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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Scoping a field experiment: error diagnostics of TRMM precipitation radar estimates in complex terrain as a basis for IPHEx2014" *by* Y. Duan et al.

Anonymous Referee #2

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While there are many papers on TRMM PR – ground based comparisons in the literature, there are not many that I know of that focus on rain in mountainous areas using rain gauge data. And although we know from the basic geometry & performance of the TRMM-PR that the comparisons cannot be good (the PR beam is too large and the detection capability is poor relative to most ground-based radars), as the authors say, it is informative to know how bad they are and why. The paper is quite thorough and I would suggest publication. I do have some complaints, however.

There should be a better appreciation of what the 2a25 algorithm does and does not do. It does not do rain detection or clutter detection/suppression. These are tasks

done in the level 1 algorithm. As such, the question as to whether the v6/v7 version of 2a25 improves detection or clutter suppression is not a valid question. Even if the rain/surface clutter algorithms were changed in going from v6 to v7, 2a25 should not be evaluated in these terms since it's not the right place to look. Moreover, the best retrieval algorithm in the world will not improve the rain detection capability of the radar. It might be possible to increase the detection capability (though, with a probable increase in the false alarm rate) but as said above, this is not the responsibility of 2a25.

The clutter detection/correction problem over mountains and hills is especially difficult: imagine trying to fit a 5 km pancake-shaped volume at different incidence angles into a valley without touching any of the surrounding hills. In many instances, what is thought to be rain return is probably surface clutter. I think that explains why the authors see cases of large overestimates of rain in the valleys. I do agree that with a higher resolution more accurate digital elevation map the clutter detection problem can be improved.

I have difficulty interpreting the data in Table 3 which gives rain detection statistics between the gauge network and the TRMM PR. The PR overflies the site probably within a 10-20 second period so the different averaging times must apply to the different gauge averages. Is this correct? Why are these long averaging times (up to 1 hour) considered when the PR overpass is basically instantaneous? Since the site has been operational for 5 years, it might be worth looking for CloudSat overpasses. Even though these will be rare because of the narrow swath of CloudSat, since it has a much better resolution and higher detection capability, such comparisons could be informative.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 11137, 2014.