To

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Submission of manuscript “**Same but different: Rethinking the common understanding of ENSO and its impact on biodiversity in its terrestrial core region**”

Dear Dr Hoorn:

In agreement with our previous correspondence, we are pleased to submit our manuscript to the **Humboldt Special Issue**. In the Humboldtian tradition, our research has focused on studying species turnover along spatio-temporal gradients in South America. Specifically, we present the results of a study conducted in the (semi-)arid areas of northern Peru over four years. The study area is of special interest since it is heavily affected by the El Niño Southern Oscillation (ENSO) – in fact, it is the region where ENSO exerts its greatest terrestrial impact. Each of the studied years represents a different ENSO episode. We investigated the effect of ENSO on the floristic composition in 50 permanent plots along a humidity gradient from the extreme dry Pacific coast to the semi-arid Andean foothills. We are not aware of any other study comparing different ENSO episodes on the floristic composition along a humidity gradient. To visually represent the changes in floristic composition across the years and along the humidity gradient, we use an innovative approach by spatially predicting and mapping the scores of a Detrended Correspondence Analysis with the help of a Generalized Additive Model and spatial cross-validation.

What is more, variation partitioning helps us to determine the effect of topography and soil on the floristic composition, and how this effect changes as soon as water is no longer the limiting factor. This is especially interesting since the influence of edaphic variables along gradients is not very well known, especially in comparison with other gradients (humidity, altitude), and hardly available for drylands. Additionally, we support the results from the field with an irrigation-fertilization experiment whose results are of utmost importance for sustainable agrarian management.

The proposed manuscript is local in scale but of global relevance since it contributes to a better understanding of the influence of geodiversity on biodiversity in the core region of ENSO. ENSO in turn is a global phenomenon and especially the frequency of related extreme events (El Niño/La Niña) is likely to increase with climate change. The high variability of ENSO in its terrestrial core region suggests that it is very likely that its impact in regions further away (teleconnections) are even more variable. Even if simple patterns are alluring (such as EN corresponds to more/less rain in certain regions), oversimplifications might lead to wrong predictions and hence wrong recommendations with partly devastating effects especially for the affected population. Therefore, we suggest overthinking our common understanding of ENSO.

The manuscript consists of 4999 words (excluding acknowledgments, authors’ contributions and references), represents a new work, and has been prepared according to the journal’s guidelines for authors. We, therefore, hope that you will consider our manuscript for publication in the **Humobldt Special Issue** of the *Journal of Biodiversity*.

We are looking forward to your response and the comments of reviewers.

Yours sincerely,

Jannes Muenchow, Petra Dieker, Jonas Brock, Gregor Didenko, Desiree Jakubka, Anke Jentsch, Michael Richter, Eric Frank Rodríguez, Rodolfo Arismendiz Rodríguez, Rütger Rollenbeck, Pablo Salazar Zarsosa and Alexander Brenning