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Comment on amt-2022-83

Anonymous Referee #1

Referee comment on "Automatic quality control of telemetric rain gauge data providing quantitative quality information (RainGaugeQC)" by Katarzyna Ośródkka et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2022-83-RC1>, 2022

Automatic quality control of telemetric rain gauge data providing quantitative quality information (RainGaugeQC)

By

Katarzyna Ośródkka, Irena Otop, and Jan Szturc

Overview

The authors introduced the quality check method named RainGaugeQC developed by the Institute of Meteorology and Water Management – National Research Institute of Poland in the present paper. They analyzed the influence of the RainGaugeQC by comparing the horizontal distribution of gauge observation and interpolated precipitation fields. They also investigated using the precipitation field observed by weather radars. Proportions of observed data removed or rated as low quality were also examined with the consideration of their seasonality

The content of this study seems to have potential value to be published. However, the description includes unclear parts disturbing the understanding of the specific procedures in the RainGaugeQC and the authors' evaluation analyses. It is difficult for the reviewer to review the manuscript in the present form. The manuscript should be reviewed after the substantial revision in an aspect of the presentation. The reviewer hopes that the comments listed below help the authors improve their paper and that this study will become worthy of publication in Atmospheric Measurement Techniques.

General comments:

- There are sometimes logically strange places. Some of them are because of lack of explanations.
- It is difficult to read some sentences due to their complicated structures.
- For the reviewer, the usage of the term "rain gauge" is incongruous in this manuscript. The reviewer thinks the authors should use the word "station" to show one observation site.
- The reviewer recommends asking for the help of a professional English editor. The manuscript should be carefully revised by the authors before submitted to an English editing company.

Specific comments:

Abstract:

The abstract lacks the description of analyses evaluating the quality check method, for example, evaluation using horizontally gridded distribution of precipitation.

l. 33:

Is this "the RainGaugeQC scheme" a name as a proper noun, in other words, the name of a specific QC scheme?

l. 103:

It seems that this "correct" is unnecessary.

l. 116:

Do you mean a (numeral) value by this "a number"? I think this expression is inappropriate for an academic report.

I. 118:

What do you mean by "The latter approach"? The approach described in lines 115–117? In this description, "the former approach" is unclear.

II. 126–127:

I think that this sentence is not necessary because readers have already read Section 1.

II. 149–150:

The positions of Dzierżoniów and Nowa Wieś Podgórna should be shown in the Fig. 2 for foreign readers.

II. 154–155:

What are reasons for much smaller values of precipitation in the unheated sensor than in the heated sensor, brought from the difference in the type of sensors? If the reason can be judged as a malfunction in the specific sensors, the replacement of the sensors should be prioritized.

I. 168:

Where are these radars? I suggest to the authors to briefly show the radars' functions and positions in a table. The positions can be plotted in Fig. 1.

I. 170:

Do you mean dual-polarization by "that functionality"? The part after ", and the others" seems to be unnecessary for the present paper.

II. 189–190:

Why do you give priority to heated sensors?

I. 193:

Please clearly give the definition of the value G .

II. 229–230:

I think that this criterion is too strict. For example, for a 30-years period, $\sim 16,000$ measurements (correspond to ~ 110 days) are subject to a QI reduction by 0.25.

I. 231:

Please show a specific analysis period for determining the thresholds.

II. 235–237:

Is the RCC conducted when a gauge measures precipitation < 0.2 mm/10 min? If so, this sentence seems to be incorrect.

II. 239–240:

Is this sentence repetition of the previous paragraph?

II. 240–242:

A criterion for gauge measurement is not shown here.

II. 247–248:

I cannot understand why you use the present progressive form here.

II. 254–258:

Why did you include the check in this paragraph in the temporal consistency check?

II. 255–256:

I can guess that the check is influenced by snow, but I cannot understand the reason why the check is unable in the cold half of the year.

I. 291:

The sentence is unclear especially what the value "over 3%" indicates.

II. 292–293:

I think that this is only in the cases with strong outliers. If so, you should clearly describe it. Or you should specify the reason why you can say the check is tolerant judging from the results in all the 3 categories of outliers.

I. 305:

I think the more distant from the nearest gauge, the more uncertainty the interpolated precipitation data has.

II. 309–310:

What is the reason why the QI values should be spatially interpolated as the precipitation is interpolated? How do you calculate the $QI(G_{int}(x, y))_p$?

I. 329:

Did you describe that a larger value is employed from the precipitation observation by heated and unheated gauge sensors? What is the reason justifying it? Is this against what written in II. 189–190?

I. 347:

This description seems to include an error. An interpolated precipitation field is not a distribution of observed precipitation with gauges.

I. 370:

What do you mean by this "excerpt"?

I. 375:

Please spell out of the NWC-SAF.

I. 377:

What do you mean by this "Thus"? The reviewer feels that the logical connection with the

previous sentence is strange.

I. 395:

Please spell out the RainGRS.

Fig. 9:

Is this analysis include periods without precipitation?

You should give exact labels showing the ranges of QI for the horizontal axes (e.g. [0.90, 1.00) for the left most bar).

I. 410:

Are these values about 98.5–99.1% estimated from the shown histograms?

"many times" can be written with "much".

I. 411:

This part can be written as "between the ranges of (0.50, 0.75] and (0.75, 0.90]".

The value range [0.75, 0.90) is different from that in the labels for the horizontal axes in Fig. 9. It will be "(0.75, 0.90]".

I. 413:

What do you mean by "relatively many reductions to a zero value"?

I. 420:

What do you mean by this "diversified distribution"?

I. 455–460 (item 1):

In this rule, the case with precipitation of 0.1 mm / 10 min will be regarded as an error if the radar detects the precipitation over 0.4 mm (/ 10 min ?). The reviewer thinks that this rule is too strict.

I. 458:

Is this value for 10 minutes?

II. 461–485 (item 2):

I think the authors should note that the rule is stricter in mountainous or foothill areas.

I. 464:

This rule makes the case, with (1) similar values (for example, meeting the SF criterion) in the gauge observations and radar observation at a pixel including the gauge station, (2) no precipitation in the radar observaiton at the other pixels, will be classified as an erroneous data. I feel this is unreasonable.

I. 467:

How do you define mountainous, foothill or lowland areas?

I. 495:

How long is this time step?

II. 495–496:

How do you define observations with poor quality?

I. 507:

Do you mean the number of gauge stations by this lower-limit number of "three"?

II. 509–512:

What do you define the values of the median and 25, 75 percentiles for? What are the

values G and Q_{xx} ?

I. 515:

"the values of sensors within a given subdomain" is not specifically defined.

I. 517:

What cases do you assume for the case when Q_{75} equals Q_{25} ?

II. 518–519:

I think that you can determine Q_{90} , Q_{95} and Q_{99} values without D_i .

I. 520:

In this procedure, don't you test beyond the border of the domains but only in the shifted subdomains within one domain?

I. 524:

What do you mean by "vertically"? I think the domains and the subdomains are defined in the horizontal area.

II. 532–533:

There was no definition for the quality index of radar observation.

I. 537:

Is this procedure for cases with no precipitation from gauge observation?

I. 538:

Here, you compare the values with different properties; G / R_{\max} is a ratio of precipitation amount, and $QI/4.0$ is calculated from the quality index. How do you justify such a comparison? (for example, empirically justified?)

The following parts are unclear:

I. 110:

"due to ... structures"

II. 303–305:

The sentence is unclear due to a strange structure of it. Please check it again.

I. 415:

Do you mean the cases when QI is zero? I think that this expression is unclear.

I. 487

II. 490–491

II. 505–507