CENTER FOR MARINE BIOLOGY
UNIVERSITY OF SÃO PAULO
CEBIMar USP

March 20, 2025

Dear Dr. Werner Ulrich,

Thank you very much for handling our manuscript entitled “Scales of marine endemism in oceanic islands and the Provincial-Island endemism” submitted to Peer Community In Ecology. We improved the manuscript following the reviewers suggestions, and we believe it has now the standards to be published in PCIEcology. Please find below how we addressed each reviewer comment.

Sincerely,

Hudson T. Pinheiro

Assistant Professor, Center for Marine Biology
University of São Paulo

Editor Comments

Thank you for your patience during the first round of review. I had considerable problems attracting two experts in the field for review. We have now received these reviews. The second referee is satisfied but wrote a very short evaluation. The first referee has made some very valuable recommendations and comments. We agree with him. Therefore we invite you to resubmit a revised version that point for point addressed the comments of the first referee.

RESPONSE: *Thank you very much for handling our manuscript. We worked on the suggestions of the first reviewer. Please find below how we addressed their comments. We believe that the article has now the standards to be published in PCIEcology.*

Reviewer 1 (Paulo Borges)
The study presented in the manuscript addresses an important research question and provides significant insights into the marine endemism on oceanic islands. The authors have conducted a comprehensive and well-designed review.

RESPONSE: *Thank you very much for your consideration.*

However, the data used of the analyses will be very useful to the readers of this manuscript to perform additional analyses. I understand that Data is curated by the senior author of this study JPQ (quimbayo.j.p@gmail.com), who is currently performing a data paper (in

preparation). It will be important that this Data paper is published first and the authors add here the Link to the Data repository.

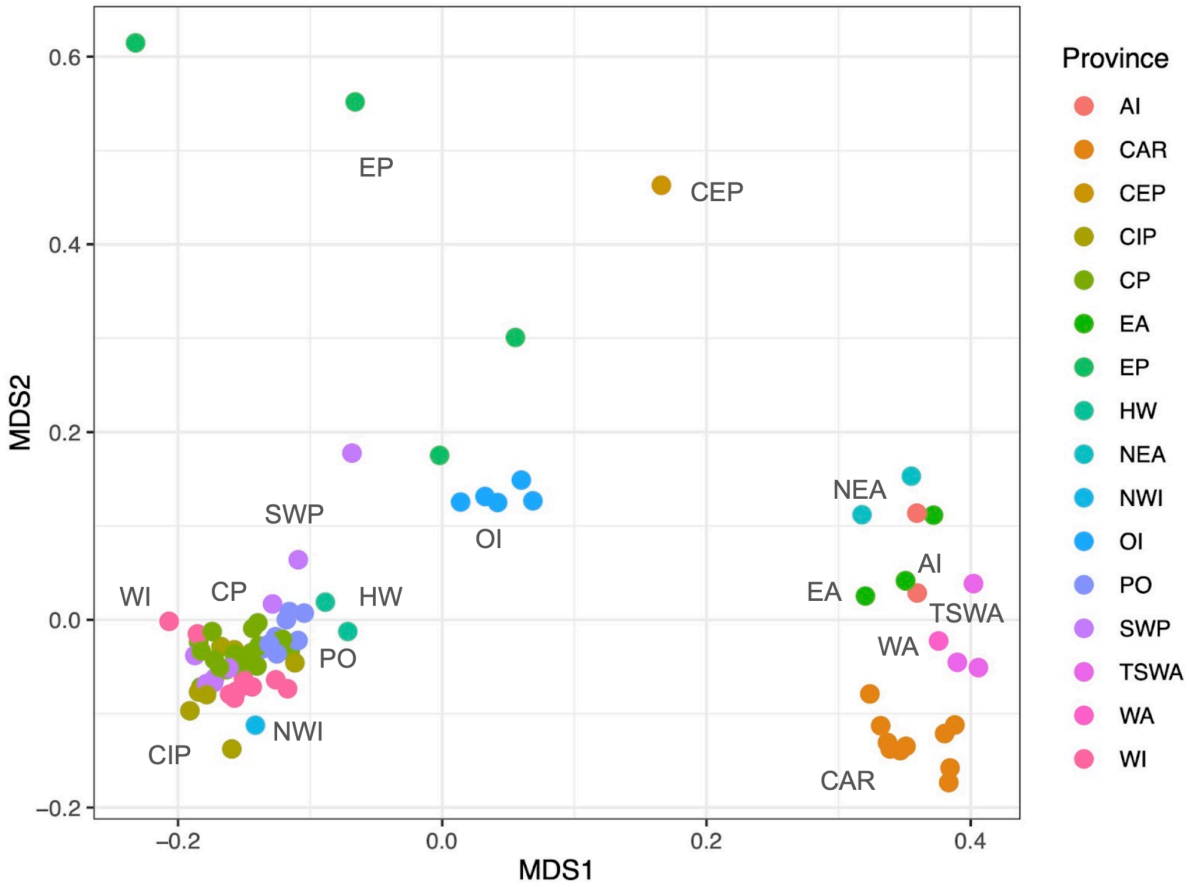
RESPONSE: *We clarified in the manuscript (line 208) that the data is available in a repository: Quimbayo et al. (2022) A trait-based approach to marine island biogeography. https://zenodo.org/records/7316869*

