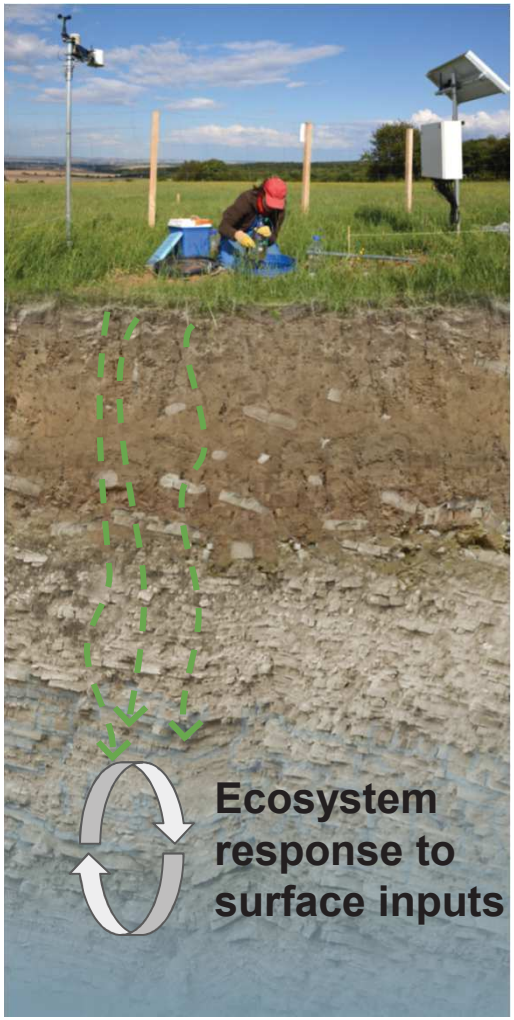
Are you interested in diving into our groundwater resources and discovering how this largely unexplored ecosystem works? Find out in an exciting projected aimed at discovering:

How does surface organic matter change a pristine aquifer?

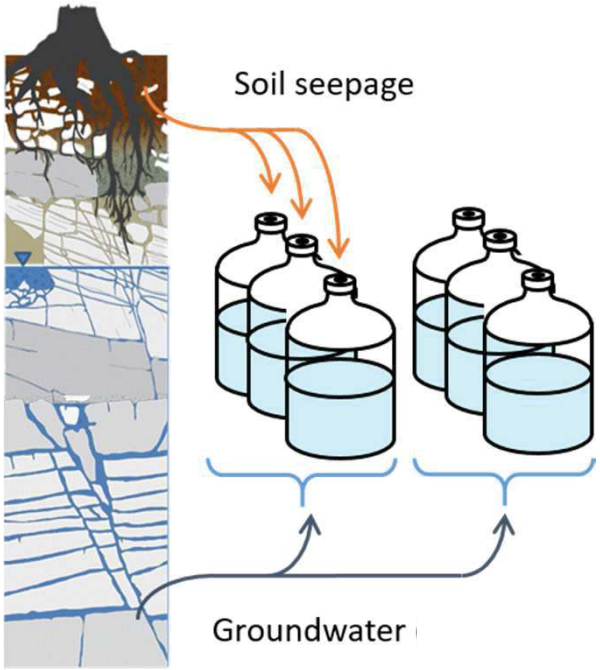
Overarching Hypothesis: High rain events directly connect the surface to the subsurface and introduce organic matter and microorganisms which impact the aquifer



Specific Question:

Do groundwater microorganisms respond to seepage?

Which populations can grow under these conditions?



Dr. Will Overholt

What you'll do:

- mesocosm experiments
- monitoring of responses (O_2, Flow cytometry)
- taxonomic profiling of microbial communities (High throughput seq.)

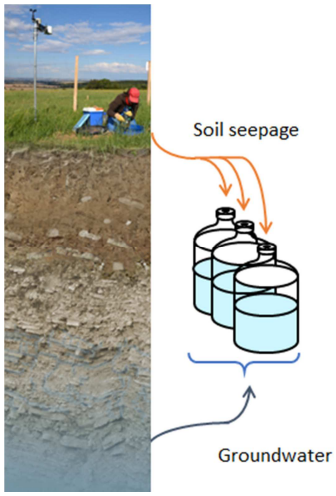
Bachelors Project Available Institute of Biodiversity, Aquatic Geomicrobiology

Are you interested in diving into our groundwater resources and discovering how this largely unexplored ecosystem works? Our Aquatic Geomicrobiology team at the Institute of Biodiversity has an exciting Bachelors project aimed at:

Determining how surface-derived organic matter impacts and alters indigenous ground water microorganisms in the Hainch Critical Zone Observatory

Background:

Around 25% of the world's population gets their drinking water from karst aquifers, and these play a critical role in Germany's long term water security. CRC AquaDiva has been intensively studying the links between the surface and the subsurface by looking at how microorganisms, viruses, and organic matter are transported into the groundwater. In addition, we will examine whether surface microbes can survive in the groundwater, and conversely, which native groundwater microbes can use the new organic matter to grow. Previous research from the environment has shown that some soil microbes are preferentially transported into the groundwater, and that many groundwater microbes have the genetic machinery to access complex tree-derived compounds. We will simulate these conditions under laboratory controlled conditions to confirm these preliminary results and look at how these populations can survive.



Research Questions:

1. Do groundwater microorganisms respond to soil seepage water from a grassland environment containing high amounts of organic matter?
2. If so, which specific populations are growing in these treatments?
3. How rapidly is surface derived organic matter consumed?

Experimental Design and Methodology

You will create a well replicated mesocosm experiment that has treatments with different amounts of seepage added to groundwater retrieved from the Hainich CZE. Using both non-seepage added controls as well as T0 (initial) samples, you will track changes in the microbial community through DNA extraction and next-generation sequencing approaches. Microbial growth will be monitored using both flow-through cytometry measurements as well as oxygen consumption as a measure of heterotrophic aerobic respiration. The techniques employed in this experiment are widely applicable across multiple fields from environmental engineering to human health applications.

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