

## ***Interactive comment on “Precipitation changes in the South American Altiplano since 1300 AD reconstructed by tree-rings” by M. S. Morales et al.***

**Anonymous Referee #1**

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The authors present an annually resolved precipitation reconstruction from the South American Altiplano region based on tree rings from *Polylepis tarapacana*. Based on this record they analyze periods of climatic extremes, the relationship with ENSO and identify trends towards increasing drought in the 20th century. The analyses were carefully done and stem from a group which has had great success and considerable experience of working with these tree rings records in the past. While I do have a few suggestions for improvements to the paper, as outlined below, I think the main message conveyed in the paper is very novel and this article should by all means be published in this special issue. The records are from a region where we still know very little about past changes in climate and its linkages with modes of climate variability such as ENSO, so I am very much looking forward to seeing this record published.

C2574

### Specific issues

- The paper could benefit from a carefully proof-reading of a native English speaker. It contains a large amount of grammatical errors.
- Page 4299, lines 25-26: Be careful with sweeping generalizations. The statement that 60% of all camelids on the Altiplano died in 1998 due to drought is exaggerated. This number, while maybe correct in certain locales, was much lower when averaged over the entire Altiplano region.
- Page 4300, line 6: you mean an ‘increase in the elevation of the 0C isotherm’.
- Page 4301, line 18-19: The statement that this record provides the first annually resolved rainfall record for the Altiplano is not quite correct. The accumulation record from Quelccaya in the northernmost Altiplano is also annually resolved (albeit strictly speaking it is snowfall and not rainfall). In fact it would have been nice to see a graphical comparison of the two records.
- Page 4306/4307: I don’t quite understand why the correlation between the tree ring chronology and SST was done using annual mean (Nov.-Oct.) data. Clearly precipitation in the region is highly seasonal and hence tree ring growth only records climate during a few months per year. I would therefore expect that only SST during the austral summer wet seasons (or maybe the months immediately preceding) show a clear relationship with tree growth. One would think that using data averaged over an entire year would only help to weaken the statistics of this relationship.

Figure 4: The tree ring reconstruction shows a much subdued precipitation anomaly during the LIA when compared to other precipitation reconstructions further north in the tropical Andes (Quelccaya, Thompson et al., (2006, PNAS), Pumacocha, Bird et al., (2011, PNAS)), which both indicate a very pronounced wet period during the LIA. Is this lack of centennial-scale departures related to the tree ring standardization or does it represent a real regional difference? This aspect should be discussed in more detail.

C2575

-Page 4315, lines 26-30: Note that while Urrutia and Vuille (2009) did indeed use an RCM, the results by Minvielle & Garreaud (2011) are based on an ensemble of GCMs, not an RCM.

Minor errors:

Page 4316, line 26: 'SENAMHI' is misspelled

The reference section is littered with mistakes. Please revise this section very carefully.

Page 4317, line 18: 'journal name is incomplete'

Page 4318, line 3: 'journal name is incomplete'

Page 4318, line 18: 'Seager' is misspelled

Page 4318, line 22: 'Hydrol. Sci.'

Page 4318, line 24: 'Ann. Rev.'

Page 4318, line 26-29: The paper by Francou et al. (2004) was published in 'Journal of Geophysical Research' and not in 'Geophysical Research Letters'.

Page 4318, line 24: Journal abbreviation is erroneous.

Page 4319, line 6: Error in article title: it should read '... and mechanisms of past changes'.

Page 4319, line 6: 'journal name is incomplete'

Page 4319, line 8: 'journal name is incomplete'

Page 4320, line 3: 'journal name is incomplete'

Page 4320, line 10: Journal abbreviation is erroneous.

Page 4320, line 14: 'journal name is incomplete'

Page 4321, line 32: 'journal name is incomplete'

C2576

Page 4321, lines 10-11: Journal abbreviation is erroneous.

Page 4321, line 24: Journal abbreviation is erroneous.

Page 4323, lines 8-9: 'journal name is incomplete'

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Interactive comment on Clim. Past Discuss., 7, 4297, 2011.

C2577