Evolutionary dynamics and diversification in changing environments

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Abstract

We use adaptive dynamics models to study how changes in the abiotic environment affect patterns of evolutionary dynamics and diversity in evolving communities of organisms with complex phenotypes. The models are based on the logistic competition model and environmental changes are implemented as a temporal change of the carrying capacity as a function of phenotype. In general we observe that environmental changes cause a reduction in the number of species, in total population size, and in phenotypic diversity. The rate of environmental change is crucial for determining whether a community survives or undergoes extinction. Until some critical rate of environmental changes, species are able to follow evolutionarily the shifting phenotypic optimum of the carrying capacity, and many communities adapt to the changing conditions and converge to new stationary states. When environmental changes stop, such communities gradually restore their initial phenotypic diversity.

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Figure 1: This is a caption