

MASTER'S THESIS GRANT (M2)

DOWNSCALING CLIMATE CHANGE SCENARIOS FOR METROPOLITAN FRANCE TO UNDERSTAND ECOSYSTEMS AND BIODIVERSITY CHANGE.

The Earth is increasing temperature at rates never observed on record and only in the last two years have broken high temperature records in many parts of the world, having adverse effects on ecosystems and society. That, said, how temperature affects biodiversity is still unknown in part due to the lack of appropriate climate layers operating at the scale of the organism, including humans. Understanding how future climate change can impact nature and society requires the most advanced simulations to delineate future scenarios.

To date climate change scenario data are served are coarse resolutions with maps that range between 1 km to 100 km resolution. Such low resolution impacts the translation of such information into actionable mitigation strategies. **In this M2 thesis, we will use advanced topoclimate downscaling techniques and microclimate modeling to downscale climate change scenarios at 50m resolution for Metropolitan France.** We will use a stepwise procedure to first create maps of topographic conditions, and then use forest canopy cover in interaction with topography attributes to infer microclimate inside and outside the forest. **The result is to estimate how different scenarios and modeling approaches can impact climate projections and climate connectivity in France by the end of the 21st century.**

We are seeking for a highly motivated individual who is interested in big data and is at ease with coding and geographical information systems. We are ultimately interested in making this project available to the public through a scientific publication, so candidates interested in a research career are welcome.

Keywords: big data, forest, climate change, GIS.

Desired skills

- Good knowledge of R programming language
- Experience with Geographic Information Systems and topographic analysis.

Any question?

Feel free to contact me to discuss this work, the research question is large enough to be crafted for students wanted to develop a particular skill.

How to apply?

Send an email to C; Piedallu and JM Serra-Diaz (email addresses below) with the following files: (1) CV, (2) a short (half page maximum) motivation letter that includes the names of a former supervisor that could write a reference letter for you.

Supervisor(s):

Christian Piedallu (christian.piedallu@agroparistech.fr)

Josep M Serra-Diaz (pep.serradiaz@agroparistech.fr)

Other researcher(s) involved:

Jonathan Lenoir

Location: AgroParisTech campus, Nancy, France

Dates: January to May/June 2024 (5 or 6 month internship).

Lab: UMR SILVA, équipe EcoSilva.

Websites: UMR SILVA [here](#)

Languages used during the internship: English and French

Stipend: 3750 EUR (full period of 6 months).