**Atmospheric
Measurement
Techniques**
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Discussions

(EGU)

Interactive comment on "An empirical QPE method based on polarimetric variable adjustments" *by* Jungsoo Yoon et al.

Anonymous Referee #1

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Review: An empirical QPE method based on polarimetric variable adjustments

General comments: The manuscript presents a method to enhance radar based QPE through empirical relations between radar observations. Overall, this manuscript's logic is clear and well written, but considering its content, I suggest "reject" for the following reasons:

1.) The challenges in radar based QPE are mainly from the following three aspects: a.) The radar data quality control, this includes calibration, attenuation correction, partial beam blockage mitigation, non-meteorological clutter (ground clutter, sea clutter) removal and etc. 1 dBZ (0.1 dB) biased in the Z (ZDR) field could cause 10% biased rainfall rate estimation. More and more evidence shows that ZDR is over sensitive to calibration and attenuation, therefore, it should not be quantitatively used in rainfall

rate estimation. Currently, more accurate and robust rainfall rate estimation approach using specific attenuation has been develop for S-, C-, and X-band dual-polarization radars. b.) The relationship between the polarimetric radar variables and the rainfall. All the radar variables are sensitive to the drop size distribution (DSD) to some degree. Therefore, we choose different relations for stratiform, convective, and even typhoon precipitation. c.) Other related issues such as bright band correction, vertical profile of reflectivity (VPR) correction, radar coverage gaps and etc. Check the consistency between radar variables belongs to the quality control category, and should be done even before implement the radar in QPE. 2.) I did not see contributions from this work to the radar meteorology community. The key of this work is the "empirical relationships between polarimetric radar variables". This is based on the self-consistency principle, which has been discussed in tons of journal publications. Even the relations in Equations 1 and 2 are from WRC (2014). I think this manuscript is OK to be used as a work report, but not for a journal publication. 3.) I believe steps 2 and 3 together with figure 1 are the core part of this work, but to be honest, I have no idea what authors did after reading this paragraph and figure. Everything looks very vague. I even do not understand the Fig. 1: why the y axis is "Zdr or Kdp"? what is the value of x axis (Z), and y axis ("Zdr or Kdp")? What is the line, what is the dashed line contour? What is the star? ….

Overall, this work reports a well-accepted approach in radar based QPE. It does reveal any new findings and relationships. Its contribution is trivia. Therefore, I don't think it is ready to be published in the current shape.