*Interactive comment on* "Precipitation and Microphysical Processes Observed by Three Polarimetric X-Band Radars during HOPE" *by* X. Xie et al.

**Anonymous Referee #2**

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General Comments

This paper presents some data from an two months experiment. The examined dataset included three polarimetric X-band weather radars supplemented by MRRs, disdrometers and rain-gauges. The focus of the paper is on the radar observations. The recorded rain events were of low intensity and this didn't permit a more advanced evaluation of radars performance. Thus, instead of just showing some daily statistics and example data from three rain events with typical stratiform rain characteristics, the authors could present methods of data processing. For example, they have a network of three radars which overlap in the area of interest and, thus, a detailed comparison between the radars (and the rest of sensors like the MMR, disdrometers and raingauges)

could be performed. Furthermore, a method for construction of a mosaic with the quality controlled measurements from the three radars would be meaningful as a first data analysis. Also, the authors don't even mention the basic and critical processing algorithms of the radar data like the attenuation correction scheme and the handling of melting layer (bright band) effect on the estimated rain field.

Specific Comments

Section 2.1, Fig. 1: The setup of the systems shown in Fig. 1 is not optimal at all. Most of the systems (including two radars) are within 5 km distance. If this setup was intended for e.g. the study of small scale spatial distribution of rain this was shown in the paper.

p. 10, Fig. 4: The daily accumulated precipitation from the 7 disdrometers in Fig. 4b has larger range (minimum, maximum) compared to the range from the 3 rain gauges and the 7 disdrometers in Fig. 4a in some days (e.g. on 26 April), while obviously it should be less.

p. 14, lines 8-14: The conclusions of the authors about Fig. 7 are contradictory. First they say that precipitation patterns observed by the three radars, but immediately after the mention a lot of the many reasons why the observed patterns are different (which is the correct conclusion). They propose that a reconstruction of the precipitation pattern using a combination of all the radar data should be made, but as it was noted in the general comments they don't try to implement such a method.

p. 16, Fig. 9: There are not evident melting layer characteristics in the RHIs, even though it is mentioned in the text to move from 2100 m height down to 830 m during the event. It would be useful to include in Table 1 (or in a separate table) the operational parameters of the radar (like beamwidth, antenna rotation rate, sampling frequency etc.)

Section 4.2: In this section some data from MRR and disdrometers are shown. As

it was noted in the general comments the authors probably have enough data from the radars and these sensors to make a more detailed and useful comparison of their measurements. For example, a comparison of radar RHI data over (or near) the MRR site and MRR data would be an interesting comparison and study of the melting layer characteristics.

p. 21, lines 22-23: Why consider MRR data at 600m height as a reference (and not e.g. rain gauge data) and conclude that the Parsivels are overestimating rainfall rate? The MRR should be reduced to ground level using the time delay due to the average fall velocity of the droplets to have a proper comparison.

p. 23, Fig. 13: A comparison of QVPs and data from RHIs would be useful to understand the difference of QVP from actual vertical profiles and the limitations of this method.

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