Moreover, I think that to this manuscript needs some additional Biogeographical analyses to have more interesting readership. As it is with only some descriptive Graphs and proportions of Single Island Endemics is quite poor. I suggest performing at least some Beta Diversity analyses. The data can be analysed using Q-mode analysis, a statistical technique that focuses on understanding the relationships between objects—in this case, regions (archipelagos)—by examining their characteristics or descriptors, such as the species (taxa) found in each region. This approach contrasts with R-mode analysis, which instead explores the relationships between the descriptors themselves (e.g., taxa), based on how they are distributed across the objects (archipelagoes). In essence, Q-mode seeks to compare the regions with one another, while R-mode compares the species distributions across the regions. In Q-mode, a key tool for understanding these relationships is the use of similarity coefficients, which are employed to measure the degree of association between different archipelagos. The authors can use binary data (presence/absence of species). By focusing on binary data, similarity coefficients can provide a clear picture of how similar or dissimilar regions are based on which species they share. Non-metric multidimensional scaling (NMDS) or principal component analysis (PCA) can be used to visualize and assess the relationships between different archipelagos based on their species composition. NMDS is particularly well-suited for presence-absence data because it uses rank orders of distances rather than raw data

RESPONSE: *We agreed with the suggestion and performed a Q-mode analysis aiming to explore the relationship between the studied islands. We created a similarity matrix using Jaccard coefficient on the species presence-absence data (binary data), and then built NMDs for visualization (Figure 1). We believe that this additional analysis contributed to improve our manuscript. Please find below the paragraph describing the new results (lines 70 - 84).*

"We analyzed the distribution of 7,289 fish species associated with reef environments of 87 oceanic islands and 189 coastal reefs around the world (e.g., Kulbicki et al., 2013), and uncovered that 5,260 (72%) species occur in oceanic islands. According to their composition, the islands are strongly structured by ocean basins, where islands of the Atlantic Ocean are more similar among themselves, while a large gradient of similarity is observed in the Indo-Pacific (Figure 1). This gradient in similarity levels seems to be driven mainly by a combination of the islands' isolation and distance from the Coral Triangle, which result in two compositional patterns (Randall, 1998): First, a gradient in species richness and associated nestedness occurs, with remote locations exhibiting a strong selective pressure favoring species with superior dispersal capabilities. Second, higher levels of endemism are observed in these remote locations, resulting from speciation in isolated populations. Further, scrutinizing the composition of the islands we observed that 4,346 species occur in both oceanic islands and continental coastal reefs, and 890 species are exclusively found around oceanic islands. Thus, 12.2% of the world´s reef fish biodiversity seems to be

endemic to oceanic islands, where 541 (60.7%) are single island endemics, while 349 (39.3%) are multiple island endemics (Figure 2A). Therefore, both widespread and island restricted species contribute to the similarity among locations (Figure 1)."



àFigure 1 - Similarity among oceanic islands, based on the Jaccard coefficient and presence-absence data of the distribution of 5260 reef fish species. The biogeographic provinces used in this analysis were adapted from from Kulbicki et al. (2013): AI - Atlantic Islands; CAR - Caribbean; CEP - Continental TEP; CIP - Central Indo-Pacific; CP - Central Pacific; EA - Eastern Atlantic; EP - Eastern Pacific; HW - Hawaiian; NEA - North-Eastern Atlantic; NWI - North-Western Indian; OI - Oceanic Islands Eastern Pacific; PO - Polynesian; SWP - South-Western Pacific; TSWA - Tropical South-Western Atlantic; WA - Western Atlantic; WI - Western Indian Ocean.

Reviewer 2

This preprint is a well written piece that fits all the recommendations issued by the journal. In my opinion, it is recommendable for publication and I do not have any major comments.

RESPONSE: *Thank you very much for your time and positive feedback.*