Soil and water contamination risk

Senior scientists

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Research Field and Subjects

- Study of the fate and transport of chemicals of natural and anthropogenic origin, particular agricultural origin, in soil and water.
- Study of pollution pressure on soil and water resources.
- Development of analytical techniques to assess soil and water contamination risks.
- Development of geophysical, in particular hydrogeophysical prospecting techniques for contamination risk assessment.
- Development of mathematical models (deterministic and stochastic) to simulate water and chemical transport in soil and water systems on different spatial scales.
- Study of the relationships between widely available land attributes (soil map, land use map,…) and the functioning of soil and water systems in terms of contamination and pollution attenuation.
- Development of advanced stochastic techniques for contamination risk mapping.

Representative References

- MINET J., WAHYUDI A., BOGAERT P., VANCLOOSTER M., LAMBOT S. Mapping shallow soil moisture profiles at the field scale using full-waveform inversion of ground penetrating radar data. Geoderma 161: 225-237. **2011**.
- DELEERSNIJDER E., CORNATON F., HAINE T., VANCLOOSTER M., WAUGH D.W. Tracer and timescale methods for understanding complex geophysical and environmental fluid flows. Environmental Fluid Mechanics 10: 1-5. **2010**.
- MATTERN S., FASBENDER D., VANCLOOSTER M. Discriminating sources of nitrate pollution in a sandy aquifer. Journal of hydrology 376: 275-284. **2009**.

Main Equipment

- Analytical laboratory: basic and advanced equipment for chemical analysis of complex environment matrices (atomic emission spectrometers (ICP-AES), carbon analyser; atomic adsorption spectrometer; high pressure liquid chromatograph; X-ray diffractometer; NC elemental analyser).
- Hydrogeophysical laboratory: advanced hydro geophysical equipment for assessing proxies of soil and water contamination. Mobile GPR platform (quad vehicle, high precision GPS, multiple antenna ground penetrating device, electromagnetic induction device). Geo-electrical device (electrical resistivity tomography).
- Soil physical laboratory: equipment for measuring of the density of soil (pycnometer) and soil porosity (mercury porosimetry). Equipment for the measurement of the moisture retention curve (sand box apparatus, pressure plate apparatus) and the unsaturated hydraulic conductivity curve (suction and pressure infiltrometers, multi-step outflow devices). Equipment for the determination of the hydrodynamic dispersivity.

Products and Services

- Inorganic and mineral analysis of complex environmental matrices (soil, water)
- (Hydro)geophysical prospection for fast assessment of soil and water contamination
- Deterministic modelling for assessing soil and water contamination risk at the local

(HYDRUS2D/SLIM/WAVE) and the regional scale
‣ Stochastic and geostatistic modelling tools for assessing soil and water contamination risk at the regional scale (BMELib)

Keywords

Soil contamination
Water contamination
Groundwater
Diffuse pollution
Risk mapping

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