Institut für GEOWISSENSCHAFTEN und GEOGRAPHIE
Martin-Luther-Universität Halle-Wittenberg

MARTIN-LUTHER-UNIVERSITÄT
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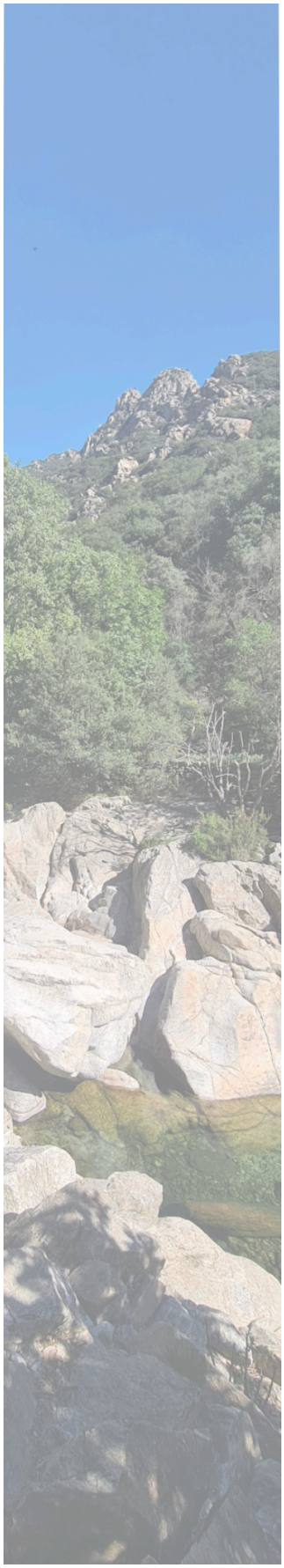
Geowissenschaftliche Kolloquien
SoSe 2024



03.06.2024
17.15 Uhr

Dr. Theresa Hennig

GFZ German Research Centre for Geosciences, Potsdam, Germany

Geochemical modelling of radionuclide migration in the Opalinus Clay

10.06.2024
17.15 Uhr

Prof. Dr. Manish A. Mamtani

Department of Geology & Geophysics Indian Institute of Technology (IIT) Kharagpur, INDIA

Petrofabric analysis of deformed rocks using Anisotropy of Magnetic Susceptibility (AMS) - Applications in Structural Geology

17.06.2024
17.15 Uhr

Prof. Dr. Thorsten Nagel

Endogene Geologie/Tektonik, TU Bergakademie Freiberg

"Petrologic Appearance and Tectonic Significance of ultra high pressure metamorphic Rocks in NE Greenland"

01.07.2024
17.15 Uhr

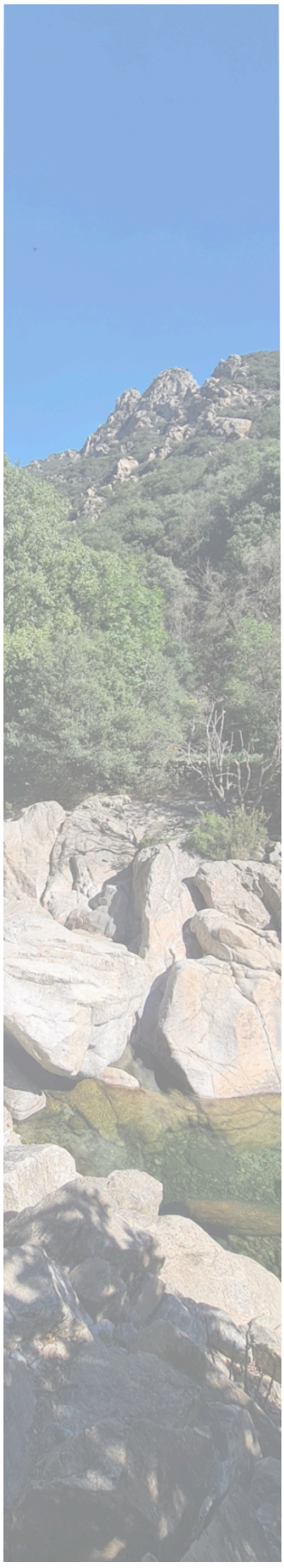
Prof. Dr. De Vleeschouwer

Institut für Geologie und Paläontologie Erdsystemforschung Universität Münster

Pre-Cenozoic cyclostratigraphy and paleoclimate response to astronomical forcing

Institut für Geowissenschaften und Geographie Von-Seckendorff-Platz 3, 06120 Halle, Hörsaal 3.0.21, Erdgeschoss, Haus 3

Geowissenschaftliche Kolloquien SoSe 2024



03.06.2024 Dr. Theresa Hennig

17.15 Uhr GFZ German Research Centre for Geosciences, Potsdam, Germany

Geochemical modelling of radionuclide migration in the Opalinus Clay

Safety assessments of potential nuclear waste disposal sites must demonstrate that the thickness of the host rock is sufficient to isolate radionuclides from the human environment. In this context, it is essential to investigate the underlying transport processes, e.g. sorption and diffusion, and their governing factors to quantify migration lengths on the host rock scale and for one million years .
Laboratory experiments are conducted for defined geochemical conditions to determine the required transport parameters. The combination with reactive transport simulations is a beneficial workflow to deduce process-based quantifications. This enables the application to the host rock scale or reveals knowledge gaps. This is shown for the examples of neptunium and uranium migration in the potential host rock Opalinus Clay.
In the case of uranium migration in the Opalinus Clay system at Mont Terri, the results demonstrated the extent to which simulated migration lengths can vary for a million years, depending on the model concept as well as on the underlying data and parameters. As can be seen in Figure 1, the range extends from 5 m applying experimentally determined transport parameters, over 50 m using process-based approaches and taking hydrogeology into account and up to 80 m depending on the thermodynamic data set used.

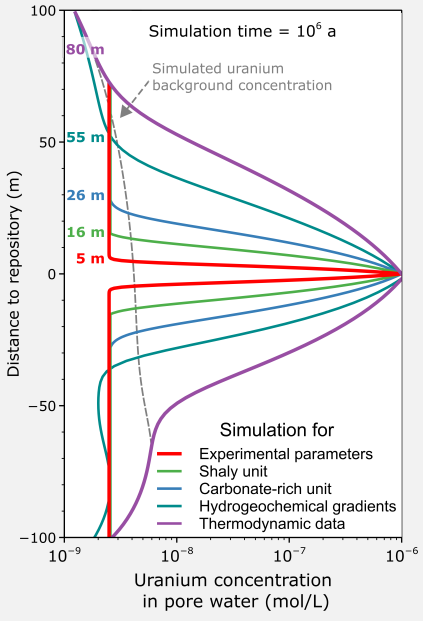


Figure 1: Uranium migration lengths in the hydrogeological system of the Opalinus Clay at Mont Terri are simulated with a Fick's diffusion model using experimentally determined transport parameters (red). Results of reactive transport simulations, which are conducted for different clay mineral quantities (green and blue), taking hydrogeology into account (cyan) or using a different thermodynamic data set (purple), differ by several metres.