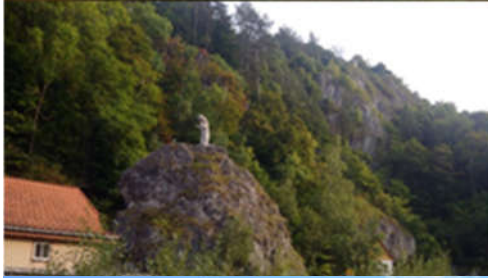


## Master / Bachelor thesis advertisement

### **Working title: Reference measurement of soil moisture for a novel, mobile CRNS in a train at a railway section in the Harz mountain**

Cosmic ray neutron sensing (CRNS) is becoming an established method for deriving soil water content (SWC), based on the inverse relationship of the natural background of neutrons and hydrogen atoms in the surrounding area. The measurement footprint, lateral up to 200 m radius and vertical of several decimeter, qualifies CRNS to bridge the information gap between classical hydrogeophysical approaches and remote sensing. Recent approaches on performing mobile CRNS on trains showed further the potential of expanding the measurement along a railway track.



Whereas there are already point measurement probes installed along the test railtrack to support the CRNS interpretation, a stationary CRNS probe shall be installed additionally, because it represents a much larger integration volume than point measurements. The derived time series of soil moisture, including profile measurements, will be provided for “ground-truthing” of the CRNS running several times a day along the railtrack (approximately 15 km) in the train.

We are looking for a curious student who is interested in engaging into soil moisture measurements at landscape scale. We will provide a new CRNS probe (including muon and gamma detector) and support on technical level as well as the link to the CRNS train test project. Measurements shall be performed during the vegetation period in 2022. An existing software package shall be used for processing of the CRNS data from the stationary probe and its interpretation. The final outcome of the thesis should be a fully corrected and processed time series of soil moisture representing the footprint of the CRNS during a period of a few months.

Further information about the position and operational environment could be obtained by Prof. Sascha Oswald ([sascha.oswald@uni-potsdam.de](mailto:sascha.oswald@uni-potsdam.de)) and Dr. Daniel Altdorff ([daniel.altdorff@uni-potsdam.de](mailto:daniel.altdorff@uni-potsdam.de)). The work could also be reduced to address a shorter period of time to be applicable as a Bachelor thesis.

All interested students are encouraged to contact us in German or English for a more detailed discussion.