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## ***Interactive comment on “Comparing peasants’ perceptions of precipitation change with precipitation records in the tropical Callejón de Huaylas, Peru” by W. Gurgiser et al.***

### **Anonymous Referee #1**

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This is a really interesting study comparing observed precipitation records, which do not show a clear change in seasonality, with local perceptions that suggest such a change did occur. I greatly enjoyed reading the paper and I especially appreciate the interdisciplinary approach taken by the authors. We need more similar studies of this kind. I only have a few minor comments to offer below, which the authors may want to consider when revising the paper, but think that it should be accepted and published.

1) While the topic is very interesting and the analyses have been carried out very carefully, it is a bit of a pity that the authors do not provide a clear conclusion as to what could explain the observed discrepancy between meteorological records and local

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Comment

peasant's observations. The reader is left somewhat in limbo at the end, wondering who is correct, the meteorological data or the local observers.

2) Were the peasants queried as to what they perceive or believe to be the cause of the changes they identified in the interviews? If any information on this aspect were available it would be nice to include more discussion of it.

3) Figure 1 could be improved a bit. Much of the text is written in extremely small font (also true for Figure 2) and the setting of the study site within the Rio Santa and within central Peru are not very clear. Finally the darker rain-fed areas are hard to distinguish from the dark satellite backdrop. It might be better to use an actual map, rather than a satellite image as a basis for this Figure.

4) Figure 3: same comment as above: if possible, please improve readability of the text in the legend.

5) Onset of the dry season. I wonder whether this chosen criterion is optimal. From simple visual inspection of Figure 3, it appears that the end of the wet season is often characterized by long dry spells, which would suggest that the dry season may actually start earlier (i.e. the length of the wet season may be overestimated). Indeed a wet season in this region that extends to mid May is somewhat inconsistent with reported precipitation seasonality in the literature from this region. Indeed Fig 4a shows a wet season around 250 days. That is too long for this region. I would suggest that the authors try and find a more stringent measure for defining wet season (there are plenty of them floating around, for example in the South American monsoon literature, that could be adapted to this region). Usually such measures are defined based on end of the wet season, rather than beginning of dry season metrics.

6) Dry spells also could probably be defined more narrowly. Figure 4 shows that in some wet seasons there are more than 100 dry spells. How is this possible? Dry spells by definition are periods that must extend over several days (otherwise it is not a spell). Are you maybe counting several days that form part of the same dry spell individually

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rather than as one and the same dry spell? In any case it might be worthwhile to compare your estimates with other numbers from the literature on dry spells in the Peruvian Andes, which usually only lists a few dry spells per wet season (e.g. Sulca et al., *J. Hydrometeorol.*, 2015-in press, although their wet season is based on only 3 months).

7) The boxplots in Figure A1b, A1c need a bit more explanation in the Figure caption. What do the red crosses indicate and why are they shown only for some months?

8) The statement that freezing levels remained constant since the 1980s is inconsistent with data shown in Bradley et al. (*Geophys. Res. Lett.*, 2009) and Rabatel et al. (2013, the Cryosphere) and also with observations that suggest continued warming at high elevations in the Andes over the period 1981-2010 (Vuille et al., 2015, *J. Geophys. Res.*). I think this statement needs to be a bit more balanced, given all the evidence suggesting otherwise.

9) Page 1883, line 7: ‘affects’ (not ‘effects’)

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Interactive comment on *Earth Syst. Dynam. Discuss.*, 6, 1863, 2015.

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