Atmos. Chem. Phys. Discuss., 13, C5904–C5906, 2013
www.atmos-chem-phys-discuss.net/13/C5904/2013/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Seasonal cycles of fluorescent biological aerosol particles in boreal and semi-arid forests of Finland and Colorado" *by* C. J. Schumacher et al.

Y.-L. Pan (Referee)

yongle.pan.civ@mail.mil

Received and published: 14 August 2013

This manuscript presents long-time measurements of atmospheric "fluorescent biological aerosol particles (FBAP)" from two locations in two different countries. It tries to find the seasonal cycles from the variations of concentration and size distribution from total aerosol particles and fluorescence particles, to seek the possible correlation between fluorescent particles and RH or rains, and to give some reasonable explanation of the results. This work will supply broader view in long time scale for atmospheric aerosol research and I strongly recommend this manuscript should be published in ACP, even the writing quality of this manuscript need further improved. First I would like the au-

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

thors to point out the following in their paper more clearly. As some researchers claimed that the UVAPS is able to distinguish bioaerosol from non-bioaerosol particles, and did not pay attention to the limitation of fluorescence-based bioaerosol sensors, I do see the authors have pointed out in this manuscript that these sensors are not “selective for all types of PBAP”, “have certain instrument-specific biases”, and have “lower limit for PBAP”, even the 355 nm excited fluorescence particles also contain non-bioaerosol particles, for example as those containing certain polycyclic aromatic hydrocarbons (not of biological origin). For the shorter-wavelength excited fluorescence particles (ex. 263, 266, 280nm), it could give a higher concentration of bioaerosol particles result with some non-bioaerosol particles. Different bioaerosol particles fluoresce under the excitation of different wavelength, the same for non-bioaerosols [1-3]. Therefore, I suggest that if the paper can further clearly state that the “fluorescence biological aerosol particles” detected by UV-APS in this study is all the particles that have fluorescence above a certain threshold when excited by 355 nm laser and they are mainly from bioaerosol particles but not included all bioaerosol particles, and it is just called fluorescence biological aerosol particles, then can educate other readers better. I may miss the description of the calibration and maintain of UVAPS for such a long time measurement, particularly the size calibration and filter replacement. I would like the authors to add that in. As I know, once the filters are used for long time and there are too many particles deposited, then the flow rate 1 Lpm is going to greatly decreased gradually with time, and the measured size distribution is going to shift with time from the real distributions. So I would like the authors to double check this, especially for the very strange particle size distribution in Fig 4, 5 with a sharp peak around 2.5 um with the number distribution is shifted toward bigger particles. The particle number size distribution I read from literatures are mostly somehow close to Fig 4 (b) with some certain degree of variations, but far from Fig 4(c), 5 (a, b). Hill et al 2009 is not on the Reference list Most of the figures need improve their quality and carefully check the units, labels. Using thicker solid, dot, dash curves with different colors may help readers to distinguish them, especially when they are printed in black-white color, e.g.

ACPD
13, C5904–C5906, 2013

the curves in Fig. 1, 3, 7 No Y-axis label on the right for Fig 1. No X-axis label on Fig 7.

1. C. Pohlker, J. A. Huffman, and U. Poschl, "Autofluorescence of atmospheric bioaerosols – fluorescent biomolecules and potential interferences," Atmos. Meas. Tech. 5, 37-71 (2012)

2. Y.L. Pan, S.C. Hill, R.G. Pinnick, H. Huang, J.R. Bottiger, and R.K. Chang, "Fluorescence spectra of atmospheric aerosol particles measured using one or two excitation wavelengths: comparison of classification schemes employing different emission and scattering results," Optics Express 18, 12436-12457 (2010).

3. Y. L. Pan, J.D.T. Houck, P. A. Clark, and R. G. Pinnick, "Single particle size and fluorescence spectrum from emission of burning materials in a tube furnace to simulate burn pit", Applied Physics B: Lasers and Optics, 112 (1), 89-98 (2013)

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 17123, 2013.