

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2021-389

Geoff Pegram (Referee)

Referee comment on "Hydrological response of a peri-urban catchment exploiting conventional and unconventional rainfall observations: the case study of Lambro catchment" by Greta Cazzaniga et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-389-RC1>, 2021

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Review

This article is a very interesting and useful update of the technique of using microwave links for estimating rainfall at hourly intervals over the Lambro catchment in Italy. The argument in the text is very well set out in a neat and parsimonious manner. I found it easy to read and understand. The introduction is very well structured, informative and terse - a pleasure to be given an overview.

Unfortunately, there is always a need for correction. The very few grammar errors were easily dealt with, but the figures and table need resiting. Their captions need to be more informative, particularly because not everyone who starts to read it will glance at the abstract, the figures and the references, before reading the whole article.

I am returning my marked-up copy of the article with this review and suggest that a revised version be submitted in due course. The comments below will be the more substantial ones - I leave the spelling and grammar corrections to the authors to lift from the attached annotated pdf of the article. My more serious remarks follow below my signature, which is my wont.

Geoff Pegram

16 August 2021

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I will copy my suggestions according to the text line-number, followed by comments preceded by #

71: The analysis of events

70 taking place in different seasons allowed us to point out some limits of CMLs in detecting specific types of precipitation.

This is a nice idea.

85: The case study is the Lambro catchment, a peri-urban catchment, left side tributary of Po river, in Fig. 1.a.

Please resite Fig. 1 closer to this mention - it's 2 pages away

112: IDW technique (see Sec. 3.3) and for each HRU a different number of sensors was exploited. Figure 2

Fig. 2 [and many others] is mentioned in the text well before Table 1. Please rearrange figures, tables and text in a decent order of mention. I find the switching between pages separated by more than one to be irritating.

Figure 1. Case study area. Panel (a) shows the Lambro catchment, the partitioning in 15 sub-basins (HRUs), and the position of the sensors, while panel (b) reports the scheme of HRU interaction.

I suggest adding "in a network". Also, referring to Fig. 1, see line 230, where this image is first referred to – above 100 lines of text

Figure 3:

There are no 30 Gz data mentioned in the text [see lines 106 - 108] nor shown on the figure & please move this Figure 3. down after the first citing in line 185

173: Eq. 1

Please indent all your equations to about here for easy reading and equation numbers about here - I checked that you have space enough [for 'here' please see the Figure]

288:.... On the other side, CMLs tend to return higher estimates than RGs during High rain rate events (circles), even though the trend is not as evident.

Comment: the 4 rain-rates are very nearly the same ...

301: We therefore focused on the CML hourly wet-dry (see Sec. 2)

'please see Section 2' - but note that it is 170 lines above (I eventually found it at line

129!) where it should read: 'An hour is considered dry when the detected rainfall depth is lower than 1 mm and wet otherwise.'

305 ..., whereas the occurrence of a false positive is relatively rare in both cases

Comment: then you should junk data which are false negative - by the way, what is the proportion of false negative?

Figure 6. Relative difference ΔE between CML and RG hourly rain depths against RG rain depths. X-axis has a logarithmic scale

What is the lowest rain depth? I guess 1 ... Also, what is the meaning of ΔE being -1

You should make your figure captions more informative. Also, it's difficult for the reader the way the text is presented relative to the figures, as this mismatch causes the reader to hunt desperately for the linkage - please fix this irritation. I have got around the problem by splitting the screen of the pdf - but it's a pain!

Figure 8. Box plots of ΔE for the 12 storm events grouped by HRU.

What is the range of the box plots? the usual ?

- Minimum (Q_0 or 0th percentile): the lowest data point excluding any outliers.
- Maximum (Q_4 or 100th percentile): the largest data point excluding any outliers.
- Median (Q_2 or 50th percentile): the middle value of the dataset.
- First quartile (Q_1 or 25th percentile): also known as the *lower quartile* $q_n(0.25)$, is the median of the lower half of the dataset.
- Third quartile (Q_3 or 75th percentile): also known as the *upper quartile* $q_n(0.75)$, is the median of the upper half of the dataset.

6 Conclusions

In the conclusion, as well as I suggested in the introduction, please reintroduce the full meaning of the acronyms as many readers might skip, via figures to the conclusion...

403: The hydrographs simulated by the hydrological model highlight better performances in terms of NSE and D_v

Insert before D_v : 'the relative error on flow volume,'

429:

This is a competent and useful summary

430 Author contributions.

This is the first time I have ever seen this allocation of tasks - very interesting to read!

Please also note the supplement to this comment:

<https://hess.copernicus.org/preprints/hess-2021-389/hess-2021-389-RC1-supplement.pdf>