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Title: Fluorescent Bioaerosol Particle, Molecular Tracer, and Fungal Spore Concentrations during Dry and Rainy Periods in a Semi-Arid Forest

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Sample Name	Start Time	End Time	Temp (°C)	Relative Humidity (%)	Rain Amount (Normalized)	Leaf Wetness (mV)	FAP Number Ratio (N_f/N_{tot})	Category
HiVol 1*	7/24/2011 18:53	7/25/2011 18:00	17.833	50.185	0.002	283.040	0.058	Dry
HiVol 2	7/25/2011 18:07	7/26/2011 18:01	18.833	55.325	0.015	268.491	0.071	Dry
HiVol 3*	7/26/2011 18:07	7/27/2011 18:07	15.821	62.651	0.008	308.613	0.166	Rainy
HiVol 4	7/27/2011 20:00	7/28/2011 20:00	16.245	71.366	0.031	316.778	0.144	Rainy
HiVol 5	7/28/2011 20:03	7/29/2011 20:03	16.143	71.328	0.000	323.439	0.102	Rainy
HiVol 6	7/30/2011 9:39	7/31/2011 7:59	18.241	64.787	0.000	265.938	0.111	Rainy
HiVol 7*	7/31/2011 8:02	7/31/2011 11:57	25.532	47.118	0.000	264.071	0.053	Dry
HiVol 8*	7/31/2011 12:01	7/31/2011 16:05	28.552	60.247	0.000	261.547	0.037	Dry
HiVol 9	7/31/2011 16:08	7/31/2011 20:04	23.847	71.358	0.000	261.640	0.045	Dry
HiVol 10*	7/31/2011 20:06	7/31/2011 23:57	16.472	72.437	0.000	262.850	0.055	Dry
HiVol 11	8/1/2011 0:01	8/1/2011 4:01	14.019	47.018	0.000	264.140	0.064	Dry
HiVol 12*	8/1/2011 4:03	8/1/2011 8:03	16.829	24.150	0.000	264.600	0.061	Dry
HiVol 13	8/1/2011 8:06	8/1/2011 20:00	22.429	40.287	0.002	272.026	0.065	Dry
HiVol 14*	8/1/2011 20:04	8/2/2011 20:26	14.579	59.359	0.090	323.792	0.163	Rainy

HiVol 15*	8/2/2011 20:28	8/3/2011 20:04	15.288	83.425	0.019	319.096	0.241	Rainy
HiVol 16	8/3/2011 20:06	8/4/2011 0:07	12.192	93.181	0.023	311.640	0.281	Rainy
HiVol 17*	8/4/2011 0:09	8/4/2011 4:10	10.120	81.078	0.000	345.847	0.348	Rainy
HiVol 18*	8/4/2011 4:13	8/4/2011 8:12	12.325	45.288	0.000	316.787	0.290	Rainy
HiVol 19*	8/4/2011 8:15	8/4/2011 12:17	20.699	66.244	0.000	268.531	0.131	Rainy
HiVol 20*	8/4/2011 12:19	8/4/2011 15:57	16.594	89.947	1.088	345.723	0.114	Other† (Rainy)
HiVol 21*	8/4/2011 16:00	8/4/2011 20:12	12.355	91.505	0.021	340.625	0.189	Other† (Rainy)
HiVol 22	8/4/2011 20:14	8/6/2011 20:03	16.309	66.855	0.001	303.368	0.170	Rainy
HiVol 23	8/6/2011 20:05	8/7/2011 20:05	19.345	46.283	0.000	280.559	0.097	Dry† (Rainy)
HiVol 24	8/7/2011 20:12	8/8/2011 19:48	16.486	36.066	0.000	261.572	0.072	Dry
HiVol 25	8/8/2011 19:49	8/9/2011 20:11	18.638	39.696	0.000	276.794	0.082	Other
HiVol 27	8/9/2011 20:13	8/10/2011 20:02	15.714	41.574	0.000	273.601	0.089	Other
HiVol 28	8/10/2011 20:05	8/11/2011 19:53	17.020	61.301	0.001	300.357	0.061	Other† (Rainy)
HiVol 29	8/11/2011 19:54	8/12/2011 19:51	16.484	51.366	0.000	267.808	0.061	Dry
HiVol 30	8/12/2011 19:52	8/13/2011 19:47	17.310	52.223	0.000	291.408	0.075	Dry

