

Responses to RC2

We are grateful to the Editor and the Reviewers for reviewing our manuscript. The comments and suggestions are very helpful and valuable. According to the nice suggestions, we have made point-by-point response to the reviewers' comments.

RC2:

This paper presents a different method for defining "rain cells" using TRMM data, and publishes the new dataset for public use for meteorological studies. The method fuses TMI, PR, and VIRS data and uses a minimum bounding rectangle method to construct its features, as opposed to fitting ellipses, which has been the traditional method in the literature. Referring to other methods in the literature, there is already an extensive body of work constructing precipitation features with TRMM data, combining all three datasets. The authors reference this body of work but fail to describe how their dataset is an improvement beyond the state of the art. For this reason, I recommend rejection. I would recommend revision and resubmitting a paper in the same journal but selected as a method paper instead of a data paper, detailing how the MBR method is advantageous and presents a feature dataset beyond that which is already constructed by the Liu/Zipser groups and readily available.

Response: Thank you very much for your frank comments and suggestions, but I regret your negative decision. I would like to reply you as follows, perhaps you will change your previous decision.

First of all, I want to tell you that the corresponding author has made significant rewrites to the original manuscript, because there were many unreasonable descriptions in the original expression. Secondly, we describe the starting point of this study, that is, the previous study results must be respected, such as the contributions made by Dr. Liu, Nesbitt, Zipser, et al. in this field. This is the scientific ethics that subsequent Scientific workers must follow, so the revised manuscript makes positive comments on their methods and results. In the revised manuscript, it is pointed out that the identified rain

cell is within the PR scanning range to ensure the integrity of the identified rain cell. We know that the rain cell data established by Dr. Liu/Zipser is very good and widely used. We often read the articles published by their group and are deeply inspired by them.

In our study, the proposed rain cell identification method and the corresponding data may be another choice for studies, after all, more datasets should be better than one for scientific research.

I hope you will be satisfied with my response to your comments. Since we are colleagues, I welcome you to communicate with us. Thanks again.

Major Comments

1 Title: I would suggest removing the multiple “and”s and using commas

Response: Thank you. The title has been revised.

2 Literature: The background section reads as thoroughly as a textbook, going back to the 1970’s for a definition of a “rain cell” – the references need to be updated to more relevant sources and some discussion of the motivation behind a consistent definition of a “rain cell” is needed, here. Different scales and boundaries are useful for different reasons.

Response: Thanks. The revised manuscript was rewritten. The history of rain cell studies was mentioned to highlight the importance of Nesbitt, Liu and Zipser's work on the identification of rain cell “With the massive data observed by PR, VIRS and TMI, Nesbitt et al. (2006), Liu et al. (2007, 2008), Liu and Zipser (2013) made spick-and-span studies in the field of rain cell identification and its parameters with elliptic fitting method. Their rain cell data were also widely used on analyzing the temporal and spatial distribution characteristics of rain cell (Zhou et al., 2013; Yokoyama et al., 2014; Ni et al., 2015), such as that line shaped convective systems occurred more frequently over ocean, and showed higher frequency in the subtropics (Liu and Zipser, 2013).” [Line

55-60]

Because this study laid emphasis on the rain cell method (MBR and BFE) so the previous rain cell identification methods were briefly summarized, and those specific studies will be discussed later studies. Thanks again.

3 This paper discusses, disjointedly, the Precipitation Feature Databases constructed by the Liu/Zipser groups at the University of Utah and Texas A&M Universities at Corpus Christi. The PF database has evolved into a massive undertaking with cells of every size and strength, and defined by PR radar (RPFs), and passive-microwave polarization corrected temperature (PCTFs). Some focusing solely on precipitation, convection, MCSs, tropical cyclones, etc. They are freely available for download from <https://pps.gsfc.nasa.gov/> or <http://atmos.tamucc.edu/trmm/>.

While this manuscript references the dataset, it does not elucidate how the work advances the state of the art of constructing precipitation feature (or rain cell) databases, beyond trying a new boundary-definition method.

There are many other boundary definition methods currently used to define precipitating areas from satellite data, such as convex hull or K-means clustering. Many of the Precipitation Features (PF) are defined using contiguous pixels, and do not require a bounding ellipse to be drawn.

It is not made clear in this manuscript how the authors' method advances this technique of defining features.

Response: Thank you for your frank questions. There is some ambiguity in the expression concerning your questions in our original manuscript. In the rewrite manuscript, we made drastic changes and additions, such as the use of data (see the last paragraph in the conclusion).

This study presents a slightly different approach to the rain cell from that used by Dr. Liu/Zipser's group. The mainly difference was rain cell identified within the scope of PR scan, and rain cell data of two cases was supplied.

As you said, it is a huge project to build a massive database that is easy for everyone

to use. The China Satellite Meteorological Center is already implementing this project, and we are also involved. As an independent study unit, programs need to be written by itself and methods needs to be established by itself. However, we can learn from the data provided by the international community and the methods already adopted, which is also a respect for the existing studies.

I hope my above answer will please you, because you have recognized that we have a spirit of independent study and respect for previous study results and scientists. Thank you very much again.

Minor Comments:

1 13 “Previous studies have mostly analyzed rain cells from a single radar data” This statement is false, there is a wealth of studies of rain cell (feature) database analysis from satellites.

Response: Thank you. It's missing from the rewrite.

2 17 Swath truncation: is this in reference to the ends of orbit files creating boundary artifacts? Or the edge of the swath on the sides cutting off features prematurely? It is not made clear in the rest of the manuscript.

Response: Thank you. Although this issue is not specifically discussed in the revised manuscript, we have been redescribed to avoid confusion. Please see line 130 to 133 “According to the working mode of PR, its swath consists of 49 pixels (from number 1 to 49), so if the identified rain cell has pixels at the edge of the PR swath (the first pixel and 49th pixel), the rain cell is not included. If the identified rain cell is at the beginning and end of the PR swath, the rain cell is also eliminated.”, and line 137 to 139 “The slight differences of geometric parameters calculated by MBR method and BFE method show in the length and width of rain cell, while the physical parameters calculated by the both methods are the same.”. Dr. Liu/Zipser's approach is not wrong either, we just have a slightly different focus. You know that very well.

3 28 Many journals do not allow citations in an abstract

Response: Thanks for reminding us, we will follow the requirements of ESSD.

4 33 suggest “the literature”

Response: Thank you. It's missing from the rewrite manuscript.

5 79 suggest “over East Asia”

Response: Thank you. It's missing from the rewrite manuscript.

6 83-84 How is what you have created different from previous datasets in the literature?
Specifically, the PF database?

Response: Thank you. First of all, the data set created in this study has something in common with the PF database, both were built based on the TRMM multi-instrument observations. By defining different characteristic conditions, PF database forms various precipitation parameters, including microwave brightness temperature, infrared temperature and lightning information, which shows that the information of PF database is very comprehensive and worth to learn. The data set of this study took the rain cell within the swath of PR scanning as the object, defined its geometric and physical characteristics parameters. The identified rain cells were numbered and convenience search. The specific differences between our dataset and the PF database will be further studied.

7 156 Please clarify if you are referring to the edge of the swath or the end of the orbit

Response: Thanks for reminding me. In revised manuscript, the sentence had been changed into “According to the working mode of PR, its swath consists of 49 pixels (from number 1 to 49), so if the identified rain cell has pixels at the edge of the PR swath (the first pixel and 49th pixel), the rain cell is not included. If the identified rain cell is at the beginning and end of the PR swath, the rain cell is also eliminated.” [Line 131-133]

All the above have been modified in the revised manuscript. Thank you again.