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sDiv working group meeting report

”sTeTra - Quantifying temporal change in traits across taxa and the globe”

Working group meeting report

This working group meeting took place 8 to 12 May 2023 in Leipzig, and included the participants listed in table 1. This was the second meeting in Leipzig of the sTeTra working group and had two main objectives: 1) to finalize the first manuscript coming out of this working group (focused on change in body size); 2) select and determine which of the other projects to prioritize to finish. The working group meeting proceeded as series of iterative daily discussions interspersed with break out group time where we advanced preliminary analysis, or developed conceptual figures, to be discussed in plenary. Most discussions were held in person, but daily catch up sessions over zoom took place, to provide opportunities to contribute to remote participants.

1) Change in body size through time

This project, which is now published (Martins et al 2023), was completed in the previous working group meeting, and submitted shortly after. At the time of this meeting the first wave of revisions and response to reviewers was shortly due. We used the meeting to discuss the revised figures and any changes to interpretation of the results they implied. We also aimed to finish a clean draft of the revised manuscript, as well as 1st full draft of the response to reviewers.

2) New project priorities

Three main projects emerged as having highest priority to be completed within the sTeTra working group: 2.1) an analysis of change in trait rarity through time; 2.2.) an analysis of traits as predictors of contribution to turnover; and 2.3) an analysis of selection on traits through time.

2.1) Rarity

This project wanted to leverage the many metrics of trait and phylogenetic diversity currently available, yet a consensus emerged that the project should be guided by a question rather than go on a fishing expedition of calculating many different metrics. During the meeting we defined the question for this project as *“Are we gaining or losing evolutionary or trait uniqueness?”*. We further defined that we would use the new iNEXT Hill numbers approach to tackle this question. Prior to the meeting the two leads, Faye Moyes and Isaac Trindade, had done the trait and phylogeny matching for birds and fishes

within the BioTIME database. Preliminary results for the metrics were produced and discussed. Some methodological issues emerged regarding the role of tau (a parameter) in the metrics, and the consequences of different standardizations for interpretation of the results.

2.2) Contribution to turnover

This project focuses on the identities of winners and losers of the widespread composition change currently unfolding as asks the question: *"Do species contributing the most to turnover have particular traits?"*. Annegreet Veeken is leading this project, and had completed preliminary analysis focused on plants. Discussions were held about whether to keep this taxonomic focus or expand it, and also about whether to keep the method used in this preliminary analysis or change metric. The results also sparked interest in attributing the patterns observed to specific drivers of change, and what data sources to use in this attribution exercise.

2.3) Selection

This project is focused on assemblage scale trait distributions. A discussion was held to define which traits to focus on, initially targeting life history traits, because specific hypothesis can be drawn for how these are changing in the Anthropocene. We also discuss whether to keep a broad taxonomic focus, and how to address traits that do not have clear equivalents across taxa. A consensus emerged that the focus should be more on the trait distributions and the process of selection. Specifically, the question for this project became one about the *prevalence of directional, stabilizing or diversifying selection*. The project is being led by Mike McWilliam.

3) Next steps & upcoming deliverables

The week ended with a concrete list of tasks assigned to different working group participants, to be completed ahead of the next sTeTra meeting. We agreed to deliver three more publications arising from this working group, pertaining to each of the projects defined above (2.1, 2.2, 2.3).

4) General working atmosphere and feedback on sDiv support

The working group ran smoothly, thanks to the excellent conditions afforded by the sDiv building, and the organization support from the sDiv staff in booking dinners, organizing lunch etc. The discussions had a supportive and friendly culture, with contributions from all participants regardless of career stage, gender or nationality.

Table 1 - Participant list

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*remote participation