

sDiv working group meeting summary

“sTURN - Does time drive space? Building a mechanistic linkage between spatial and temporal turnover in metacommunities”

Summary of the first meeting November 2017

Understanding the mechanisms that govern diversity of ecological communities is one of the very classical topics in ecology, yet has rarely been as relevant as today. We know that diversity of any local community results from processes at the local (habitat) as well at regional scales, yet the interplay of processes at both scales remains unclear. Analysis of species area relationships and interpretation of beta-diversity so far remains a controversial topic.

The sTurn working group aims at achieving a better, mechanistic understanding of these processes by explicitly addressing time together with space. By following the dynamics of communities in space and time, the processes driving colonization-extinction dynamics should become evident.

The sTurn group approaches this problem from two sides. First, in a modeling approach, possible scenarios will be simulated, hence a blueprint from an idealized world will be available as a reference for the analysis of empirical data. Second, empirical data from metacommunities will be collected. For this part, the group will focus on short-lived aquatic organisms, especially phyto-, zooplankton and macroinvertebrates, since only for these groups of organism a sufficient number of datasets are available. Focusing on organisms with short generation times allows to capture multiple colonization-extinction dynamics in empirical datasets spanning >5 years. Hence, this synthesis group focuses on aquatic communities with short generation times.

The first meeting had two major focuses. First, a data group browsed the literature for collecting suitable datasets, and started preparing the data in terms of bringing it into harmonized formats. Second, a modeling group was formed and started to formulate the framework for the simulation procedure. Here we summarized the potentially relevant assembly processes (e.g. priority effects, dispersal limitation, neutral dynamics), and decided on relevant environmental scenarios.

Currently the working group has identified >30 datasets relevant to the groups work topic. A particular requirement for datasets used in this group concerns harmonized taxonomy, as calculation of beta-diversity is strongly biased by inconsistencies in species lists. Among the empirical data, lake

datasets especially from Nordic countries seem particularly promising, since these datasets are well standardized in terms of taxonomy. A particular treasure seems to be a dataset shared by David Angeler from SLU (Uppsala, SE), which comprises >50 lakes with >20 year of observation per lake, covering both phytoplankton and macroinvertebrates.

Preliminary analyses on the empirical datasets indicate that for a given habitat in a metacommunity, changes in community composition over time may eventually approach turnover in space (=beta-diversity). This complies with a central hypothesis of this group, i.e. temporal turnover is essential for understanding beta diversity.

As part of the sTurn group meeting, Bram Vanschoenwinkel from Vrije Universiteit Brussel (VUB) was giving a seminar on his research about invertebrate metacommunities in inselberg rock pools.