Review report

Manuscript title

Hailstones across the Greater Sydney Metropolitan Area

By A. A. Rasuly, Kevin K. W. Cheung and Benjamin McBurney

[Note: this review was based on the author's manuscript version3]

General comments

This study has addressed the climatology of hail occurrence in the Greater Metropolitan Severe Thunderstorm Warming Area (GMSTWA) in New South Wales, Australia. Based hailstone records extracted from the Australian Bureau of Meteorology (BOM) severe storms archive, a representative dataset was created through a sound selection and analysis procedure. By applying climatologically oriented GIS functions, the temporal/spatial characteristics of hailstones were visualized for the study region, these including the diurnal, monthly, seasonal and interannual variability, as well as the magnitude patterns. The analytic methods appear adequate for the intended research objectives. The findings can be a good addition to the literature, and are valuable for informing regional emergency management. The study, as mentioned by the authors, has also provided a basis for further investigation of hailstone formation and risks in the study region.

I recommend that this manuscript be published by the journal with minor revision. In particular, I suggest that the clarity and conciseness of the text be improved and the literature review be updated to reflect some recent work in the field. Unnecessary information overlaps may be avoided in the text as well as in some of the figures and tables. Also, the quality of figures (e.g. font size) may be further improved for increased readability.

Specific comments

Abstract

1) Page 1: minor grammar issue in "a sprawling suburban area, with a population of…). Suggest that the comma be deleted.
2) Page 1: suggest that the 3rd paragraph be improved for clarity.

Introduction

1) Page 3: 1st paragraph "…usually affecting smaller areas that are more common than any other natural hazards, and are responsible for continuous damages" needs to be improved for clarity.
2) Page 4: use of TORRO - needs to spelled out before its use.
3) Page 4: 1st paragraph "Hannay and Wilson, 1954" - should 1954 read 1994?

Climatic characteristics

1) There are overlaps of information between Figures 1 and 2 - suggest the two figures be combined for simplicity.
2) Page 5: 1st paragraph 1st sentence "which is in the western part of the Tasman Sea and has the South Pacific Ocean to the east". Is GMSTWA in the western part of the Tasman Sea? The area appears to be mainly land areas to me.
3) Page 5: 1st paragraph with last two sentences - there are apparent information overlaps.
4) Page 6: 1st paragraph last sentence - should this text join the start of the next paragraph (since it's about Sydney)?
5) Page 6: 2nd paragraph last sentence may be deleted (or this is moved to an earlier location).

Data and methodology

1) Page 8: 2nd paragraph last sentence with typo, "heavily infrastructures".
2) Page 8: 3rd paragraph first sentence with grammar error, "analyzed applying".

Results

1) This section can be improved by avoiding information overlaps (e.g. details below).
2) Information overlaps in Figure 3 and Table 3, as well as relevant discussion text on Page 10-11.
3) Suggest that time be expressed consistently throughout the text (i.e. EST, local time or am/pm). For example, different time expressions used in Figures 4 and 5.
4) Caption Figure 4(d) 18-00 h: should it read Figure 4(d) 18-24 h?
5) Page 11: 2nd paragraph typo – should Fig. 5e read Fig.5?
6) Page 11: Figures 6 and 8 (and last two paragraphs) contain somewhat similar information.
7) Page 12: 2nd paragraph with typo, "dilates" .
8) Page 12: 2nd paragraph last sentence, "The hails were mainly oriented from southwest to northeast direction throughout the GMSTWA." Does the author refer to the area of hail occurrence?

9) Figure 8 does not provide much new information when compared to Figure 6.
10) In Table 4, suggest that the column tile “average” be changed to “average diameter”, and “maximum” to “maximum diameter”.
11) Page 13: first paragraph, “in autumn and winter the study area received less hails and minimum of hailstone sizes…” - the statement is not accurate when looking into Figure 4, where hailstones in April have an average diameter of 3.7 cm and maximum diameter of 9 cm.
12) Page 13: 2nd paragraph, “The broadest time scale over which hail events varies is the year-to-year variation in their frequency and hailstone size” – the meaning of this statement is unclear to me.
13) Suggest that the definition of hail events and associated (hail) days be made clear in the captions of Figure 10 and the related text.
14) Page 13: 2nd paragraph, “the skewed nature of thunderstorms”. Suggest the statement be expanded for clarity (e.g. why/what skewed nature).
15) Page 14: “…Figure 10b clearly shows sequences of positive (wet) and negative (dry) years…” - Positive (negative) year in Figure 10 is not necessary related to wet (dry) weather.
16) Figure 11(b): suggest that a definition of “area-average” be made explicit.
17) Page 14: 2nd paragraph, “In a smaller extent, it also appears that two of the LGAs: Wingecarribee and Hawkesbury ….” – it may be highlighted that Sydney metropolitan region is one of them.

Discussion

1) Page 17: 1st paragraph, “Results of the current study lead to an initial conclusion that different landcover/landuse patterns, for example the more dense residential and city areas, are able to affect the temporal-spatial distribution of hailstones.” Is this just a suggestion, rather than a conclusion?

Other sections

No comments.