HiVol 31	8/13/2011 19:48	8/14/2011 19:54	18.546	53.361	0.000	264.413	0.082	Dry
HiVol 32	8/14/2011 19:55	8/15/2011 20:05	17.592	57.800	0.000	281.191	0.073	Dry
HiVol 33*	8/15/2011 20:06	8/16/2011 19:47	15.037	51.222	0.003	278.961	0.080	Dry
HiVol 35*	8/16/2011 19:48	8/17/2011 20:05	16.937	63.064	0.000	303.816	0.101	Dry
HiVol 36*	8/17/2011 20:06	8/18/2011 19:47	18.282	55.774	0.000	295.593	0.072	Dry
HiVol 37*	8/18/2011 19:48	8/19/2011 20:07	17.883	41.821	0.000	262.093	0.074	Dry
HiVol 38*	8/19/2011 20:08	8/20/2011 20:08	18.160	47.394	0.000	265.929	0.071	Other† (Dry)

Table S1: Summary information for each hi-volume filter sample including: start and stop times (local time), average air temperature, relative humidity, rain amount (normalized to 2.0) leaf wetness, number ratio of fluorescent particles from the UV-APS, and wetness category determined as described in Section 3.1. Cross symbol (†, last column) indicates that category assignment was manually changed from the algorithm determination (original category in parentheses). Star symbol (*, first column) indicates samples used in fungal DNA determination. N_f represents the number of fluorescent particles, N_{tot} represents the number of total particles as measured by the UV-APS.

Figure	Linear Fit Parameters	
	Rainy	Dry
5.c	y=38.0x-21.8	y=2.0x+8.1
5.d	y=54.9x-37.5	y=2.9x+8.3
5.e	y=32.0x+11.9	y=18.8x+6.9
5.f	y=41.6x+14.6	y=9.9x+9.2

Table S2: Linear equation fit parameters for Rainy and Dry conditions for Figure 5c-f. Each equation represents the linear trend linear for correlations of arabitol (5c,e) or mannitol (5d,f) with UV-APS FAP mass (5c,d) or WIBS Cl 1 FAP mass (5e,f).

Figure	Linear Fit Parameters	
	Rainy	Dry
6.d	y=0.4x+11646	y=0.2x+5064
6.e	y=0.3x+9613	y=0.2x+1939
6.f	y=0.004x+236	y=0.01x+83
6.g	y=0.9x+15514	y=1.4x+5389
6.h	y=0.9x+12683	y=1.1x+4094
6.i	y=0.005x+313	y=0.05x+190

Table S3: Linear equation fit parameters for Rainy and Dry conditions for Figure 6d-i. Each equation represents the linear trend linear for correlations of estimated fungal spores (N m^{-3}) from (6d,g) arabitol, (6e,h) mannitol or (6f,i) colony forming units (CFU) with (6d,e,f) UV-APS FAPs or (6g,h,i) WIBS Cl 1 FAPs.

