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## Understanding groundwater metabolome trajectories

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Groundwater is a dilute, but biologically rich environment harbouring plenty microbial life [1]. This microbiome requires influxes of dissolved organic matter (DOM) as energy source. Within the Hainich Critical Zone Observatory project [2,3], we have collected metabolomic information on groundwater DOM by liquid chromatography / mass spectrometry since late 2014, in an assembly of sampling wells across a 7 km transect. We analysed this long-term dataset with principal component analysis methods, inferring distance measures to translate individual sampling campaign information into long-term trajectories that can be compared against external influences (such as groundwater flow patterns).

Our data show that these sampling wells have fluctuating inter-well similarities in terms of the metabolome, giving evidence that some wells are mostly isolated entities while others may be receiving influxes from similar groundwater sources. We show that the groundwater hydraulic head fluctuations exert a key influence on similarity profiles, suggesting groundwater mixing. We emphasize that our inferred principal component measures may therefore serve as a basis to unravel the interactions and influences of groundwater flows, metabolome (biogeochemistry), and microbial life.

### References

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