

Master thesis/Engineer internship

DIGITAL MAPPING OF THE SOIL FUNCTION WATER PURIFICATION AND REGULATION IN OCCITANIE (SOUTHERN FRANCE)

Soils play a key role in ecosystem functioning and provide a multitude of services to human societies. Although soils are mainly considered as the basis for the production of food, fibre and timber, they also sustain a wide range of functions related to climate and water regulation, water purification, nutrient cycling or habitat for biodiversity, which in turn contribute to the provision of ecosystem services. The quantification of soil functions is still a scientific challenge, because soil functions are not directly measured, but instead emerge from the combination of multiple soil properties used as indicators (e.g. soil organic carbon, clay content or bulk density). **The objective of this internship is to use the legacy data available in the Occitanie region (Southern France) to produce digital soil maps of the soil function water purification and regulation.**

The approaches will rely on testing various strategies for the mapping of the soil function using soil data from multiple soil depth intervals available in the Occitanie region combined with national (RMQS data) and international soil database (WoSIS). The various strategies are “mapping first” the soil indicators and then calculate the function of “calculate first” the function before interpolating. Spatial interpolation will be made using statistical models that relate the indicators or function to a set of environmental variables. The student will need to account for the correlation among indicators using, for example, multivariate statistical modelling. Although there is preference for interpolation made with geostatistical models (e.g. regression co-kriging) alternative approaches using machine learning and deep learning will also be considered. There are synergies with a PhD candidate in the group working on mapping of soil multifunctionality

The expected results are maps of the soil function for Southern France. The results can be compared with previous works from the same group.

Desired skills

- Good knowledge in pedology and ecohydrology.
- Good knowledge in applied statistics and spatial analysis.
- Knowledge in programming with the R environment.
- Geographic information systems (ArcGIS/SAGA).
- Interests in spatial statistics.
- Interested to learn about soil functions and ecosystem services provided by the soils.

Internship data

- Supervision in French or English
- Level Master 2/Engineer
- 5-6 months – starting date around February-April 2023
- Allowance: €591,51 monthly
- 35h per week
- Onsite access to LISAH infrastructures

To apply: send a CV + cover letter to Alexandre Wadoux

alexandre.wadoux@yahoo.fr and Philippe Lagacherie philippe.lagacherie@inrae.fr



UMR LISAH

Campus INRAE-Institut Agro
2 place Pierre Viala,
Montpellier, France

Contact :

Alexandre Wadoux

Alexandre.wadoux@yahoo.fr

+61 491 747 770