

## **Referee Comment 1**

### **General comments**

The work reveals the characteristics of thunderstorm dynamic movement based on eight thunderstorms evenly distributed around the Pearl River Delta (PRD) region in southern China from May 17 to May 23, 2014. They found that the storms initiated in the west of the PRD region, then moved to the east and disappeared after the thunderstorm travels around 106.5 km in longitude. In addition, there are two kinds of distribution to depict the property of valid area, which are one-peak distribution and two-peak distribution. This manuscript used five parameters and found, affected by rivers in the Pearl River Delta region, the motion of storms shows a distinct pattern, as the spread of direction distributes tightly in the range of 0°- 90° and 270°-360°. The overall structure and layout of the manuscript is clear and the experimental design is reasonable. I will suggest it to be accepted after addressing my comments below.

### **Authors' Response**

We thank the referee for your encouraging comments

### **Specific comments**

L189: The definitions of one-peak distribution and two-peak distribution in the manuscript are vague, and more detail is suggested.

### **Authors' Response**

The authors would like to express our appreciation for the reviewer's suggestions, The one-peak distribution means the variation of VA rises at first and drops dramatically. The two-peak distribution means there is a distinct decrease between two peaks during the lifetime of the thunderstorm. We have added some explanations to make it more detailed.

L196: "Figure 5(c)(d) is not in full accord with one-peak distribution ... after the highest peak", is that means there may be three kinds of distribution of thunderstorm valid area in the whole evolution processes? Does it need to be considered separately?

### **Authors' Response**

Thanks for your comment. The issue pointed out by the reviewer is very important. Figure 5 (c)(d) is not in full accord with one-peak distribution but very close to it. Although there is another much smaller peak in the dissipating stage, it can be seen as the normal fluctuation. The authors suggest that it can be considered as the one-peak distribution. The corresponding explanation has been added to the manuscript.

L202, 220: The finding that velocity does not match precisely with the VA, which is differ from common cognition about thunderstorms, is mentioned several times in the manuscript. How is the common cognition (example references) and what causes this?

### **Authors' Response**

Thanks for your comments. The authors have looked up the literature and found that few papers mentioned the relationship between velocity and area of thunderstorms. We believe that this is a good innovation point of this article. As for the mechanism inside the convective cloud, we believe that more research can be done to explain this finding

in the future. We will continue to study the movements of thunderstorms and the microphysical principle inside the storm. The corresponding explanation has been added to the manuscript.

### **Typing errors**

L8, 250: “was” should be replaced by “were”.

L142: The full name of “PRG” should be elaborated.

L187: “3.2” should be replaced by “3.3”.

L241, 245: “duation” should be replaced by “duration”.

L243: “setted” should be replaced by “set”.

L247: “aviod” should be replaced by “avoid”.

L274: “acitivity” should be replaced by “activity”.

### **Authors' Response**

Thanks for your comments. The typing errors have been checked and revised throughout the article.