Particle Mass Percentage (%)			
	Dry	Rainy	Other
Cl1	2.15 ± 1.38	16.98 ± 10.14	4.03 ± 3.42
Cl2	4.72 ± 1.43	6.01 ± 1.57	6.68 ± 2.38
Cl3	19.92 ± 5.81	13.22 ± 5.78	23.79 ± 10.60
Cl4	4.44 ± 1.64	8.83 ± 3.73	6.53 ± 3.45
FL 1	8.42 ± 3.37	62.05 ± 35.10	24.70 ± 23.61
FL 2	18.51 ± 4.02	71.55 ± 31.34	38.26 ± 24.77
FL 3	36.79 ± 6.26	85.95 ± 28.23	61.77 ± 28.29
FL	38.01 ± 6.34	87.99 ± 28.53	64.92 ± 30.66
UVAPS FAP	25.53 ± 2.99	51.50 ± 14.83	32.87 ± 9.45

Table S4: Percentage of particle mass in various UV-LIF instrument categories. Each mass value compared to total particle mass, determined using UV-APS number size distributions, converted to a mass for particles of aerodynamic diameter 0.5 – 10 μm and using particle mass density of unity. WIBS particles were integrated into total number over the same size range in optical diameter and using unity density. Range shown are standard deviation of 5-minute time averages.

Particle Type	FL1 Fluorescence Intensity	FL2 Fluorescence Intensity	FL3 Fluorescence Intensity
A	I>Threshold		
B		I>Threshold	
C			I>Threshold
AB	I>Threshold	I>Threshold	
AC	I>Threshold		I>Threshold
BC		I>Threshold	I>Threshold
ABC	I>Threshold	I>Threshold	I>Threshold

Figure S1: Particle type assignment for WIBS data. Particle category type defined as fluorescent in a given channel when the fluorescence intensity (I) in channel FL1, FL2, or FL3 is greater than the threshold value, defined as blank + 3σ. Colors correspond to particle type used also in Figures 2-3.

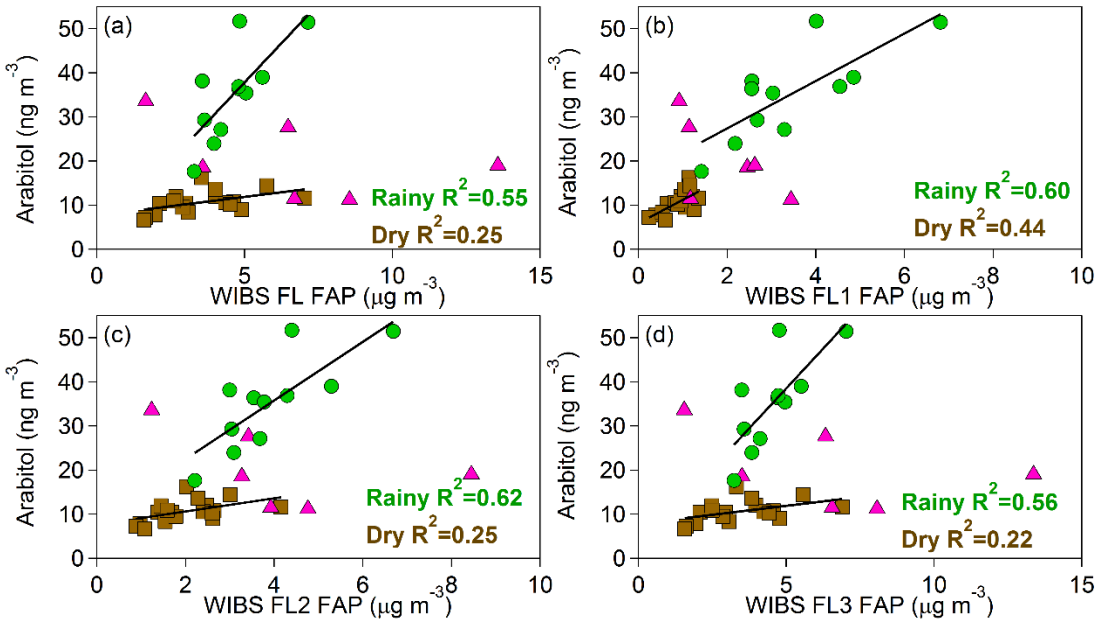

Figure S2: Atmospheric arabitol concentration (ng m^{-3}) correlated with WIBS fluorescent particle mass (µg m^{-3}) (a) any fluorescent particle, FL; (b) particles fluorescent in channel 1, FL1; (c) particles fluorescent in channel 2, FL2; (d) particles fluorescent in channel 3, FL3. R^2 value shown for each fit in a,b,c,d. Linear fit parameter are shown in the table below.

