The return of the variance: Implications of temporal and spatial variability in meta-community structure on diversity and ecosystem functioning

Description for the general public

Since ancient Platonic philosophy, canonized during medieval times, nature was defined by an ideal, a well-designed state, where deviations were mainly seen as imperfection, illness, or curiosity. It was Charles Darwin, who definitely demonstrated that variability and imperfectness are the motors of evolutionary change. However, it took another 100 years until Robert MacArthur and other ecologists began to highlight the importance of variability in ecology. Recently, the role of variability for ecosystem stability and functioning has come into focus. The present research project is in line with this renewed interest. We want to establish whether and how variation (the dynamic) in the pattern of species occurrences and in species characters influence the stability and the functioning of ecological meta-communities, that is the set of local communities spread among disjoint habitats. Our basic starting hypothesis asserts that moderate variability in community composition (that is frequent local extinctions and colonisations) stabilizes ecosystem functioning. We build our project on three main tasks, (1) modelling the dynamic of species occurrences; (2) measuring variability in forest understorey community composition and functioning; (3) analysing global data sets on plant and animal meta-community composition. We hope to publish our results in high ranking ecological journals.