A general model for coevolution in spatialized interaction networks

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Abstract

In this working paper, we outline the basic ingredients for a phenomenological model of coevolution in spatial interaction networks. This model relies on developments from the insular biogeography theory and the metacommunity theory.

1   Introduction

2   Ingredients of the model

The metapopulation framework is ...

Building on these previous results, TTIB built a trophic model of island biogeography. This model achieves the overlap between ecological network theory and biogeography, but lacks an evolutionary component. It is the goal of this paper to descibe how the TTIB model can be coupled to simple evolutionary rules,

to obtain a phenomenological model of evolution in spatialized networks.

3 Speciation and intra-specific drift

In our model, each species is defined by a centroïd C_S in the niche space. Each population of this species has a given position C_P, which allows calculating how far this population is from its species centroïd. When $d(C_S, C_P)$ becomes superior to a given treshold, the isolated population initiates a new species.

4 Rules for interaction

The existence of an interaction follows the same rules as in the niche model of WILLIAMS. Each species is identified by its position n on a niche space, which can be composed of as many arbitrary continuous quantitative niche axes as needed. On each axis, each species has a centroïd c, and a range r, meaning that each species will interact with any other species whose trait value falls within $n + c \pm r$.

5 Conclusion