# Response to Anonymous Reviewer 2

We are grateful to the reviewer, whose comments allow to improve the paper.
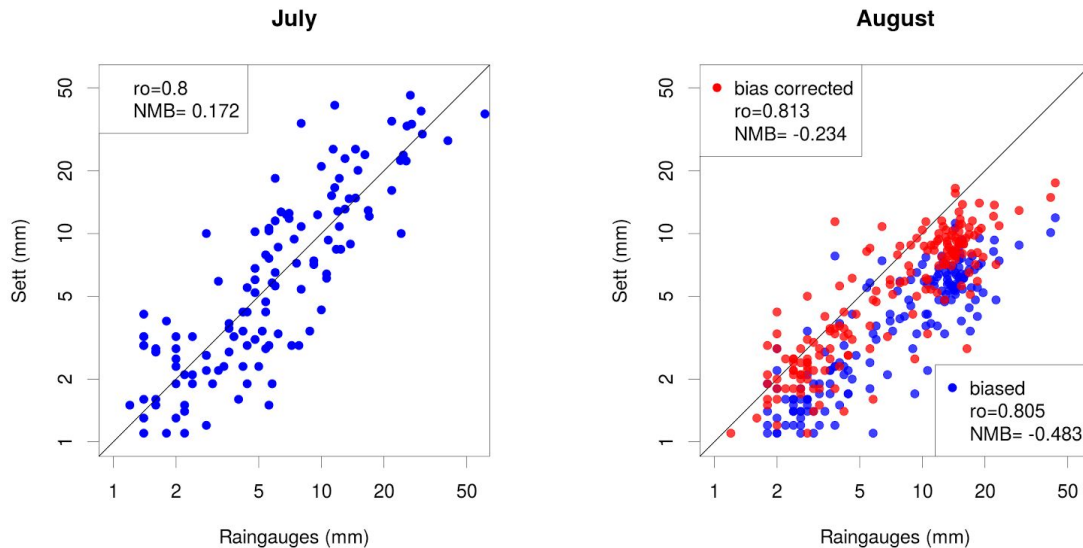
Point to point response:

**This paper illustrates how a combination of monitoring techniques can quantify the calibration bias in a network of radars with a higher degree of confidence than would be possible by just using individual techniques.**
**None of the techniques used are strictly speaking new and all them are part in some form or another of the regular procedures of most of the National Weather Services (or at least the most advanced ones). Recommendations in that sense have been performed in the past by, for example, the OPERA programme of the EUMETNET and in specialised workshops and  conferences. However, it is true that a global view of those calibration techniques and their practical implementation on an operational network is lacking in the literature. This paper has the potential to offer just that because it is clear, well-written and offers practical examples on the use of the different techniques. However, I think there are two items that are missing: In the first place, the bibliography related to each technique should be expanded significantly. As it is the reader cannot be aware of the effort placed by the entire community in developing monitoring and calibration techniques. In the second place, I think the paper should better illustrate the impact that a proper calibration has on the final products, notably QPE. I suggest, for example, to reprocess data from one of the precipitation events examined during the monitoring period, calibrated according to the results, and objectively compare it (using rain gauges for example) with the output of the real-time processing.**
**If such effort is undertaken I would warmly recommend its publication.**

Thanks for the general comment. We have expanded the bibliography to give a wider and more comprehensive review of the variety of efforts taken over the years by the scientific community for the radar calibration.
As the reviewer suggests, we are also considering the impact of the calibration on the QPE, comparing the results with rain gauges for a selected event. In the following figure, we show the comparison between the retrieved rain rate from radar measurements and the rain rate measured by raingauges located within 70km from Monte Settepani radar. The left-side scatterplot displays the rainfall occurred during July 28 and 29, August 1 and 4. This scatterplot is considered as reference since no calibration issues were found in those days. Instead, the right-side scatterplot shows, in blue color, the rain rates comparison during August 13, 15, 19 and 23, when the self-consistency and clutter calibration techniques show a radar miscalibration. We corrected the radar reflectivity according to the values found by the aforementioned procedures and the scatterplot is shown in red color. It is remarkable the decrease of the rain rates bias, even if it does not reach the July value. We suppose that this is caused by assuming a constant DSD for all the rainfall events.

**Section 3.1 It should be clear in the text that there are many different dual-polarization estimates of rainfall not just two.**

In section 3.1, among the dual-polarization rainfall estimators available in literature, we focus on the Kdp-based and Z,Zdr-based rainfall estimators.

**Section 4.1 The results of the self-consistency should be shown for the entire monitoring period and the criteria used to discard the measurements. As pointed in the conclusions of the paper, the selection of the data is a major stumbling block for the automatization of the technique. It would be interesting to show just that.**

The self-consistency technique has been expanded to all the significant rainy events, i.e. the same events that are used for the inter-calibration, as others reviewer also suggested. The full automatization of the self-consistency procedure is clearly an ambitious goal which we are now trying to pursue, given the extended dataset considered.

**Specific comments: (P: page, L: line)**
**Page 7-line 19:…a uniform…**

Corrected.

**Page 11-line 29:…but in the following…**

Corrected.