

Long-term aerosol optical hygroscopicity study at the ACTRIS SARTA observatory: synergy between ceilometer and in-situ measurements (acp-2019-12)

Andrés Esteban Bedoya-Velásquez^{1,2,3}, Gloria Titos^{1,2,4}, Juan Antonio Bravo-Aranda^{1,2}, Martial
5 Haeffelin⁵, Olivier Favez⁶, Jean-Eudes Petit⁷, Juan Andrés Casquero-Vera^{1,2}, Francisco José Olmo-
Reyes^{1,2}, Elena Montilla-Rosero⁸, Carlos D. Hoyos^{9,10}, Lucas Alados-Arboledas^{1,2} and Juan Luis
Guerrero-Rascado^{1,2}

¹Andalusian Institute for Earth System Research (IISTA-CEAMA), University of Granada, Autonomous Government of
10 Andalusia. Granada, Spain.

²Departament of Applied Physics, University of Granada. Granada, Spain.

³Sciences Faculty, Department of Physics, Universidad Nacional de Colombia. Medellín, Colombia.

⁴Institute of Environmental Assessment and Water Research (IDAEA), CSIC, Barcelona, Spain.

⁵Institut Pierre Simon Laplace, École Polytechnique, CNRS, Université Paris-Saclay, Palaiseau, France

15 ⁶Institut National de l'Environnement Industriel et des Risques, France

⁷Laboratoire du Climat et des Sciences de l'Environnement (LSCE), France

⁸Physical Sciences Department, School of Science, EAFIT University, Medellín, Colombia.

⁹Facultad de Minas, Departamento de Geociencias y Medio Ambiente, Universidad Nacional de Colombia. Medellín,
Colombia.

20 ¹⁰Sistema de Alerta Temprana de Medellín y el Valle de Aburrá (SIATA), Área Metropolitana del Valle de Aburrá (AMVA)

Correspondence to: Andrés Esteban Bedoya Velásquez (aebedoyav@correo.ugr.es)

25 **Author's response**

We thank the anonymous reviewer for his/her comments and suggestions that have helped to improve the quality of the manuscript. According to the referees' reports, the following changes have been performed on the original manuscript and a point-by-point response is included below, where blue colour is related with answers for referee#1 and red colour for referee#2.

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Answers to Referee#1:

Minor comments:

35 1. Abstract, line 35: change to "This study evidences ..." (add "s")

The change has been performed in the same line of the abstract

2. Page 2/3: Discussion on previous measurements combining/comparing in-situ and remote sensing data including hygroscopicity and chemical composition – I would suggest to also cite the study by Rosati et al., 2016 presenting $f(RH)$ values from an airborne campaign and comparing to remote sensing data. It could be added in line 30.
Following the reviewer’s suggestion, we have added in Page 3, lines 1-2 the following phase that includes the reference suggestion:
5 “... and good results have been also obtained in Rosati et al. (2016) by comparing airborne in situ with remote sensing on $f(RH)$ calculation.”
3. Page 8, lines 6-8: what is meant by “truly far”? it also says right now “perceptual differences greater than 43%” – is “percentage” meant instead? Please rephrase this sentence to make it more clear.
10 The change suggested by reviewer has been done in Page 8, line 6-7:
“The RH_{ref} extrapolated values presented a percentage differences greater than those found in this study, suggesting that theoretically the aerosol should be dry at lower”
4. Page 8, line 11: delete “latter”
15 Done
5. Page 8, lines 15-16: the newly introduced sentence starting with “However, here, it was...” should be re-written. It is not clear what is meant with “it was used the values of gamma found and the same modelling..”
20 According to the reviewer suggestion, the change has been done in Page 8, line 15-16:
“The uncertainty of $f_{\beta}(RH)$ was also estimated using the Monte Carlo technique by using the values of γ found and the same modeling previously performed”
6. Page 13, lines 23-24: rephrase “..., becoming more pronounced the negative correlation”. - for example: "showing that xxx has a more pronounced negative correlation than xxx"
25 Following the suggestion, the change has been performed in Page 13, line 21-22:
“This calculation showed two different trends when NO_3^- and NH_4^+ were added, showing that NO_3^- has a more pronounced negative correlation than NH_4^+ ”
7. Page 13, line 25: add “for” before “each inorganic compound”
30 It was done in Page 13, line 24
8. Page 13, line 31: change to “Shanghai”
It was done in Page 13, line 30.

Answers to Referee#2:

Minor comments:

- 5
- 1. P9 L26, add “3.v”. “following steps (3.iii, 3.iv, 3.v and phase 4)”**
According to the reviewer suggestion, the change has been done in P9 L26
 - 2. P10 L19, change to “(from 7:17 to 10:17 UTC)”**
The change has been performed in P10 L19
- 10
- 3. Table 2, change “OM” to “OA”**
Following the reviewer’s suggestion, we have done the changes