



CESAB

CENTRE FOR THE SYNTHESIS AND ANALYSIS OF BIODIVERSITY

BIOSHIFTS

Global redistribution of biodiversity: A macro- and eco-evolutionary approach to understand species vulnerability to global changes

PRINCIPAL INVESTIGATORS:
Gaël GRENOUILLET - Université de Toulouse (FR) / **Lise COMTE** - Illinois State University (US)

POSTDOC:
Brunno OLIVEIRA - FRB-CESAB (FR)

START AND FINISH:
2021-2024



14 PARTICIPANTS:
ROMAIN BERTRAND - UNIVERSITÉ PAUL SABATIER TOULOUSE 3 (FR) / **CHING CHEN** - NATIONAL CHENG KUNG UNIVERSITY (TW) / **SARAH DIAMOND** - CASE WESTERN RESERVE UNIVERSITY (US) / **LESLEY LANCASTER** - UNIVERSITY OF ABERDEEN (UK) / **JONATHAN LENOIR** - CNRS (FR) / **JÉRÔME MURIENNE** - CNRS (FR) / **GRETA PECL** - UNIVERSITY OF TASMANIA (AU) / **MALIN PINSKY** - THE STATE UNIVERSITY OF NEW JERSEY (US) / **BRETT SCHEFFERS** - UNIVERSITY OF FLORIDA (US) / **JENNIFER SUNDAY** - MCGILL UNIVERSITY (US) / **LAURA THOMPSON** - U.S. GEOLOGICAL SURVEY (US) / **FABRICIO VILLALOBOS** - INECOL (MX) & UNIVERSITÉ FÉDÉRALE DE GOIAS (BR)

It is now indisputable that plants and animals are responding to climate change by undergoing the largest redistribution of life on Earth for tens of thousands of years. **Yet, recent studies have found that species range shifts are highly idiosyncratic and that climate warming alone is unlikely to explain the rates of biodiversity redistribution.** Whereas intrinsic species traits (e.g., thermal tolerance, dispersal ability, ecological specialization) and evolutionary mechanisms (e.g., adaptive potential) are expected to influence both trailing-edge contractions and leading-edge expansions, other extrinsic non-climatic factors (e.g., habitat fragmentation, human pressures) may also constrain or exacerbate range shift processes. Despite intense scrutiny, the contribution of these different mechanisms has never been comprehensively assessed across the tree of life or broad-scale spatial gradients, and the extent to which species redistributions are predictable thus remains an open question.

BIOSHIFTS will fill this knowledge gap by addressing the fundamental question of how contemporary climate-driven range shifts arise from the interplay of intrinsic and extrinsic mechanisms. **BIOSHIFTS** will upgrade, build upon, and leverage the power of a comprehensive geodatabase compiling range shifts documented in marine, freshwater and terrestrial ecosystems over recent decades, together with open source databases of species traits and innovative phylogenetic comparative methods. The project will thereby investigate whether range shift processes vary across ecosystems, taxonomic groups, or environmental contexts (both natural and anthropogenic).

BIOSHIFTS aims to both synthesize and extend the conceptual and analytical tools in range shift research, thus advancing a predictive science seeking to improve our ability to forecast further biodiversity loss and inform better decision-making processes.

CESAB

CESAB (Centre for the Synthesis and Analysis of Biodiversity) is FRB's flagship program and an internationally renowned research center whose objective is to implement innovative work to synthesize and analyze existing data sets in biodiversity research.

