

Interactive comment on “CAFE: a new, improved non-resonant laser-induced fluorescence instrument for airborne in situ measurement of formaldehyde” by Jason M. St. Clair et al.

Anonymous Referee #1

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St. Clair et al. describe a newly developed non-resonant laser induced fluorescence instrument for measurements of formaldehyde. This team is quite experienced with LIF measurements of formaldehyde and has published descriptions of two other of these instruments, COFFEE and ISAF, which are also discussed in the present manuscript. The manuscript is well written and does an excellent job of describing details of the instrument design and operation. I have no concerns about the scientific quality of the work and believe that the paper should be published in AMT after considering my comments below.

My only general suggestion is that the authors might provide some context or discus-

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sion of the data quality relative to measurement requirements for their target sampling regions. For example, CAFE is described as being well suited for high altitude operation, but it is not clear to me that the data quality are sufficient for measuring formaldehyde in the UT/LS region. Figure 9 shows that in the UT regions sampled by the DC-8 there are some quite significant discrepancies between the ISAF measurements and CAFE. From this figure it appears that even with more averaging, at times the difference between ISAF and CAFE might exceed 100%. I presume this is due to the as stated ± 100 pptv in the CAFE zero. Perhaps the authors could discuss for example what measurement quality is required to understand the role of HCHO in the UT HO_x budget or to identify convective events, scientific issues which they mention in the introduction.

Specific points: 1) Page 7, line 14. How much more signal can be gained by excluding the H₂O Raman filter and how would this translate to S:N? 2) Figure 9a, extend HCHO axis to show negative values.

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