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Supplement of

Contributions of dust and biomass burning to aerosols at a Colorado mountain-top site

A. G. Hallar et al.

Correspondence to: A. G. Hallar (ghallar@dri.edu)

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Supplemental Material:

Continuous Light Absorption Photometer (CLAP)

The Continuous Light Absorption Photometer (CLAP) is a NOAA/GMD developed, filter-based method that measures light absorption by particles at three wavelengths (467, 528, 652 nm). The method is a variant of the integrating plate technique in which the change in optical transmission of a filter caused by particle deposition on the filter is related to the light absorption coefficient of the deposited particles (Lin et al, 1973). The CLAP is similar to the Particle Soot/Absorption Photometer (PSAP; Bond et al., 1999). The CLAP differs from the PSAP primarily in that, instead of a single sample spot, it has 8 sample spots. Solenoids are used to switch to the next sample spot once the transmittance reaches 0.7. Thus, the CLAP can run eight times as long as the PSAP before requiring a filter change, ideal for remote sites, like SPL.

Bond, T.C., T.L. Anderson, and D. Campbell, Calibration and intercomparison of filter-based measurements of visible light absorption by aerosols, *Aerosol Sci. Tech*, 30, 582-600, 1999.

Lin, C.-I., Baker, M., and Charlson, R.J., Absorption coefficient of atmospheric aerosol: a method for measurement. *Appl. Optics*, 12, 1356-1363, 1973.

Table S1: Statistics for fire and dust events from nephelometer and CLAP measurements of aerosol scattering and absorption. α_{Neph} = angstrom exponent calculated from scattering ($\lambda_1=450$ nm, $\lambda_2=700$ nm), BFR=backscatter fraction (back-scattering/total scattering), SSA=single scattering albedo at 550 nm. #scat=number of hours of data for scattering, #abs=number of hours of data for absorption.

Fire statistics (means)							
Event Origin	Scat (Mm ⁻¹)	Abs (Mm ⁻¹)	α_{Neph}	BFR	SSA	#scat	#abs
Wallow	65.25	NA	1.75	0.12	NA	68	0
Waldo/ High Park	46.45	4.20	2.40	0.15	0.92	100	100
NW US 2	62.11	4.80	2.14	0.13	0.92	114	114
NW US3	117.80	7.41	2.03	0.11	0.94	49	49
Mean	72.90	5.47	2.08	0.13	0.93		
Dust statistics (means)							
Event Start Date	Scat (Mm ⁻¹)	Abs (Mm ⁻¹)	α_{Neph}	BFR	SSA	#scat	#abs
4/22/11	16.12	NA	1.58	0.13	NA	26	0
5/1/11	7.56	NA	1.84	0.15	NA	66	0
5/5/11	14.32	NA	1.14	0.14	NA	141	0
5/27/11	8.29	NA	1.30	0.14	NA	42	0
3/7/12	17.63	1.70	1.17	0.13	0.92	48	48
3/20/12	4.85	0.30	2.04	0.17	0.94	39	39
3/27/12	18.63	1.39	0.63	0.12	0.93	42	42
4/2/12	3.88	0.19	1.85	0.18	0.95	14	14
4/7/12	18.23	1.58	1.14	0.13	0.92	90	90
5/20/12	17.18	0.93	1.59	0.13	0.95	86	86
5/24/12	23.22	1.16	1.52	0.13	0.95	178	178
4/16/13	7.88	0.72	1.64	0.15	0.91	78	78
5/25/13	13.16	0.92	1.14	0.13	0.93	18	18
Mean	13.15	0.99	1.43	0.14	0.94		