

Interactive comment on “Design and performance of an automatic regenerating adsorption aerosol dryer for continuous operation at monitoring sites” by T. M. Tuch et al.

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We wish to thank the reviewers for their relevant suggestions. All subjects addressed by the reviewers have been changed accordingly in the revised version of the manuscript. Answers to specific questions arising from this discussion can be found below.

Specific modifications:

Reviewer 1, J. Gras: The use of stainless steel throughout is excellent, but the reason given, for reducing losses due to image charges (p1146, l18), may be a little inaccurate.

The sentence has been changed according to the suggested formulation.

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...it would be good to mention whether the dryer was loaded with desiccant for the tests.

The dryer was loaded with desiccant during the test. An additional Nafion dryer in front of the TDMPs system was used to avoid artifacts due to different relative humidity of the aerosol in both aerosol paths. This information has been added to the manuscript.

Reviewer 2 ...the description of the valves is sometime confusing (magnetic feed valves, magnetic exhaust valves and ball valves

Valve descriptors as used in the schematic drawing of the dryer have been added to the manuscript.

In the introduction you describe several methods to condition the aerosol to a required relative humidity. What about GORE-TEX tubing of large inner diameter to dry the sample flow?

Gore-Tex has been added to the diffusion dryer section of the introduction.

It would be useful to mention the “particle residence time” within the dryer column. Similarly you could specify some details about the mesh used in the columns.

Details about the mesh and a residence time of 1.6 seconds at a flow rate of $1\text{ m}^3/\text{h}$ have been added,

How is calculated the transmission efficiency shown in Fig.5

The transmission efficiency was calculated by dividing the average size distribution with dryer / average size distribution without dryer.

Fig.5: Why is the transmission efficiency greater than the unity for particle diameters larger than 150 nm ?

Transmission efficiencies exceeding 1 are due to different tube lengths of both inlets and to non ideal external plumbing due to the limited space in the measurement con-

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tainer. This sentence has been added to the manuscript.

During time, silica gel grains will breaks down “producing particles” that could pass through the grid. Does this imply a “contamination” of the aerosol sample flow through the mesh while the columns switches? Did you never check “leaks” from the inner mesh? (e.g. using a total filter at the dryer inlet and measuring the total counts during the switching phase)

This is a good point. The dryer is therefore checked monthly with an absolute filter. Typically we measure less than 5 particles/cc with the filter. Any increase of this number concentration would indeed suggest a change of the desiccant if no other reason for elevated levels can be found

Did you replace the Silica Gel after 6 month?

No, even after now 16 months we did not encounter degradation of the Silica gel. A change of the desiccant was therefore not necessary.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 1143, 2009.

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