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Atmospheric Measurement Techniques Discussions

Interactive comment on "Cézeaux-Aulnat-Opme-Puy De Dôme: a multi-site for the long term survey of the tropospheric composition and climate change" *by* Jean-Luc Baray et al.

Anonymous Referee #2

Received and published: 24 February 2020

Review of Baray et al.,

Cézeaux-Aulnat-Opme-Puy De Dôme: A multi-site for the long term survey of the tropospheric composition and climate change

The article summarizes instrumentation, research and conceptual facility design built up at and around the Puy-du-Dome, central France, over the last decades, with historical roots reaching back to more than a century ago. Development, operations and future perspectives of an excellently equipped and integrated observatory are described

and main findings shortly pointed out or cited, but often only mentioned. The site's relevance emerges from its frequent use by the scientific community for process dedicated campaigns, field deployment of new measurement techniques and strategies as well as its and the contributing institutions' important roles in national and international research infrastructures.

The description of the CAO-PDD observatories, their relevance, concepts, aims and integration is comprehensive and useful to AMT readers. A broad selection of results, including many references, convinces that excellent scientific results have been inferred from the CAO-PDD measurements. A review like this may, for brevity and clarity, discuss part of the results qualitatively, however, its added value develops from their combination and their synopsis. I'm missing a number of important figures either in the text, as table(s) or as plots in order to serve as a 'first stop' also for external readers aside the European atmospheric science community. To this end, it should be possible to find the basic numbers of characteristic atmospheric parameters for the CAO-PDD network of stations already inside this article (without extensive literature search).

You may therefore expand tables 1-3 to include e.g. mean values, trends/tendencies and seasonalities from the individual observations or supply this info by adding representative data sets to Figs. 8. Combine several measurands in the figures. Given the details of the instrument descriptions (370 lines), the corresponding results often stay unnecessarily vague (l 582, l 590, l 616ff, l 630,..) - covering only 227 lines. For example the article does not contain any value for basic aerosol parameters like number- or mass-concentration, absorption- or scattering coefficients and composition).

With these revisions I recommend publication in AMT.

Special comments:

Instrumental part: Though proper operation, calibration and traceability is guaranteed by EUSAAR and ACTRIS conformal sampling and audits, I miss specific information about dry/humid sampling of aerosols by the specific instruments.

L 247ff: Is the nephelometer sample dried? Why do you call this diffusion coefficient and distinguish it from the scattering coefficient? Also 'simple diffusion albedo' sounds 'very French' → single scattering albedo

L 336ff: The Picarro analyser... It seems that part of this sentence is missing.

L 360ff: Which consequences has the (commonly executed) change from molybdenum towards blue-light-converter for the consistency of the time series and the long-term trend at PDD?

L 614ff: Could you add some numbers for the inorganic aerosol (anions/cations) concentrations and fractionation?

Fig 4: Is the linear model the appropriate approximation to the observed data over 140 years? Is there no change in the trend during the last decades?

Fig. 8: If these were easily to extract from your database: Could you show several more quantities as box-and-whisker-plots or superimposed as monthly means with percentiles?

Please also note the supplement to this comment:
https://www.atmos-meas-tech-discuss.net/amt-2019-383/amt-2019-383-RC2-supplement.pdf

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