



Versuchseinrichtung zur Grundwasser- und Altlastensanierung · VEGAS  
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### Thesis Topics for:

**B.Sc., M.Sc.**

**BAU, UMW, WASTE, WAREM**

Universität Stuttgart  
**Institut für Wasser- und  
Umweltsystemmodellierung**

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## Experimental Methods for the Evaluation of Immobilization Approaches for Soils Contaminated with Perfluoroalkyl Substances (PFAS)

Perfluoroalkyl substances (PFAS) are used in many industrial branches as well as in fire-fighting foam because of their hydrophobic and lipophobic properties. Due to their ubiquitous distribution and their persistency, PFAS have attracted increasing attention in the field of soil and groundwater remediation. In the region Rastatt/Baden-Baden in the Upper Rhine Valley, Germany, approximately 800 ha of predominantly agricultural land has been contaminated with per- and polyfluoroalkyl substances (PFASs). One remediation strategy currently being investigated is the immobilization of the PFASs in the soil. Substances with a high sorption capacity would be applied on the ground surface and mixed with the soil.

In this project, we want to develop a test-strategy to evaluate different immobilization strategies and the long-term leaching characteristics of different soil mixtures. The treated soil is tested on different scales (batch experiments, column experiments, lysimeters) and under different saturation conditions (saturated, variably saturated). Effluent concentrations are monitored over time and distinct PFASs as well as the organic fluorine after digestion are measured.

A thesis would involve:

- Organization, set-up and sampling of batch and column experiments
- Data analysis and evaluation (skills in programming (eg. Python) help)
- Evaluation of experiments (leachate characteristics, link to field, ...)
- Comparison of batch and column experiments
- Literature study about PFAS (sorption/desorption mechanisms, biotransformation, precursors...)
- Depending on interest: solute transport modelling and data processing

Start: May 2020 and later

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