

Interactive comment on “New algorithm for integration between wireless microwave sensor network and radar for improved rainfall measurement and mapping” by Y. Liberman et al.

Y. Liberman et al.

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Dear Anonymous Referee #1,

Thank you very much for your comments.

Enclosed, please find the point by point comments (black text), along with their corresponding response (blue text).

General Comments:

- "I would suggest to remove also the remaining overstating words (like novel)".

C1259

- The word "novel" is not derived from the integration itself, but rather from the idea of integrating these two interesting sources for improved rainfall measurements and mapping. The use of the proposed algorithm and its development had never been suggested before, hence, it may be considered as novel.
- "the authors should justify why the calibration against rain gauges is made for the integrated radar and microwave link data instead of the more logical approach to correct the various systems for the error appropriate for each system (e.g. the radar data for attenuation effects, beam blockage, clutter etc.), to calibrate separately radar and microwave link data against rain gauges and then to integrate them".
 - The kind of integration which is used in this research is meant for using both the radar and the ML sources as stand alone rainfall mapping instruments as much as possible. The rain gauges that were used for the weights calibration (for each inspected rain event) were used from other (independent) rain events. By doing so, and from the weights calibration results, we may claim that this approach is quite generic, robust and consistent, where by doing otherwise it may not have been the case. Still, the proposal for other integration scheme by calibrating each one of the sources separately, or alternatively, the use of other integration, possible non linear, models may (and probably will) be the focus in future research, as indicated in the paper as well.

Specific Comments:

- "The authors still do not mention that the development of networks of small range radars is a research subject by many researchers."

C1260

- According to the suggestion, this issue will of course be attended in the revised manuscript to be submitted.
- "A data resolution of the order of 4 km and 30 minutes, which the author mention as sufficient for research and applications and is the resolution of data from wireless communication networks, is too coarse for critical subjects like flash flood research and warning".
 - The use for possible applications of such a tool are referred in the Introduction section (i.e., Sec. 1) as follows: "It has recently been acknowledged that precipitation estimates with a spatial and temporal resolution of 4 km and 30 minutes, respectively, are realistic target levels useful for many researches and applications, (Sorooshian et al. 2004). This is particularly true for estimation of orographic rainfall distribution on the high meso-gamma scale resolution, as reviewed by Alpert et al. (1994)". Indeed, for flash-floods analysis this resolution may not be sufficient.
- "page 4485, lines 4-5: Replace the word 'or' between 'polarimetric' and 'Doppler' with 'and'. Modern radars are Doppler and polarimetric radar".
 - According to the suggestion, this issue will of course be attended in the revised manuscript to be submitted.
- "page 4490 line 10: Are the radar data so unreliable to avoid using them in places with good microwave links coverage? I would expect a comparison between them to show the quality (if they agree) of rain field estimation by these two different systems".
 - As detailed in Section 2, line 198: "If both of the conditions stated above are satisfied in a given area, an **optimal recovery of the rainfall**, using ML, in that area is possible, (Lieberman, 2013)". Which means that any use of other

C1261

source (e.g., the radar) may decrease the reconstruction accuracy. This fact was also proven and demonstrated in the work of Liberman (2013).

Sincerely,

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 4481, 2014.

C1262