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sDiv working group meeting report

„sUCCESS – Pantropical forest succession"

Report third meeting Nov 21-25 2022

The sUCCESS working group combines conceptual synthesis, data-driven pantropical analysis, and mechanistic modeling to elucidate demographic and environmental drivers of tropical forest succession at local to continental scales. In this third meeting we have advanced on old projects, and started new ones.

Participants

Workshop participants consisted of 3 workshop organizers (Nadja Rüger, Michiel van Breugel, Lourens Poorter), 6 old team members (Frans Bongers, Wirong Chanthorn, Dylan Craven, Jorge Meave, Natalia Norden, Markus Schorn) and 3 new team members (Daisy Dent, Edwin Lebrija-Trejos, Miguel Martínez-Ramos). Because of logistic and financial reasons several earlier team members could not participate live, and 4 of them joined on-line (Lucy Amissah, Caroline Farrior, Hao Ran Lai, Masha van der Sande). The overall working atmosphere was very good and constructive, as people had all a lot of experience with the topic, and knew each other from earlier meetings. The sDiv support in terms of rooms, facilities for remote participants to join, whiteboards, tasty lunchbreaks and evening dinner places was highly appreciated.

General structure of the week

The first day all participants gave short presentations about their work, and we discussed co-authorship possibilities and rules. The remaining 4 days consisted of short presentations on 6 focal papers with results, advances, and questions, followed by 2 smaller break-out groups to brainstorm about specific questions, and a plenary meeting in which we reported back to the group and took decisions. Remote participants could join the presentations, break out groups, and we had 2 plenary meetings in which we reported back to them. We also reserved two afternoons for writing sessions for a manuscript, and to work on revisions for 2 other manuscripts. We enriched the meeting with an excursion to the Leipzig Floodplain Forest and a concert in the Gewandhaus.

Upcoming products and next steps

During the week we focused on 7 products; two Modelling (M) papers (1,2) that are in revision, 3 Conceptual (C) and Empirical (E) papers (3-5) that we started in earlier workshops, and 3 new initiatives (6-8):

1. **Successional shifts in tree demographic strategies in wet and dry Neotropical forests** (M). Nadja Rüger et al. A revision was prepared and we worked on the rebuttal letter. The manuscript was resubmitted in Dec 2022.

2. **Tree demographic strategies largely overlap across succession in Neotropical wet and dry forest communities** (M). Markus Schorn et al. A revision was prepared and we worked on the rebuttal letter. The manuscript will be resubmitted in Jan 2023.
3. **A conceptual framework of ecological succession** (C). Michiel van Breugel & Team. A full draft is available. We discussed the focus of the paper (what drives directionality and variation in successional pathways), the novelty (the feedback loops), how we could improve the structure, and we had a writing session during the workshop. A new version will circulate for comments in Feb 2023.
4. **Socio-economic drivers of resilience** (E) (Lourens Poorter & Team). This paper evaluates how 3 social drivers and 3 biophysical drivers affect the recovery of 12 forest attributes during succession using 96 sites across the tropics. We discussed preliminary results and statistical analyses, and discuss the 'final' results in an on-line meeting in Feb 2023.
5. **Successional patterns in tree size distribution along a rainfall gradient** (E). Hao Ran Lai & Team. We discussed the focus of this data paper (how asymmetric competition for light determines tree size structure), the data selection, and statistical analyses. The preliminary results will be discussed in an on-line meeting in 2023.
6. **A comprehensive successional framework** (C). Lourens Poorter & Team. Despite 100 years of successional theories a comprehensive successional theory/framework is lacking. We discussed the need for- and niche of- such a framework, and further developed the conceptual diagrams. A draft manuscript will circulate for comments in Feb 2023.
7. **Drivers of biomass dominance structure of secondary forests along resource gradients** (E). Edwin Lebrija-Trejos & Team. Preliminary results were presented. We refined the research questions (How does the biomass structure of communities, in terms of the biomass contribution of the single most dominant species and the evenness of the distribution among co-occurring species, changes: a) with successional time and b) along spatial gradients in climate and soil fertility?), and discussed the statistical approach. To be continued in 2023.
8. **How do liana density and biomass recover during secondary succession** (E). Daisy Dent & Team. The preliminary analysis was based on 12 sites. To avoid the complexities of different census methods and areas we decided to analyze the data at the site-level and do a meta-analysis on those results. We will include data from 4 more sites. A draft will circulate for comments in Feb 2023.