

Dear Editor,

We submit for your consideration our manuscript entitled “What drives study-dependent differences in distance-decay relationships of microbial communities?” intended for publication in *Global Ecology and Biogeography*.

In our manuscript, we answer a central question in microbial biogeography of why biogeographic patterns, specifically the distance-decay of similarity relationship, appear to be so variable in microbial communities? Understanding the sources of this variability may provide critical insight into the fundamental processes that control microbial community structure across spatial scales, allowing us to better understand how microbial biodiversity changes across the Earth. To do this, we conducted a meta-analysis of >450 distance-decay relationships, and recorded data on the methodological approach and ecological context of each study. We show that microbial distance-decay relationships are jointly influenced by contextual variables, such as spatial extent and study environment, and especially methodological variables, such as choice of similarity metric. We conclude that microbial biogeographic patterns fundamentally differ between different contexts, but that methodological choices add an additional layer of noise. Consequently, drawing generalisable relationships from microbial biogeographic patterns will require us to tailor methodological approaches to contexts, so that our methods enhance rather than obscure biogeographic signals.

We are confident that the manuscript will be of interest to the readership of *Global Ecology and Biogeography*, as it concerns a classic biogeographic pattern in an understudied group of organisms, and also addresses a central tenet of macroecology regarding the generality of this relationship. We would like to suggest several potential reviewers who we feel may be interested in reviewing our manuscript; Janne Soininen (University of Helsinki), Jessica Green (University of Oregon), Andrés Baselga (University of Santiago de Compostela), Stephanie Kivlin (University of Tennessee), and Jennifer Martiny (University of California).

We confirm that the enclosed work has not been published or accepted for publication and is not under consideration nor has been submitted to any other journal or book. All persons entitled to authorship have been included and all authors and institutions have approved submission of this manuscript. All named authors have seen and agreed on the submitted version of this manuscript. All named authors declare no conflict of interest. Please consider this work for publication in *Global Ecology and Biogeography*.

Yours sincerely,

Dr David Clark and Prof. Alex Dumbrell (on behalf of all authors)