Geography Research Unit and
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Of niches and distributions

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As climate change exceeds species' intrinsic ability to tolerate it, species need to track suitable climatic conditions in the geographical space (distribution shifts) or adapt to the new climatic conditions in the environmental space (niche shifts) so as to avoid extinction. First, I will show that niche conservatism is more prevalent than niche differentiation suggesting that evolutionary adaptation through niche shifts is unlikely to happen over the short time scale of contemporary climate change and that species should theoretically shift their distribution synchronously. In this respect, species distribution models (SDMs) which are based on the niche conservatism hypothesis are perfect tools to test whether the magnitude of recent distribution changes match the expectations from bioclimatic velocities. However, I will also provide empirical evidence showing that the magnitude of recent range shifts is usually lower than the magnitude of expected range shifts predicted by bioclimatic SDMs, which suggests time lags in the biotic responses of living organisms to contemporary climate change. Several drivers could explain these lags, such as species' intrinsic ability to tolerate changing climate, species' longevity, habitat fragmentation, microclimatic buffering and compensation effect through non-climatic dimensions of the niche. I argue that deciphering this apparent paradox between the observed disequilibrium in species distribution changes under contemporary climate change and the fact that the climatic niche of species is static over space and time will help to tackle the challenge of the attribution of range changes to climate change, as these two are two sides of the same coin.

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Jonathan LENOIR is an Associate Professor at Université de Picardie Jules Verne (UPJV) where he teaches Ecology and Biostatistics. He is broadly interested in the ecological dynamics associated with spatial and temporal global changes, with particular emphasis on biotic responses and disequilibrium dynamics under contemporary climate change. His research interests range from broad-scale patterns of biodiversity and long-term changes in species distribution to finer-scale and shorter-term changes in community composition.

Jonathan has a Forest Engineering degree and a PhD degree in Forest Sciences from the Paris Institute of Technology for Life, Food and Environmental Sciences (AgroParisTech). During his PhD, he investigated changes in species' ranges within mountain forests in France, focusing on forest plants and using long-term vegetation databases. For his results, he has received two scientific awards, including the Award of the Best Thesis from the Lorraine Region. Before obtaining his Associate Professor position, he did a postdoctoral fellowship in Plant Macroecology at Aarhus University (AU) within the Ecoinformatics and Biodiversity Group.

Jonathan's current research focuses on the detection of invasive plant species and the assessment of their impacts on ecosystem properties through remote sensing (project DIARS), a project funded by the ERA-Net BiodivERsA. He is also working on the niche conservatism hypothesis, testing whether or not two distant or even disjoint populations of the same species retain the same realized climatic niche, an important assumption when running species distribution models (SDMs). He is currently working on the importance of fine-scale climatic heterogeneity to identify climatic microrefugia and to assess their capacity to ensure successful conservation planning of biodiversity under contemporary and future climate change.

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