



sDiv working group meeting report

"sRED"

The first sRED working group was held fully in-person in Leipzig from May 5th to 9th, 2025. The group included 19 researchers from all career stages (7 PhD/postdocs & 12 assistant/associate/full professors) and various parts of the world (7 North America, 7 Europe, 2 Asia, 1 Africa and 1 South America).

Our group was divided into 4 subgroups, each of which aimed to work on a different topic and set of questions throughout the week. The subgroups were group A working on the role of plasticity in setting range limits, group B working on the strength of selection at range limits, group C working on the demography of populations at range limits and group D working on the rope of trophic interactions network in setting range limits.

The week was divided between whole-group activities and subgroup activities, with the aim to promote cross-pollination between groups but also ensure productivity of the separate groups.

We started the week with a morning of introductions, where the subgroup leaders presented the work that had already been accomplished by their subgroup before the meeting and proposed research directions for the week to come. This led to very dynamic and critical discussions, which in some cases led to a re-orientation of subgroup objectives. For example, the plasticity at range edge group (group A) realized that the data (on the extent of plasticity of populations) required for conducting their proposed project was perhaps not sufficient. They instead became interested in quantifying the steepness of environmental gradients and whether range limits coincide with geographic areas where spatial environmental gradients are particularly steep. Generating a map of environmental steepness would be useful to test some of the hypotheses of group A and B.

On the second day, subgroups spent a lot of time working in isolation and refining their plan for the week. They then presented their game plan to the whole group in the afternoon, which led to more among-group interactions and a readjustment of some project objectives. The third day followed a similar structure, but each subgroup was asked to produce a figure (empirical or theoretical) to share with the whole group. By that time, group C had already produced an empirical figure linking range shift velocity to temporal population trends and showing very promising results. Group D presented a conceptual figure linking range limits and range shift potential to the functional and trophic structure plant-animal networks.

The general research ideas and data to be used is pretty much as described in the proposal. That said, group D decided to use data on plant-animal traits and interactions that was already available to group participant Emma-Liina Marjakangas. This data will be used to create a conceptual figure for a conceptual paper aimed at Trends in Ecology & Evolution.

We also spent some time discussing points of commonality among the subgroups, particularly in the conceptual issues around defining species range edges. One point of discussion was whether coastal range limits "behaved" the same way as inland range limits

for terrestrial species. In other words, are the ecological and evolutionary processes involved in preventing range expansion in coastal areas the same as those preventing expansion from eg. a terrestrial biome to the next.

On the last day of the meeting, each subgroup gathered and generated a plan for next steps and deliverables. We anticipate at least 4 manuscripts to emerge from this working group. Group A and D have already held follow up zoom meetings to continue making progress. Group A has drafted an introduction, and has an analysis plan using available data from IUCN ranges and CHELSA climate data. Group D has an early draft of a manuscript, with many of the figures already created.

The atmosphere during the first sRED meeting was fantastic. We circulated a survey to ask participants how they wanted to proceed moving forward, and many of them were willing to pay for their own travel in order to bring the entire group together for the next meeting.