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Discussions

Interactive comment on "Rainfall retrieval with commercial microwave links in São Paulo, Brazil" *by* Manuel F. Rios Gaona et al.

Anonymous Referee #2

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The paper proposes to analyze an important topic : possible use of CMLs data for quantitative rainfall estimation in one of the largest city under tropical climate, i.e Sao Paulo. As reminded by the authors the area is prone to intense rainfall, leading to flash floods and other natural hazards such as land slides.

The authors and various other groups have already demonstrated the potential of the CMLs based method under a range of climate and weather situations (from widespread systems in the Netherland to intense convection in Africa, through mediterranean areas and even mountainous regions). This new data set in Brazil is an opportunity to test the CMLs method in a more challenging context then in previous studies : the quality of the CMLs data set is not homogenous, the validation network is sparse. The authors seems to have partially avoided this challenge by focusing only on a very

limited subsample of the data set (where and when it works. . ..); unfortunately this also limits the scientific impact of the study and its interest as a demonstrator of CMLs potential for hydro-meteorological monitoring over Sao Paulo. . ..

Given the existing literature on the CMLs topic and the extensive data set available here, the present study should be taken a step further and provide a more robust and extensive analysis of the available data set, including issues related to data quality, sparse GV and data format variation among CML providers..

A major limitation of the paper in its present form is that conclusions are drawn from a very limited subset of the available data set : only a few links (5 out of a possible total of above 200) are exploited and for theses links the analysis is restricted to time steps where both the link and the nearby gauge detect rainfall. Doing so the authors miss a major issue : capability of the method to detect rain and not generate false alarms, and so over the whole network.

This a major forthcoming of an otherwise very well written paper, which also provides a good review of the state of the art in CMLs based rainfall estimation. I can only encourage the authors to take the necessary time to submit a improved version of their work and take the analysis a step further.

Detailed major/minor recommendations :

-One important feature of sub-tropical rainfall is the occurrence of intense (and possibly extreme) rainfall rates associated with convective cells. This is very important for some of the applications the authors put forward in their introduction . No information is provided on the actual rain rate distribution (at the 30 minutes time step for instance) observed over the study period in Sao Paulo by the gauges and how well (or not) the CML method retrieves it. The global statistics provided in Table 2 and 3 do not inform us on the performance of the Rainlink/CML data according to rain rate classes . This is an important question, for hydrological applications for instance.

-Selection of the time steps and 'events'. The authors should provide statistics covering the whole analysis period and not solely on a selected number of 30' times steps. Time step where one OR the other sensor detected rain should be included and a contingency table provided. The definition of 'events', as presented in Fig 5 is not clear. Does it include some non rainy time steps or is it based on the same selection as the 30 ' (both CMLS and gauge > 0)? Daily statistics would be useful and would allow comparisons with other studies . . ..

-The authors mention wet antenna as a possible source of bias : this should be explored further - The order of magnitude of wet antenna attenuation is known, is it compatible with the observed bias ?

-CMLS data selection : the authors should extend the analysis to other CMLs links even if they keep the present 5 links to illustrate the best case– This is important to asses the actual potential of the method in a context representative of reality. Given that the analysis is carried out at the 30' and 'event' time step, 1 km maximum distance from the gauge seems very severe.

The conclusions should be revised once a truly extensive assessment has been done on this data set.

I am looking forward to see a revised version that will investigate further this rich data set acquired in Brazil !

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-287, 2017.

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