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1) Scientific significance

Does the manuscript represent a substantial contribution to scientific progress within the scope of this journal (substantial new concepts, ideas, methods, or data)?

GOOD

2) Scientific quality

Are the scientific approach and applied methods valid? Are the results discussed in an appropriate and balanced way (consideration of related work, including appropriate references)?

GOOD

3) Presentation quality

Are the scientific results and conclusions presented in a clear, concise, and well structured way (number and quality of figures/tables, appropriate use of English language)?

FAIR

For final publication, the manuscript should be
reconsidered after **major revisions**

This is an interesting manuscript that combines geomorphology and DNA-based population genetics to understand monospecific populations of *Tillandsia* in the hyper arid Atacama Desert and their relations to sand transport by wind.

Thank you for this positive comment. The project is indeed ambitious, because results from different temporal-spatial scales (biological system and wind system) have to fit to make firm conclusions. Since we did not observe/resolve fine-scaled differences in sand properties (sample grid scale is on 100x100 m) in our study we have to phrase our conclusions sometimes with some caution.

The manuscript is very long and reads like a report to sponsors. It could benefit from severe pruning to make it more concise and to tell the authors' story more effectively. At the same time, it does lack information on the physical and biotic character of the investigated sites. Numerous correlations between variables are discussed but no plots are included.

We agree that the manuscript can be streamlined, in particular with the opening paragraph(s) of the introduction. Thus, we originally thought that it would have been worth introducing the more general aspects - which indeed might read like a review and will be shortened significantly.

It is a good idea to provide some summary on the physical and biotic characters of the investigated sites. In principle, that is all incorporated with the given manuscript. Eventually it is an option to prepare a respective summary table for the supplement. We do not see the necessity to show all the data plots with the main manuscript. But, of course, it would be possible to have them presented - if applicable - with the appendix.

Introduction – very long and introduces multiple topics – monospecific plant communities, dryland ecosystems, banded vegetation patterns, Tillandsia communities. We finally learn the objectives of this paper at line 220.

We agree and will shorten substantially.

Thesis section needs to focus on Tillandsia ecosystems in the Atacama and their distinctive characteristics and not ecological theory. Some subheadings would be helpful.

Although we feel that the more general part starting with monospecific vegetation and providing evidence for formation of particular structures in vegetation is important to see the relevance of the studied system - likely even for ecological theory because of its simplicity - we will streamline and shorten accordingly. We would also suggest a compromise while shortening and introduce subheadings as suggested above. This has been a great idea.

Methods

Very detailed documentation of sample collection and analysis.

We appreciate this comment and commitment to explain in detail experimental details.

Results

This section could benefit from some reorganization of material in order to present first the physical environment and then the biotic information. This section could benefit from some site photographs to show the environments in which the Tillandsia grow

We agree and will have genetic data placed in front of the results section. This is in line with reviewer 2 asking also for some congruence with the discussion outline. We thought that Figure 1 provides sufficient information about the vegetation. But we can, of course, provide a new Figure 2 with additional impressions from all three study sites.

785 – it is aspect, not exposition here and in this section

Thanks for spotting this. This will be corrected.

Discussion

This section is very generalized and discusses broader aspects of Tillandia ecology especially in relation to climate change. It does not easily follow from the result presented here. Some more detailed discussion of relationships between topography, winds, sand transport and particle size should be included here

The most prominent part is indeed Tillandsia biology/ecology. This is obvious, because genetic data are shown herein for the first time in a comparative way showcasing that past assumptions and concepts about population dynamics and population biology are fitting a more general perspective; and, of course, we also included all reliable past results in discussions. We will take efforts to streamline further and shorten whenever it is possible.

Inhere “Climate change” [environmental change] is important to understand that this system has been very dynamic over “biogeographical and evolutionary” scales. However, the system’s ecology is built to persist and stay as long-lived vegetation over millennia. We may have to highlight this better and will do so.

All this information is then put into the sand dynamics context, and we will consider seriously to expand the discussion as suggested by the reviewer. The three areas studied exhibit certain individual characteristics, for example with regard to their respective topographical features. We shall describe these in greater detail so that the measured wind data can be interpreted more effectively. It should be noted, however, that all areas are characterised by extreme aridity and – in comparison with other deserts where sand transport occurs – by a low-energy wind system. Taking the petrographic conditions into account, the grain sizes typically transported can be well explained, which in turn allows us to estimate the influence of the *Tillandsia* populations.

Conclusions

do not follow from the results of the field and laboratory studies documented here

We slightly disagree (in part). The first ⅔ of the paragraph is completely grounded in our results. And it is the final half-sentence that is out of our results presented herein. We intended to present a conclusion beyond a simple summary. For the final half-sentence there are two options, either we simply delete this half-sentence or we change “Conclusion” to “Conclusion and Perspectives”.

In any case, we will elaborate on the conclusion and will expand it with additional important findings and results.