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Climate of the Past Discussions

Interactive comment on "Environmental and climatic history in the NW Argentine Andes (24 S) over the last 2100 years inferred from a high-altitude peatland record" *by* K. Schittek et al.

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General comments

This paper presents a new paleoenvironmental record located in NW Argentina. The record covers the last 8000 years and the last 2100 years are presented in this paper. Multi proxy analyses have been performed to detect changes in water table, climate and human occupation. Results show fluctutations in the water table and alternance of dry and wet episods in the region which are related to changes in ITCZ seasonal shifts and

monsoon intensity. The quality of the data, wich consists in crossing informations from organic, inorganic, micro and macro fossils allows a fine reconstruction of the climate in the area. However their presentation is fuzzy and needs improvement in order to make this paper understandable by a broad community. This study would benefit also to be incorporated within a regional context of climate changes. The references cited in the paper are sometimes inappropriate, too sparse and lack discussion. I would recommend to entirely re write this paper, present clearly the data and re submit the paper to Climate of The Past.

This includes :

Title In its actual state the paper is presenting the responses of a peatland hydrosystem to climatic changes and the title proposed by Schittek et al does not cover the content of the paper.

-A map with the location of the other records that are discussed in the paper -A figure that shows the reverse pattern at 37°S with climate diagrams and the position of the Âń arid diagonal Âż. -An additional synthetic figure with an indicator curve for each analysis is needed. For the pollen results I suggest to build a pollen index, see for instance the Poaceae / Asteraceae index in Kuentz et al The Holocene 2012.

-The final conclusions are not clear as they do not mention what was the final story of the last 2K in NW Argentina as announced in the title and how it fits or not the regional pattern of changes observed in other published records.

To help, I tried to pick up some time intervals and dates mentioned in the paper to see if eventually the analyses agree one to another. For this purpose, I built a table (see below). It seems that the authors mixed up climate episods and climate intervals and that a lot of details are provided without any explanations.

To improve the understanding and the reading of the paper I suggest to organize the results with the modern samples and the sediment core presented separately, and the

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discussion in function of the different messages given by this paper. 1) changes in water table 2) changes in climate 3) human occupation. The relation between peatland's surface wetness and climate is not obvious and needs to be better explained.

Specific comments

About ∂C13 in the High Andes, see also Ledru et al 2013 The Holocene, where modern vegetation is between -27.8 and -25.6 ‰ Wetter conditions are observed when values decrease and drier conditions when they increase. Values at CTP range between -26.4 and -24.5 ‰.How do you explain such a narrow interval of changes when you have such differences in the pollen content for instance ? Did the authors consider the C3 plants ? the pCO2 under these high elevations ? Does Oxychloe andina explain everything ? Separate the plant discussion from the sediment core discussion of the results and show how the first one contributes to the second one (also for TOC and ∂15N).

Polen diagram : what are the criteria used for the zonations ?

What shows the principal component analysis performed on the geochemical data ? I would suggest to erase that part.

Page 2049 L23 Âń very low Âż how much ?

Page 2047 L6 Âń ..is highest.. Âż How much ?

P2059 L2-4 Is it the main result of this study ?

P2059L9-18 Was it a methodology paper ?

P2060 L2-3 are these phases or events ?

L4 What were these volcanic forcings ?

L7-14 this was also showed in Schittek 2015 and should not come as a conclusion for this paper.

References

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Kuentz A., Ledru M.-P., Thouret J.C. (2012) Environmental changes in the highland of the western Andean Cordillera (southern Peru) during the Holocene. The Holocene 22 1215-1226.

Ledru M.-P., Jomelli, V., Bremond L., Cruz, P., Ortuño T., Bentaleb I., Sylvestre F., Kuentz A., Beck S., Martin, C., Paillès C., Subitani S. (2013) Evidence for moisture niches in the Bolivian Andes during the mid-Holocene arid period The Holocene 23 (11), 1545 - 1557.

Table 1

Interactive comment on Clim. Past Discuss., 11, 2037, 2015.

Analyses	Drier	wetter	Human
Inorganic =peat surface and water bodies ?	BC50-AD 100 AD1000-AD1100	AD 250-AD 550 AD1810-AD1830	
Organic TOC $\partial^{13}C$ $\partial^{15}N$ =peat surface and water bodies ?	BC150-AD50 AD700-AD1750	AD300-600 The past 100 years AD200-600	
Micro Macro fossils =climate changes ?	AD 700-AD1450 AD1000-AD1100 AD 1250-AD1330 BC50-AD100	BC150-AD700 AD1450-AD1900 17th-first half 18th century	Reduction in charred particles at AD 1100

Fig. 1.

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