Biodiversity scenarios neglect future land use changes

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Abstract

Forward-looking approaches exploring possible futures for biodiversity allow decision makers to weigh the impacts of different policy options and strategies. Although biodiversity is affected by multiple threats, most scenarios addressing the effects of future environmental changes on biodiversity focus on a single threat only. We examined the studies published during the last 25 years that developed biodiversity scenarios based on climate and land use change projections. Results show that more than 85% of them used climate change projections alone, indicating that biodiversity scenarios focus overwhelmingly on the future impacts of climate change and largely neglect future changes in land use. This imbalance in the research agenda has increased over time and has now reached a maximum.
We raise concern that too strong a focus on climate change could dilute research efforts that examine the effects of other threats to biodiversity which are just as important, if not more so. The destruction and degradation of habitats through land use changes are among the most significant and immediate threats to biodiversity. They may act in concert with climate change to push ecological systems beyond tipping points. Therefore, the neglect of other factors than climate is not a credible approach and may lead to potentially dangerous conclusions regarding the relative importance of different threats to biodiversity and ecosystem services in the future.

We advocate strengthening interdisciplinary research efforts at the crossroads between ecological and environmental sciences to face the challenge of developing interoperable simulations of future environmental changes that embrace multiple pressures. The most pressing

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need is to define a widely endorsed strategy to generate and integrate future simulations for a range of environmental pressures operating across varying scales. Although climate is mostly constrained by large-scale forces related to economic globalization, other responses to these same forces – such as land use changes – are largely determined by local factors. The main challenge will be to connect global and local approaches to simulate future environmental changes that reflect the interactions between global dynamics and the diversity of local contexts.

We also show that the agreement on a common framework on climate change observations and simulations, the availability and accessibility of such data and the release of special reports on emission scenarios that are interpretable by a broad interdisciplinary audience boosted the interest of the scientific community to deal with climate change. We highlight how the work of the IPCC has had a knock-on effect on the ecological science community during the last decades. An IPCC-like mechanism is therefore needed to take up the challenge of developing a multifaceted approach to anticipate the future of biodiversity. We urge the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES) to formally identify the development of scenarios that embrace the impacts of multiple interacting pressures on biodiversity as a key priority for the international research agenda. We believe that this intergovernmental body should play an authoritative role in stimulating and structuring the collaborative research efforts that will be needed to address this important challenge.

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