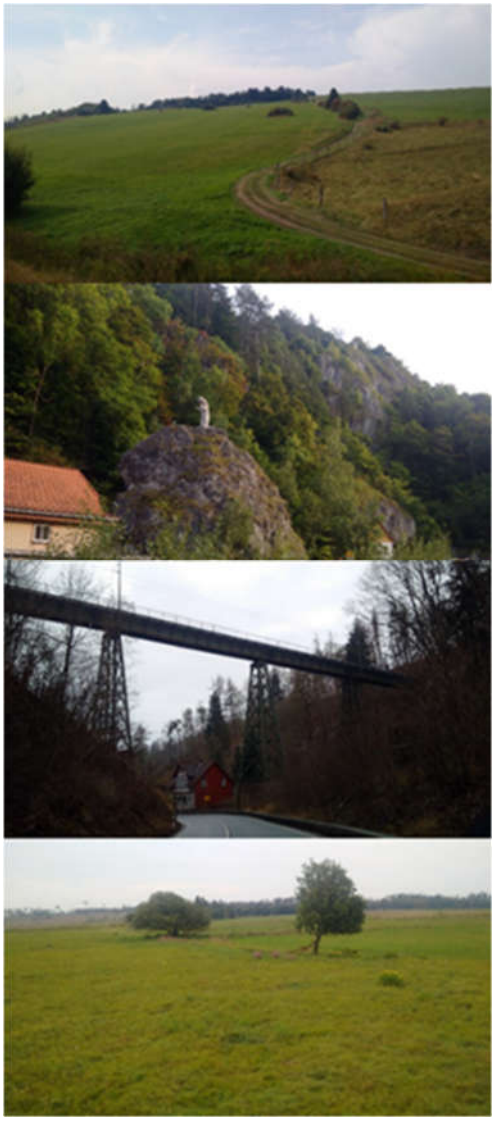
Master / Bachelor thesis advertisement

Working title: Surveying and mapping of above- and below-ground biomass and additional hydrogen pools along 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.



However, CRNS is sensitive to all kinds of hydrogen, not solitary to that within soil moisture. The recorded signal consequently contains also information from water ponds, organic material, plant water, lattice water, and other dynamic contributors. To disentangle the SWC signal from vegetation and other hydrogen sources, dedicated sampling of the local soil and biomass is needed. The derived soil and biomass maps will be a valuable addition to the traditional soil and land use maps provided by the authorities.

We are looking for an engaged student who is interested in sampling and mapping of the above- and below-ground biomass content along an approximately 15 km long railway section in the Harz mountain. He/she should be familiar with the basics of biomass and soil sampling, accustomed to georeferencing software (e.g., GIS, Surfer) and be able to work autonomous in field. During the time of the thesis, he/she will analyze and review existing maps and literature and reappraise their information in situ. The final outcome of the thesis should be a fully georeferenced map of all potential hydrogen pools around 200 m to each side of the railway segment. The spatial resolution and the number of mapped variables considered will be part of the discussions and the iteratively generated map. While the highest possible resolution of all potential effective pools is desired, the main goal is the delineation of biomass along the railway segment as needed to improve the soil moisture estimation via CRNS.

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

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