Spatial genetics group
Remote Sensing Laboratories
Department of Geography

Universität Zürich[UZH]

How fast should wild populations migrate to track climate change?

Background:

Global climate change is causing a mass extinction, threatening ecosystems that humans depend on. To survive, many species are moving their geographic ranges to track their suitable climate (e.g., alpine plants migrating to higher altitudes). Numerous studies have estimated the required movement rates for these species, often expressed in kilometers per decade.

However, these estimates often overlook another critical factor: evolutionary adaptation. Rapid climate adaptation is possible when there are populations within a species that are already adapted to the future climate. By tracking how these locally adapted populations move, we can provide a more accurate assessment of species vulnerability to climate change.

Project Overview:

In this project, you will conduct a global-scale analysis on how wild populations are responding to climate change. You will leverage a growing body of public scientific data that documents the current and future distributions of climate-adapted populations. Such data is available for a wide range of species and habitats—from alpine plants in Switzerland to wild goats in Morocco and reef-building corals in the Pacific.

Using these data, you will calculate the rate at which populations need to move to track climate shifts and assess how these rates vary across species and biomes. You will also identify which species can realistically achieve these migration speeds and highlight vulnerable species at risk of extinction.

Skills Developed:

- Conducting spatial analysis and statistical inference in R
- Handling large-scale public databases (e.g., Copernicus, BioClim)
- Applying exploratory analyses (e.g., PCA, redundancy analysis)
- Using advanced statistical techniques like mixed models and machine learning
- Scientific writing and reporting

Interested?

We're excited to hear from you! If you're passionate about conservation, climate change, and data analysis, apply by contacting us at oliver.selmoni@geo.uzh.ch. The project will be conducted within the Spatial Genetics group in the Remote Sensing Laboratories.

Starting date:

Late 2024/early 2025.