

**Response to Referee Darrel Baumgardner for review on “Software and database structure to analyze the relationship between aerosol, clouds and precipitation: SAMAC” by Gagne et al.**

Overview:

*There is a clear need for analysis programs of the type discussed in this paper and AMT is a logical journal to describe such software. That being said, the manner in which the SAMAC software package is presented here does not seem to me appropriate for a technical journal with its roots in scientific dialog. The manuscript is written too much like a user's guide rather than a concise technical description that highlights the important aspects with scientific examples.*

We would like to thank Referee Baumgardner for making these suggestions. The authors modified the text accordingly, removing some of the most technical aspects and focusing more on the scientific aspects, including the potential impact on the research community.

Specific comments:

*In addition, there are many other packages that are in use that are similar to SAMAC but have not been published in the peer review literature. The authors should do their homework and provide a review of at least the ones that are the most know. For example NCAR/UCAR through Unidata provides extensive tools similar to SAMAC and I am fairly certain if they visit other research sites at EUFAR, University of North Dakota, etc. they will find others that do not differ that much from SAMAC. Perhaps it seems unfair to make this request, but I would assume that these other software packages are described in technical reports that are referenceable.*

*My more detailed comments are found in the annotated manuscript that I include as a supplement; however, my general recommendation is the following:*

*1) Do a better review of other similar software packages.*

We agree with Referee Baumgardner and added a paragraph discussing other software at the beginning of section 2. In fact, we thought that paragraph was already there and one of the references was in the reference list without being cited in the text. We would like to thank the Referee for pointing this out.

“Software for airborne measurements already exist and some are complementary to SAMAC. The ADPAA (Airborne Data Processing and Analysis, written in IDL and C-shell) package developed at the University of North Dakota, “is intended to fully automate data processing while incorporating the concept of missing value codes and levels of data processing. ” (Delene, 2010). The EGADS software (EUFAR General Airborne Data-processing Software, written in Python) designed at EUFAR is “a toolbox for processing airborne atmospheric data” (EUFAR-EGADS, <https://code.google.com/p/eufar-egads/>). EGADS aims to be a community-driven software for processing airborne data and already provides many data-processing routines for common airborne instrumentation. MMM (Mesoscale and Microscale Meteorology) Software, provided by UCAR and Java-based includes “data analysis packages for radar, aircraft, surface mesonet, sounding and gridded data” (Atmospheric Science Software Applications – UCAR Community Tools, 2009; [https://www.ucar.edu/tools/applications\\_desc.jsp](https://www.ucar.edu/tools/applications_desc.jsp)). Unidata also provides a visualization tool called IDV (Integrated Data Viewer, Java-based) which can be used to display geoscience data (Unidata | IDV, <https://www.unidata.ucar.edu/software/idv/>). All of these available software programs are focused on earlier analysis or data correction or pre-processing. With SAMAC, we propose to take the community effort to the later stages of analysis of airborne cloud measurements.”

2) *Expand upon the need for integrating data sets with more than the simple example of liquid water path.*

The liquid water path was indeed used *ad nauseam*. We removed some of the references to the lwp and tried to reinforce the more general point that using algorithms on cloud data placed in a well-defined structure would improve comparability between different clouds in a same measurement campaign, but also between measurement campaigns. Section 5.2 was re-written now describing the steps to obtain a new Figure 6.

We added the following sentence in the abstract:

“Other researchers can readily use already submitted algorithms once their data is placed in the cloud structure provided, and they can contribute their own algorithms to the software for others to see and use.”

A paragraph was also added in the introduction:

“The creation and use of an open source standardized database structure and software would allow researchers from different institutions to compare their measurements with those of others more easily. Moreover, a basic quantity, such as the concentration of below-cloud aerosols, could be calculated using exactly the same technique (algorithm), making the quantity more comparable across various clouds, campaigns, and in the literature. Such software could also improve analysis speed by producing basic plots and calculations so that the analyst can visualize multiple aspects of the measured clouds rapidly and then decide on the next analysis steps to take. Sharing algorithms between researchers also saves coding time to all participants in addition to providing a good basis for comparison.”

3) *Highlight the principal features by posing a scientific question or hypothesis that you would like to address with a specific data set and walk the reader through these features as you demonstrate them with the software package.*

These authors have another paper in preparation in which SAMAC is used extensively for data analysis of a real cloud measurement dataset. In this version of the present manuscript, we put more emphasis on the cooperation-, traceability- and reproducibility-enhancing capabilities of SAMAC, and we believe that the more scientific functions in SAMAC must come from the research community and not only from the authors. We did leave our own algorithms, used in the above-mentioned paper in preparation, in SAMAC for other researchers to review, use for comparison, or scrutinize as a starting point, and we strongly encourage others to also contribute to this project.

*All the details of the package should go either in an appendix or a supplement.*

Both tables were removed. This information is available in the wiki pages of the software and their description in this paper is indeed not needed. The wiki pages in themselves (<https://github.com/StephGagne/SAMAC/wiki>) very much are a supplement to this paper.

Comments in the supplement:

*Please also note the supplement to this comment:*

<http://www.atmos-meas-tech-discuss.net/7/C869/2014/amtd-7-C869-2014-supplement.pdf>

The authors would like to thank Referee Baumgardner for his careful review of the text. We addressed

the comments in the supplement and respond to the most important points here.

0. The new title is “Software to analyze the relationship between aerosol, clouds and precipitation: SAMAC.”
1. Corrected
2. The sentence was replaced with “Other researchers can readily use already submitted algorithms once their data is placed in the cloud structure provided, and they can contribute their own algorithms to the software for others to see and use. This approach would improve comparability, reproducibility and transparency by allowing others to replicate results and test the same algorithms on different data.”
3. Corrected
4. We meant “developed from” as opposed to only “validated”. We rephrased this sentence: “The parametrizations are validated and constrained using measured data, remote sensing or direct airborne measurements (see e.g. Zhang et al., 2013) and have also been developed based on measurements (e.g. Boucher and Lohmann, 1995).”
5. We added the following sentence: “Improving the traceability and comparability of data analysis would help providing modellers with more transparent and comparable data.” and removed part of the following paragraph. We believe that, with the stronger emphasis on the software as a sharing platform, the strengths of SAMAC are better explained throughout the text.
6. That is true. We changed “main programmer” for “coordinator”.
7. We reduced the size of this section and removed Tables 1 and 2 entirely.
8. We removed that paragraph.
9. “spanning over” becomes “spanning more than”
10. OK
11. This paragraph was modified to better explain why it is important for SAMAC's structure to have been designed flexibly.
12. These admonishments were significantly softened.
13. References to forking were removed entirely and the paragraph as a whole was heavily edited.
14. Corrected
15. Hydrometeor changed for drizzle
16. Agreed. We instead added a sentence on how the structure is flexible enough to accommodate the recommended changes.
17. Section 5.2 was re-written to describe the entire process and how SAMAC was used from having a freshly created cloud object to obtaining Fig. 6. Fig. 6 itself was changed to show more interesting parameters.
18. The authors think that the re-writing of section 5.2, in combination with having put more emphasis on SAMAC as a tool to improve reproducibility, traceability and comparability, improves the scientific value of this manuscript.