Figure	Linear Fit Parameters	
	Rainy	Dry
S2.a	y=7.1x+2.4	y=0.8x+7.6
S2.b	y=5.4x+16.7	y=5.3x+5.9
S2.c	y=6.6x+9.2	y=1.5x+7.6
S2.d	y=7.2x+2.4	y=0.81x+7.8

Linear equation fit parameters for Rainy and Dry conditions for Figure S2a-d. Each equation represents the linear trend linear for correlations of arabitol (ng m^{-3}) with WIBS fluorescent channel particle mass (µg m^{-3}). (a) any fluorescent particle, FL; (b) particles fluorescent in channel 1, FL1; (c) particles fluorescent in channel 2, FL2; (d) particles fluorescent in channel 3, FL3.

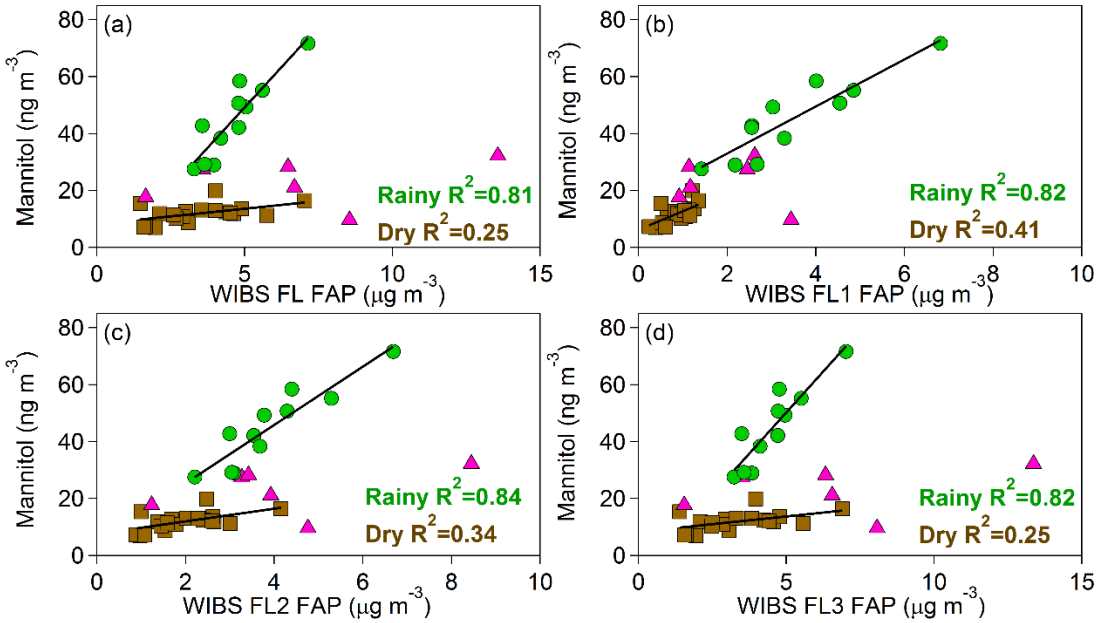

Figure S3: Atmospheric mannitol concentration (ng m-3) correlated with WIBS fluorescent particle mass (µg m-3) (a) any fluorescent particle, FL; (b) particles fluorescent in channel 1, FL1; (c) particles fluorescent in channel 2, FL2; (d) particles fluorescent in channel 3, FL3. R^2 value shown for each fit in a,b,c,d. Linear fit parameter are shown in the table below.

