

Interactive comment on “Importance of interpolation and coincidence errors in data fusion” by Simone Ceccherini et al.

Anonymous Referee #1

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Review

This is a comprehensive mathematical analysis of the data fusion methodology, with many of its features already discussed in previous papers by Ceccherini et al. The paper should be of interest to the Earth Observation community. However, before the paper is suitable for publication, the authors should address a few general points, identified immediately below, as well as the specific comments, also identified below.

As indicated in the AMTD review, the authors should address the following three points: (i) In the introduction provide more detail on how this paper is different from the previous works by Ceccherini et al. on data fusion. This should allow the reader to follow better the development of the data fusion ideas. (ii) In the discussion of previous work in the introduction, identify whether the papers discussed consider real or simulated data

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(e.g., Natraj et al. consider simulated data). (iii) On the issue of studies using multi-spectral simulated observations (discussed in the introduction) I suggest the authors consider including the following references, which include other combinations besides IR and UV, and two review papers:

Timmermans, R., W.A. Lahoz, J.-L. Attié, V.-H. Peuch, L. Curier, D. Edwards, H. Eskes, and P. Builtjes, 2015: Observing System Simulation Experiments for Air Quality. *Atmos. Env.*, 115, 199-213, doi:10.1016/j.atmosenv.2015.05.032. This is a review paper.

Hache, E., J.-L. Attié, C. Tournier, P. Ricaud, L. Coret, W.A. Lahoz, L. El Amraoui, B. Josse, P. Hamer, J. Warner, X. Liu, K. Chance, M. Hoepfner, R. Spurr, V. Natraj, S. Kuwalik, and A. Eldering, 2014: The added value of a geostationary thermal infrared and visible instrument to monitor ozone for air quality. *Atmos. Meas. Tech.*, 7, 2185-2201. This paper uses the thermal infrared and the visible. Note that Natraj et al. considers other combinations besides IR and UV.

Lahoz, W.A., V.-H. Peuch, J. Orphal, J.-L. Attié, K. Chance, X. Liu, D. Edwards, H. Elbern, J.-M. Flaud, M. Claeysman, and L. El Amraoui, 2012: Monitoring air quality from space: The case for the geostationary platform. *Bull. Amer. Meteorol. Soc.*, 93, 221-233, doi: 10.1175/BAMS-D-11-00045.1, 221-233. This is a review paper.

Specific comments:

P. 2

L. 40: Why choose 6 km for the correlation length?

P. 6

L. 19: Why choose a 5% a priori error?

P. 7

L. 23: I suggest you remove “indeed”. Same elsewhere. Please omit needless words.

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L. 24: Please avoid anthropomorphising the data fusion algorithm. I suggest you use a word other than “mised”.

P. 17

Fig. 6 caption: “. . .with the fused profile added. . .”. Same for Fig. 7 caption.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-347, 2017.