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Comment

Interactive comment on “Patterns and trends of high-impact weathers in China during 1959–2014” by J. Shi et al.

Anonymous Referee #1

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This manuscript deals with an important issue of high impact weather which is within the scopes of NHESS. However, currently I have major comments which should be given a due attention before this manuscript it can be considered for publication in NHESS. My first concern is regarding the data used. The authors state (p.6153, l.1) ...high station density... This is not the case in the provinces of Xinjiang, Tibet, Qinghai and Inner Mongolia. I could accept these low densities unless the authors explain that ...missing values were filled in by...neighboring stations... (p.6153, l.5). In some cases these neighboring stations are located at hundreds of kilometers! I doubt if data can be filled with such densities, certainly not a hailstorm which is a relatively a localized phenomenon. The authors explain how they obtained spatial averages for entire China. Apart from the question regarding a meaning of such values (see later) there

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is a major problem with the way these values were obtained. The methodology is described in section 2.2.2. The authors calculated average HIWs for each province and then calculated an area weighted average for the entire country according to the area of each province. However, the four largest provinces which have the highest weight are those with the lowest station densities mentioned above, therefore the weighted average is completely biased. It can be easily assumed that at least some of the phenomena they analyzed “slipped off” from their sample in one of these four provinces and as a result altered the average for entire China. Furthermore, even if the entire country was sampled evenly, what is the meaning of calculating the average temporal trend for such a huge country spreading over more than ten different climatic regions? The figures presented in section 3.1.1 are absolutely meaningless. The authors state that: ...snowfall weathers decreased at a...rate of 2.5 days per decade in China (p.6155, l.17). Really? I doubt it. In section 3.2.1 they list the average number of snowfall days decreasing from 196 days per year, in Xinjiang to zero for the entire analysis period, in Hainan and other southern provinces. So what exactly the calculated average represents? What does it mean a decrease of 2.5 days per decade in a region where it never snowed? The same is true for the three other variables (thunderstorms, foggy days and hailstorms). Figure 5 is the best proof for that as it shows various trends (mainly decreasing but also some increasing) of the four analyzed phenomena which cannot be averaged into a single value. Therefore section 3.1 (3.1.1 and 3.1.2) should be completely omitted from this analysis as well as Figures 2 and 3. The same comments pertain also for section 3.3 (3.3.1 and 3.3.2) and Figures 6 and 7 which should be omitted from this manuscript. These two sections and their accompanying figures are completely meaningless. Figures 5 and 9 – only significant trends should be highlighted while non-significant trends should not be colored at all. This will enable to evaluate how widespread are the different trends. In their present form, it is impossible for the reader to know if the trend in a certain region is significant or not. The description in sections 3.2.2 and 3.4.2 is not sufficient. Figures 4 and 8 present very similar spatial distributions as expected. While in Figure 4 the average number of each of the

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four phenomena is presented, Figure 8 presents the average number of long events (I think the term spell is more appropriate rather than process) of these phenomena. A simple division of the number of processes (spells) by the number of days will present the percentage of long events out of their total number for each phenomenon. I expect a map showing these ratios, to highlight the spatial variability in the behavior of these analyzed phenomena and that the authors will discuss them. Minor comments: The definition of HIW is very vague (section 2.2.1). How much is . . . a lot of heavy rain? How heavy rain is defined? The definitions should be detailed. Section 2.2.3, first sentence: Here, a weather process. . . 3 consecutive days, is not clear, please rephrase.

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