Atmos. Meas. Tech. Discuss., 7, C1199–C1200, 2014
www.atmos-meas-tech-discuss.net/7/C1199/2014/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Optimized method for black carbon analysis in ice and snow using the Single Particle Soot Photometer" *by* I. A. Wendl et al.

Anonymous Referee #1

Received and published: 4 June 2014

The manuscript describes an investigation into the determination of refractory black carbon colloids by single particle intracavity laser induced incandescence. This method has been used by a number of groups to determine refractory black carbon particles in liquid samples ranging from ice core meltwater to lake samples. The analysis is dependent on a number of factors including BC colloid stability, aerosol transport within aerosol / desolvation systems and suitable refractory black carbon external standards to calibrate the aerosol system. Comparison of three different nebulizer / desolvation systems are described. Sample stability was also investigated.

Specific questions:

1. Ideally the nebulizer / desolvation system will not change the mass or size distribution of the particles in solution. The study found that the APEX nebulizer alters the particle size distribution the least. However, a significant problem with the APEX system is that it amplifies pulsations from peristaltic pumps. Self-aspiration can be extremely fickle and the uptake rate may vary from sample to sample. Other analytical systems that use the APEX include an internal standard to correct for uptake variations. Without an internal standard, how can self-aspiration be reliable for the coupled SP2 system? Self-aspiration may be stable for one sample, but not for another. Is there a way to ensure the sample introduction conditions match that of the external calibration?

2. The study found that BC mass transport through the CETAC ultrasonic nebuliser was inefficient for particles bigger than 500 micron (spherical equivalent diameter). Are BC particles > 500 micron typically found in Arctic and Antarctic snow?

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 3075, 2014.