

Interactive comment on “Laboratory and field evaluation of the Aerosol Dynamics Inc. concentrator (ADlc) for aerosol mass spectrometry” by Sanna Saarikoski et al.

Anonymous Referee #2

Received and published: 18 May 2019

This paper presents the design, laboratory and field tests of an ultrafine particle concentrator (ADlc) for enhancement of ambient aerosol characterization by aerosol mass spectrometry. The ADlc can concentrate aerosol samples with a theoretical concentration factor ranging from 8 to 21. Laboratory tests show that the ADlc is effective for particles with diameter greater than 10 nm, and the actual concentration factor is close to the theoretical limit. The ADlc does not change the size distribution of ambient aerosol particles, and the impact on aerosol composition is minor. Field tests shows the ADlc is very robust and can run unattended over an extended period. Overall the paper is nicely written, and the topics fits AMT well. I recommend publication of the paper after the authors address the following comments.

C1

(1) Lines 34-35, The sentence “. . . did not change the size distribution or the chemistry of the ambient aerosol particles.” is too strong. The results do suggest there are some minor changes to the particle chemical composition (due to the composition dependence of concentration factor).

(2) Please add diagrams illustrating the setup of the laboratory and field tests (at least in the supplementary information).

(3) Please clarify what a “multiplex chopper” is.

(4) Line 270: how was CF measured? Fig. S2a-b shows the CF was 6.8 instead of 5.7.

(5) Figure S2c-d, the values of regression slope listed in Figures S2c and S2d are different (9.7 and 10.4).

(6) Line 302, how frequently was the sampling alternated between ADlc and the bypass line?

(7) Lines 368-369: The low particle transmission efficiency through the lens is unlikely the only cause for the low CF. Figure S3c shows that in the lower size range (e.g., 400-600 nm), the CF was about 5, substantially below the theoretical value. How do the measurements of Q-AMS with ADlc bypassed compare with HR-AMS data for different species?

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-74, 2019.

C2