

Interactive comment on “Magnitude and frequency of heat and cold waves in recent decades: the case of South America” by G. Ceccherini et al.

Anonymous Referee #2

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The paper by Ceccherini et al. describes the extreme temperature regime of heat waves and cold waves across South America over recent years (1980–2014). To do so, the authors use the Global Surface Summary of the Day (GSOD), a climatological dataset produced by the National Climatic Data Center.

The topic of this study is of interest to be published. However, the manuscript is unclear on several occasions and has several methodological issues that should be dealt with. Hence, the paper is returned for a revision. The list of comments below should be taken into account before the article is ready for acceptance.

- 1) Please remove the references from the abstract;
- 2) L21- Which areas?

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3) Section 2.1 and 2.2. More information regarding the weather stations is needed. Can the authors comment on the percentage of stations at different altitudes? In addition, I find the 30% gaps threshold a bit higher. Why the use of 30% and not 25% or even 20%? Can the authors give some information regarding the percentage of stations with different missing values?

4) Section 2.2.1. I did not understand all the details regarding the computation of the heat and cold wave magnitude indices. The authors stated: "In this work this index and the corresponding Cold Wave Magnitude Index (CWMI), defined below, are used to detect South American heat and cold waves in the present climate." So, how many indices were computed by the authors? In the present form it seems that the use of CWMI was also used to compute the heat wave index. Therefore section 2.2.1 must be completely re-organized with both definitions computation (HWMI and CWMI) to be clear as possible. With this it is impossible to fully understand the main results.

5) P7384L22. The computation of the indices ends at 2014? The date "30 June 2015" seems a contradiction to what was said before.

6) Why the particular analysis of the 2013 heatwave? It was the most intense during the 30 years analysis? Why not doing a similar example to the cold wave?

7) P7389L3 The stations with statistical significant trend do they appear clustered in some areas? or they are scattered throughout the domain?

8) Section 3.4 I believe that there are too many equations in this section. Most of the computed indices are rather straightforward, therefore a simple explanation is enough. In addition, I do not believe that the use of equations 5 and 6 are the most appropriate in this context. Probably a two-sample Kolmogorov–Smirnov test would be more appropriate.

Figure Captions need to be improved. Figure 1. You can improve this figure by adding a color representing a range of altitudes to each dot. Figure 2 and 5. What does the bar

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plots represent? Figure 3 and 6. The X - axis must be improved in order to represent as much classes as the ones in Table 2. Figure 7 Which trends are significant?

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