



Versuchseinrichtung zur Grundwasser- und Altlastensanierung · VEGAS

Institut für Wasserbau · Universität Stuttgart · Pfaffenwaldring 61 · D-70550 Stuttgart

Problem Description

B.Sc., M.Sc. Thesis

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

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Numerical Modelling of Fluorosurfactants-Transport

Motivation

Fluorosurfactants are a class of synthetic substances, commonly used in everyday-products (e.g., various papers, foam used for fire-fighting). Some man-made substances, such as PFOS and PFOA are persistent organic pollutants. The relevant transport-processes (e.g., sorption, reaction) of these substances in the subsurface are largely unknown. For this reason, a series of laboratory experiments are conducted at VEGAS.

Task

1. Familiarize yourself with the numerical modelling environment.
2. Perform a series of numerical simulations that describe the set of column experiments conducted in the laboratory. This includes the parameterization of the model including source terms, sorption properties, and physical hydrogeological parameters.
3. Analyze the modelling results:
 - a. identify possible gaps in the conceptual hydrogeological model: what parameters are the most uncertain?
 - b. Estimate the evolution of the concentrations in the outlets of the laboratory columns for time-frames larger than the time-frame of the laboratory experiments

Keywords

- numerical modelling,
- data,
- python,
- programming

Support

We support you with getting started and provide help with programming in python and support in the numerical modelling framework. A requirement is that you are interested in learning key concepts of solute transport modelling and are eager to wrangle with data. You should be curious and eager to play with data! You will learn key traits that are desired in engineering consultancies.

The student research project will be performed at VEGAS (Research Facility for Subsurface Remediation, University of Stuttgart). It is based on several preceding projects and students' theses. The experiments will be supported by the analytical capacity of the VEGAS laboratory, the workshops of the institute and the practical and theoretical know-how of the VEGAS staff.

Supervision

Dr.Ing. Claus Haslauer

Formulation of Problem / Examiners

Dr.Ing. Claus Haslauer

Dr. Jürgen Braun

Prof. Dr.-Ing. Dr. András Bárdossy

We'd be happy to hear from you and happily discuss details of the project with you!

Starting date: as soon as possible / to be discussed

Stuttgart, 1-Mar-2019