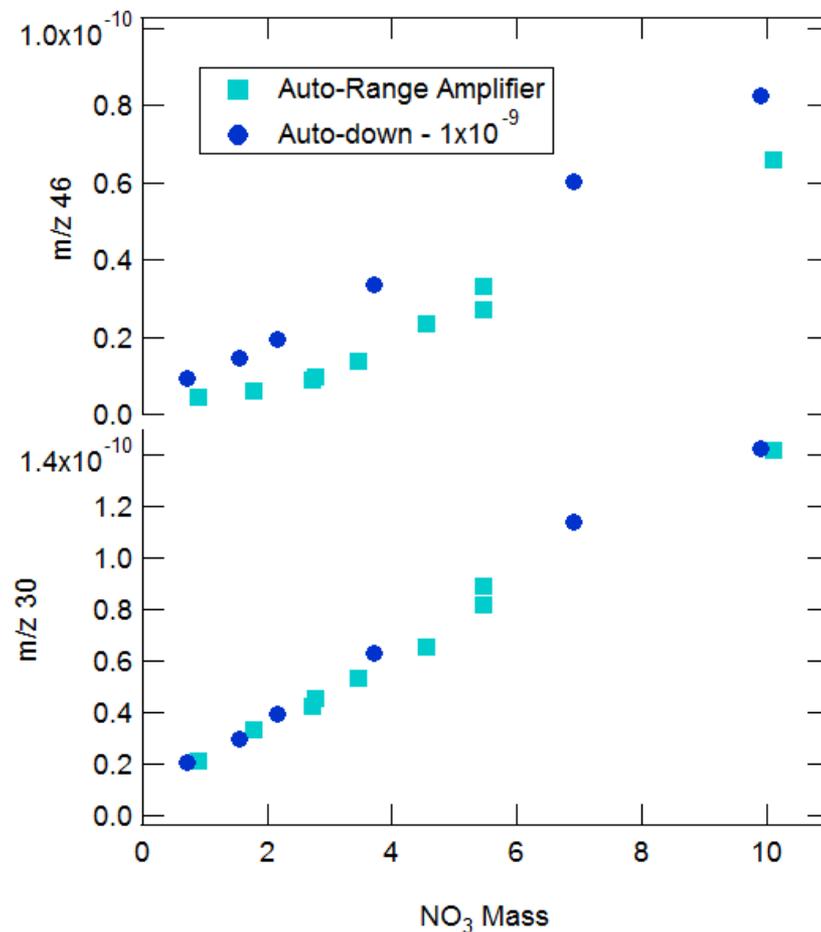
## Melpitz, Germany



- I don't think there's a good post-processing correction for this. That being said, the non-linearity seems to be pretty small.
- We could try to go up one more decade on the autoranging amplifier. My tests at ARI showed that we still had a low enough base line using  $1e-9$  rather than  $1e-10$

Using 'Auto-Down' instead of 'Auto-Range' seems to fix the non-linearity with calibration particles.

Waiting on confirmation in ambient data



- -It would be great if you could include the possibility to plot all speciated ions directly from the panel. At the moment only a few scatter plots like the Org44 vs Org43 are accessible. It would be very useful if the user could produce custom scatter plots and time series of organic fragments for specific time periods. This is especially important for users using the ME-2 algorithm.
- Good suggestion, should be easy to implement.

Q: How precisely do we know the real vaporizer temperature?

A: Probably within 20-25 deg. C.

If in doubt, always rely on the power setting (the calibration that was sent with the instrument) and visual observations from the rear window

Q: What do you think? Can we calibrate the ACSM with an SMPS without a radioactive source or do we get too many doubly charged particles? Doubly charged particles could probably be avoided with an additional impactor in front of the DMA? Many groups do have problems transporting the radioactive source across the country.

A: Q2's will probably be a problem, but we don't really have the data to answer this question at this point.

Q: Shall/Can ACSM spectra be included in the AMS database?

A: Yes – but we need to set up an infrastructure the way we have for high res spectra.

New calibration procedure: Custom scan sets instrument in filter mode (Lithuanina) -> manual override of the valves required for calibration.

Yes – my standard calibration procedure bypasses the filter valve. So it doesn't matter what state the valve is in. So when I put the Igor code together I told it to look for 'closed' data. This will be switched in the next release (coming soon!).

Should I add the option that the user chooses between sample, filter, and difference???

- The 'update only' button (to add data to an experiment) does not work. Since we are managing long data sets, we may start looking at them and making some customized plots that we do not want to lose when we want to update our data set with new data. This is especially true for the ACSM users with the NH4 spikes problem. An example with the different error messages: \* experiment with data from 06/14/2012 16:54:04 until 06/16/2012 22:51:28 \* try to upload the next day by choosing 06/16/2012 23:54:00 as the start date time and 06/18/2012 23:05:33 as the end, clicking the update only option \* error message: "start/date time is after last point. No data loaded" \* try to overlap the periods slightly, choosing 06/16/2012 21:00:00 to 06/18/2012 23:05:33 \* error message: "Aborted. End date is before start date or your time wave is non-monotonic"
- Yes, this will be fixed in the next version

- -A possibility to 'rescue' data points from the blacklist would be desirable
- -A possibility to send data points to the blacklist without choosing a reason would be desirable
- -The list of reasons for each of the blacklisted data is not found in the blacklist folder. It would be desirable to have a text wave with these reasons
- Yes, these are all good suggestions. The blacklisting feature is really under-developed. I'll work on this.

- -A possibility to apply a time-dependent CE implemented within the software would be desirable (so that the user can calculate separately the time-dependent CE wave and then be able to choose this wave to be applied)
- Yes. I put together a tool to do this and had someone test it. I need to check in and see how it went.

- -The reference values to be used for correction are those during calibration. This should be specified in the manual.
- Yes, the whole manual needs to be torn apart and rewritten..

