

# How does advection and diffusion could influence climate driven poleward migration of species

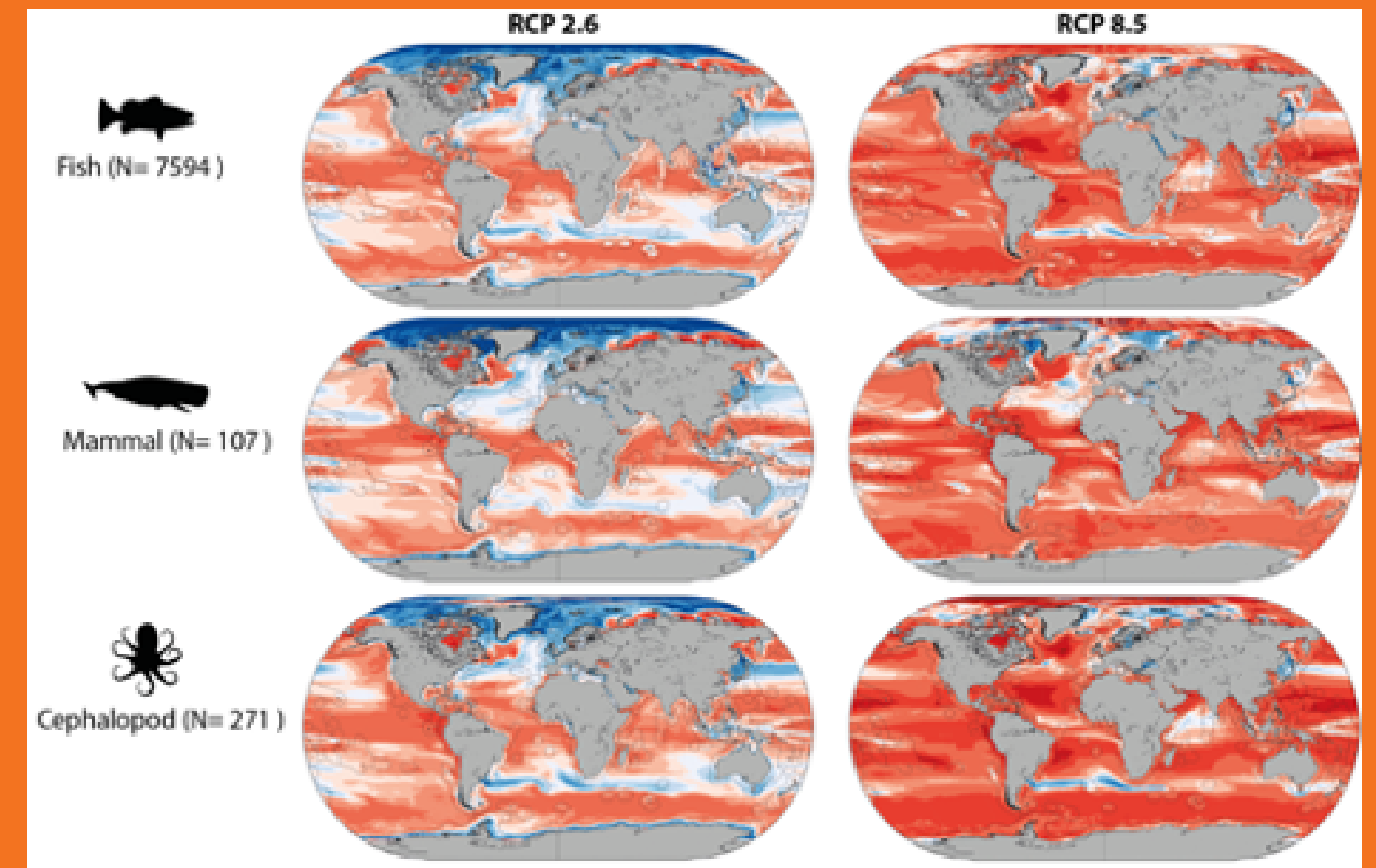
Evaluating the distribution of marine diversity is now crucially needed to have an optimal conservation approach in a context of climate change.

Given the lacunar knowledge scientist have gathered spatially, ecologically and trophodynamically, the use of explorative statistical methodology (i.e. machine learning) has increased in the last decade. Ensemble modelling approach such as species distribution models (SDM) have allowed to approximate a climatology of marine biodiversity for current and future distribution (following IPCC Representative Concentration Pathway scenarios).

Future climate projection reveals a major poleward shift of global marine biodiversity. However, these models are made solely by extrapolating the location of the fundamental environmental niche of species (i.e. sensu Hutchinson) without oceanographical or geographical restriction. While results of SDMs have been validated on the field with various species already performing latitudinal shift in their distribution, a crucial oceanographical constrain is needed to have robust forecast.

The subject of this PhD will be to develop within the AQUAMAPS/AQUAX consortium a new species distribution workflow (preferably on R) to capture of advection and diffusion on species distribution poleward shift and to Re-evaluate future change in global biodiversity distribution.

The candidate will be located at Univ. Miami within the AquaX laboratory and will be part of the Fishbase Consortium initiative (fishbase.org)



Change in species richness between now and 2100 following RCP 2.6 and 8.5, for fish, mammal and cephalopod. Red reveal a loss and blue a gain in number of species.

We are searching for a candidate with skills in programming (R or Matlab), with comprehensive knowledge in Oceanography, exploratory and spatial statistics and of course **love of marine biodiversity**

