

Thank you for your thoughtful review and for the recommendation to publish. Your comments have been very useful, and indeed they pointed out certain technical oversights of the manuscript. Reviewer comments below are in italics.

Specific referee comments and point-by-point author responses:

A) There seems to be a tendency to either over-generalize regarding LIF, or to not be sufficiently careful in making some LIF related statements.

This is true, and we have revised the text in all places you mentioned to reflect your correct perspective. Specific changes are as follows:

A1) p. 25183, Abstract:

Text changed to include “using 355 nm excitation” added as suggested.

A2) p. 25202, lines 13-15:

Text changed to include “using the UV-APS with 355 nm excitation.” as suggested.

A3.1) p. 25211, lines 17-19:

To address the comment, text changed to (purple text new, strike-out shows removal of text): “FBAP determination is instrument- and excitation wavelength-specific and, as measured by the UV-APS, can ~~only~~ be considered ~~only~~ a lower-limit of PBAP, however, because some biological particles exhibit fluorescence below the instrument detection limit of the UV-APS and related instruments. Other LIF-based bioaerosol sensors should be evaluated individually with respect to their ability to detect all PBAP classes, but care should be taken not to equate FBAP and PBAP without more detailed consideration.”

A3.2)

Regarding weakly fluorescence particles we added the following statement (at p. 25201, line 8) per the reviewer request:

“The source and identity of these particles is difficult to ascertain from UV-APS measurements alone, but we suggest the particles are likely to be fungal spores or bacteria emitted regularly every night.”

A3.3) p. 25201, lines 7-10:

Regarding the weakly fluorescent particles discussed by Gabey et al. we change the text to the following to address the reviewers concerns: “Gabey et al. (2010) also reported a mode of non-fluorescent particles associated with the FBAP peaks, suggesting small or weakly fluorescent particles may not be characterized-detected as biological by real-time online-aerosol LIF instrumentation, whether excited in the ~350 nm or ~260-280 nm regions.”

Further, we agree with the rest of the reviewer comments A3.3) regarding small particle sizes being difficult to see as fluorescent, and that instruments will typically be utilized for either large or small particles. A long discussion of this is beyond the scope of this text, but we additionally amended the text at p. 25201, line 7 as follows: “This seems to further indicate that, while the fluorescent signal used to determine FBAP concentration captures most of these particles, at certain times of the day and when the FBAP concentrations are greatest, some fraction of biological material, especially particles of small size, may be below the fluorescence detection limit of the UV-APS.”

A3.4)

We agree with this statement, and amended the text to make this important point about small particles (see response to A3.3 above).

A3.5)

We agree with the statement that care should be taken not to extend conclusions too far beyond the measurements made in a clean, remote environment and thus changed the text in the abstract to the following: "...concentrations of FBAP as a lower limit for the atmospheric abundance of biological particles in a pristine environment."

B) p. 25211, lines 26 ff.:

The word 'quenching' here was indeed out of context and was removed.

C) The word 'online' is confusing.

The ambiguity of the word 'online' was taken into account and changed to 'real-time' in all instances within the manuscript as suggested.

D) Change from UTC to local time and other clock timing issues.

All time have been changed to local time, as suggested. To highlight the timing of sunrise and sunsets, the times for these events have been added to the caption of Figure 8, in addition to being listed in the main text (as it was during submission).

Other related changes:

1) Sivraprakasm et al. (2004) discussed in review was added to the manuscript.

References:

Sivaprakasam, V., Huston, A. L., Scotto, C. and Eversole, J. D.: Multiple UV wavelength excitation and fluorescence of bioaerosols, *Optics Express*, 12, 4457-4466, 2004.