First, we would like to give our sincere thanks to the anonymous referee #1, whose comments and suggestions helped to improve the manuscript!

"As Charman et al. (2006) mention, there is a great challenge when interpreting peatland records: 'Peatlands are subject to a range of long-term developmental changes that can arise as a result of autogenic factors as well as external factors such as climate change.' Hence the question in this study is: are the redox conditions indicative of large scale precipitation changes or are they indicative of local in bog processes. Charman et al. (2006) also suggest how this could be tested: 'replicability between profiles and between sites within the same climate region should be a guide to the reliability of each suggested climate feature.'"

The influence of autogenic (autochthonous) and external (allochthonous) factors on Andean peatlands has already been discussed in the CPD online review for Cerro Llamoca peatland and in the paper´s final version (Schittek et al. 2015) and the literature cited there. We added a few sentences to the introduction to better highlight these previous findings.

The new data from Cerro Tuzgle peatland represents the first outcome of a larger-scale research project conducted in NW Argentina, which focused on high-altitude peatlands. Analyses are still going on, and hence, not all of the results could be presented in our paper. This includes the data of further cores, which had been extracted from peatlands in the closer region. We absolutely agree with the concern of the referee according to the replicability between records. The investigation of a single peatland is not sufficient. That topic will be envisaged in the near future. Nonetheless, the peatland data presented in Schittek (2014) and Schittek et al. (2015) is highly comparable to this study and can already proof the reliability of the presented new data. To point this out, we added results from Schittek et al. (2015) to Fig. 6 and the discussion.

"Fig. 6 could be greatly improved. First, I suggest fitting smoothers such as locally weighted regressions (loess) or splines to all of the data series compared. Currently, it is extremely difficult to determine whether the small spikes in the different time series that are connected by dashed lines are major features of the time-series or if they are noise. As the figure is now, I could add as many lines that show contradictions between the records as the authors draw lines that (apparently) show similarities. It is also difficult to see the general patterns of the records compared."

Fig. 6 was intended to be presented as a first draft for discussion. Therefore, we left out colors and highlighting elements. This was added to the new version of Fig. 6 in the revised version of our paper. We further added splines to all curves. The dashed lines were erased and color bars were added to show similarities.

"I also struggle to see similarities in the general patterns of the records compared. In my opinion, page 2055 lines 24 – 27 'The variation of Mn/Fe ratios at CTP clearly reveals that local moisture availability is strongly coupled to more southward positions of the ITCZ (Haug et al., 2001), which further corresponds to overall cooler conditions in the Northern Hemisphere (Moberg et al., 2005)' is not supported by the data shown in Fig. 6. It would be nice to have some evidence in terms of correlation coefficients (preferably taking into account chronological uncertainties). One method for achieving this goal is the method developed by Rehfeld and Kurths, (2014)."

The problem with the comparison of the records is mainly based on chronological uncertainties. We therefore thank the referee for his suggestion to use the method developed by Rehfeld and Kurths (2014). The application of non-equidistantly sampled time series analysis can definitely be used to test the correlation of our data with the other presented and suggested records. However, in our opinion, the presented data is intended as a very first outcome with focus on geochemical and ecological processes. Further statistical methods could be included to a follow-up publication, which could include the complete 8000-years data of the record. The inclusion of more sophisticated statistical methods would extend the range of the paper significantly. It is our aim to keep the 2100-years paper in a manageable form.

"Unfortunately, the choice of the records compared to the CTP record is not sufficiently motivated. For instance why is the Moberg et al. (2005) record used and not one of the other records available (e.g. Mann et al. (2008)). As shown in Fig. 3 of Morales et al. (2012) the precipitation reconstruction by Morales et al. (2012) is not strongly related to the precipitation in North-western Argentina for the period 1961 – 2006. Important reconstructions are omitted form the comparison. Most importantly, a comparison with the work by Neukom et al. (2010) and Boucher et al. (2011) who provided spatially explicit reconstructions of precipitation and palmer drought severity index, respectively is missing. Such a comparison would greatly improve the quality of the manuscript as it would shed some light on the major question: local, bog related signal or precipitation signal. The CTP record is not compared with the author's own record from southern Peru (Schittek et al. 2014, close to the location of the record by Morales et al. (2012)) and the proxy by Rein et al. (2004) shown in Schittek et al. (2014)."

The reason for choosing the record of Moberg et al. (2005) was to be in accordance with the works presented by Bird et al. (2011) and Vuille et al. (2012). Herein, a remarkable correspondence between Northern Hemisphere temperatures (Moberg et al. 2005) and the mean-state changes in Andean isotopic records was found. The reason for not including works like Neukom et al. (2010) and Bocher et al. (2011) was that they deal with Southern South American datasets, which are characterized by an extratropical precipitation regime controlled by the Southern Westerlies. As the NW Argentine Andes are characterized by a summer precipitation regime controlled by the intensity of the South American summer monsoon, we avoided the inclusion of data from the area south of the Arid Diagonal.

For the new version of the paper, we included the data by Mann et al. (2009) and Schittek et al. (2015).

"Fig 4 and Principal component analysis: The sentence used to describe the PCA methodology is ambiguous: 'standardisation of the data to omit rows with missing values'. I guess the authors meant to say 'standardisation of the data after omitting rows with missing values' i.e. eigenvalue decomposition was computed on the correlation matrix, which is appropriate given the data at hand. Unfortunately, I disagree with one of the interpretations of the PCA-biplot: In my opinion, Mn/Fe is not contributing a lot to PC-axis 2 as suggested page 2049 line 20. Most probably Mn/Fe has a high loading in the third component. I therefore suggest to substitute Figure 4 with a table giving the loadings of each variable in the first three components (given the third component is also significant). Using standardized data (correlation matrix), the loadings are Pearson's product moment correlation coefficients between the PC-scores of the axis at hand and the variables."

We absolutely agree with the referee´s comments. For the new version of the paper, we added a supplement containing a table with the loadings of each variable in the first three components and reworked the PCA interpretation.

"Minor comments: Fig 6.: In Haug et al. (2001) [and also Schittek et al. (2014)], the unit of Titanium is % and not cps,
P 2045 l. 14: I presume this should read $p<0.05$ and not $p>0.05$"

Thank you! This was corrected for the final version of the paper.

"P 2055 l 14: I was not sure what 'that period' refers to."

The sentence was changed into "The investigation of glacier fluctuations in southern Peru has shown that the onset of cold conditions was widespread in the mid- and low-latitude regions of both the Northern and the Southern Hemispheres during the Late Holocene period".

"P 2059 l 11 – 14: The proxies mentioned here are not prominently used to get information on past peatland surface wetness and climate."

The applicability of the Mn/Fe-ratio is already discussed in Schittek et al. (2015). The analysis of organic carbon and nitrogen contents are an established proxy for the varying degree of peat decomposition (which also depends on surface wetness), see Chambers et al. (2011) and literature cited there. Futhermore, stabile isotopes of $\delta^{13}C$ (see e.g. Ménot and Burns (2001)) and $\delta^{15}N$ (see Marshall et al. (2007)) are common proxies for palaeoclimate research based on peat archives.

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