Innovative Method for Spatializing the soil Physical Properties

Contacts

Vivien Dubois : vivien.dubois@irstea.fr, 04 72 20 89 34

Rémi Clément : remi.clement@irstea.fr, 04 72 20 87 56

Partners: Iris Instruments (Catherine Truffert and Julien Gance)

Working schedule

The thesis will be held in the REVERSAAL of Irstea Lyon-Villeurbanne research unit, in partnership with the Iris Instrument, Orléans (France).

Duration: contract for a period of 36 months, November 2018 to end October 2021

Starting: November 2018

Working Pattern: Full-time

Faculty: University of Lyon, (chemistry-process-environment)

Context and objectives

There is no satisfactory technique for assessing overall the permeability of a heterogeneous soil and its variability at the scale of a plot. The characterization of hydrodynamic parameters is generally based on measurements with spatial resolutions that are too weak and whose cost of repeatability (human and financial) in space is important. Understanding of water transfers, particularly in the case of heterogeneous soil, is limited. The development of a methodology for mapping the distribution of soil properties in 2D or 3D is essential for: i) better design of sanitation structures, allowing the integration of distributed 2D / (Ii) monitoring the effectiveness of structures over time, in particular to characterize and locate clogging processes. To this end, this project proposes to develop a methodology for the fusion of data from point measurements (infiltrometer, penetrometer, auger) and 2D / 3D geophysical methods.

Desired skills and experience

The candidate must be a holder of a master's degree or equivalent. High-quality education in the field of Mathematics (statistics and numerical development) and Physics. The knowledge of the hydrodynamic porous environments and Geophysics, will be appreciated, but is not necessarily required.

Technical skills:

- Programming (programming R or Matlab, C++)
- Reporting
- Good knowledge of English (written and oral)

- Ability to work in a team, including with external partners, in fact the doctoral student will be in strong interaction with Iris Instrument during the thesis project.
- Autonomy
- Perseverance
- open-minded
- curiosity

Your tasks:

- A broad bibliography on spatialization and geostatistical methods,
- Develop necessary algorithms and their software,
- To apply algorithms to the field dataset already acquired by the team,
- Value his work by writing scientific papers and oral presentations at international conferences,
- Plan and render his work at the various meetings of steering or advancement,
- Participate in a few field campaigns or laboratory measurements.