

Clim. Past Discuss., referee comment RC1
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Comment on cp-2022-37

Anonymous Referee #1

Referee comment on "Drought increase since the mid-20th century in the northern South American Altiplano revealed by a 389-year precipitation record" by Mariano S. Morales et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2022-37-RC1>, 2022

Dear authors, I read your paper with interest since the topic is super relevant to the dendroclimatology field.

I understand that your main point is to defend the idea of an increased dryness conditions in your study area, based on a tree-ring precipitation reconstruction, however I'm not completely sold on this idea, and you show a brief discussion about it at the end of your discussion in which you mention there are studies (one at least), that show an opposite trend for the same time period, over your study area.

I think one of the key messages would be why would we value the tree-ring based reconstruction of precipitation you are offering over the instrumental data that are currently available. You mention the other paleoclimate proxies, however they have problems like trends that are difficult to remove sometimes.

I raise a few points here, see if you find it interesting to address them.

Abstract:

Lines 35-40: I missed a little explanation of what would be the influences of ENSO in the precipitation in your study area.

In Methods you mention in "Climate data collection and analysis" that you used stations with less than 10% missing data. Why did you make the average of the 7 stations? Did you analyze each station against your chronologies? Or against your regional chronology?

Did you try gridded data too?

In line 197, did you try monthly correlations too? I'm confused, did you calculate the average of the entire year?

In line 221, is this your best correlation result? What period is this correlation?

In line 253 you say "stable", however I think you are comparing this ~ 20 years frequency with the increased frequency you observe in the 20-21th centuries, is that correct? Stable to me sounds like nothing was happening, however it was, but at a lower frequency. I suggest you change the text in this paragraph, there is no such a thing as stable in climate, because it is constantly changing.

In lines 345-347 I ask myself, what are the odds of your chronologies showing decreased growth due to increased temperature and not exactly related to decrease in ppt?

In line 370 you mention 1876/1877, and according to your dated chronology, your 1876 ring is the one that started in November of 1876 and extended to 1877. That would be already when the El Nino happened, and yet you say your 1876 shows as the wettest year.

In line 385 I would suggest you write what BT stands for, I know you already showed in methods, but it's a long way for the readers to go back and find the abbreviation.

In paragraph 409-416: What is the main source of precipitation in the study area? Is it the Pacific Ocean or the glaciers? Is this drying trend related to losses in ice cover, increased temperature, or both, and are you suggesting increased SST's activity?

In lines 424-427 you say that these differences in trends could be related to distinct time span, however the instrumental ppt data you are using are also showing negative trend, in opposite to the study published by Segura et al. 2020, is that correct? And in your study, the instrumental data you are also relatively short (~1970-present). Therefore I was asking about why you decided to calculate the average of the 7 stations, even when they had missing data.

Overall, I think this is a great manuscript, the analysis and methodology were well performed. I raised a few questions to you here that I hope can help this narrative. I do think it would be ideal to include more explanation regarding the hydroclimatology in the

area, like where does the water come from and the possible explanations for this drying trend.

Below are a few typos I noticed.

Small changes/typos

Introduction:

Line 68: "found"

Line 73: I think you mean to say "by the end of the 2st century"

Line 78-79: I would suggest you only say "changes" instead of "possible current changes"

Line 102: "...the minimum temperature is..."

In "2.7 ENSO signals in the northern Altiplano precipitation" there is a typo when you write NDJ. Right now is written as "NJD"

Discussion

Line 331: "allows"