
Anticipating plant community responses to global changes: towards a dynamic perspective

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Résumé

The rapid on-going global changes push the science towards more anticipatory and operational predictions. Improving predictive models of biodiversity becomes key to guide political decisions. The development of numerical tools and databases in ecology have provided the ecological field with powerful models that are able to exploit the large amount of information available in natural history museums, atlas, etc... to estimate the possible future state of biodiversity worldwide. This is especially true for plants. These models, the (correlative) species distribution models, are based on the theoretical foundations of the ecological niche, but they miss important processes. Community assembly is explained by abiotic conditions, biotic interactions and dispersal processes. Although large efforts have been made to account for the effect of species interactions, traditional species distribution modelling approaches remain static. They are based on the hypothesis of equilibrium between the spatial distribution of a species and the environment, which is a problem in a context where the environment is changing too fast for the species' populations to reach new equilibrium. A dynamic perspective gives more importance to spatial and temporal processes related to community assembly, including priority effects and dispersal, but also demography. Although several authors have integrated some of these processes into explanatory studies, it is a notable challenge to include dynamic processes into predictive frameworks. Different approaches can be used to tackle this problem and will be presented. They make use of various ecological theories or modelling frameworks that include more explicitly the temporal dimension. They raise new challenges, specifically related to multiple spatial scales included (community and landscape), which gives perspectives for new model development. Temporal analyses also require temporal data (or at least resampling), which is not currently largely available and should determine priorities for future data collection.

Mots-Clés: predictive models, community assembly, dynamic processes

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