Figure	Linear Fit Parameters	
	Rainy	Dry
S3.a	y=11.3x-7.5	y=1.1x+8.2
S3.b	y=8.3x+16.4	y=6.5x+6.2
S3.c	y=10.3x+4.9	y=2.2x+7.5
S3.d	y=11.5x-7.4	y=1.1x+8.2

Linear equation fit parameters for Rainy and Dry conditions for Figure S3a-d. Each equation represents the linear trend linear for correlations of mannitol (ng m^{-3}) with WIBS fluorescent channel particle mass (µg m^{-3}). (a) any fluorescent particle, FL; (b) particles fluorescent in channel 1, FL1; (c) particles fluorescent in channel 2, FL2; (d) particles fluorescent in channel 3, FL3.

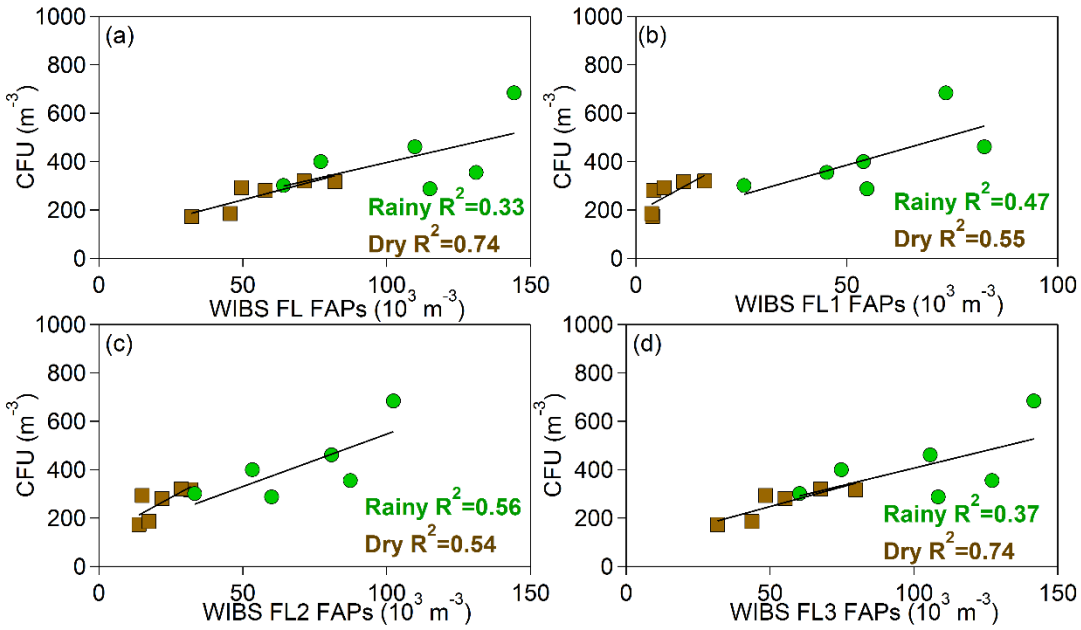

Figure S4: Atmospheric colony forming unit (CFU) concentration (CFU m-3) correlated with WIBS fluorescent particle (m-3) (a) any fluorescent particle, FL; (b) particles fluorescent in channel 1, FL1; (c) particles fluorescent in channel 2, FL2; (d) particles fluorescent in channel 3, FL3. R^2 value shown for each fit in a,b,c,d. Linear fit parameter are shown in the table below.

Figure	Rainy Linear Parameters	Dry Linear Parameters
S4.a	y=0.003x+124	y=0.003x+86
S4.b	y=0.005x+138	y=0.009x+189
S4.c	y=0.004x+113	y=0.006x+122
S4.d	y=0.003x+118	y=0.003x+84

Linear equation parameters for Rainy and Dry conditions for Figure S3a-d. Each equation represents the linear trend linear for correlations of colony forming units (CFU m^{-3}) with WIBS fluorescent channel particles (N m^{-3}). (a) any fluorescent particle, FL; (b) particles fluorescent in channel 1, FL1; (c) particles fluorescent in channel 2, FL2; (d) particles fluorescent in channel 3, FL3.