TECHNISCHE UNIVERSITÄT DRESDEN

Fakultät Umweltwissenschaften, Fachrichtung Forstwissenschaften

Institut für Bodenkunde und Standortslehre, Professur für Standortslehre und Pflanzenernährung

Technische Universität Dresden, 01062 Dresden

BSc./MSc. thesis topic

Exploring Radial and Axial Water Transport in Trees Using Water Stable Isotope

Global forests are increasingly impacted by repeated and long-term drought events. To cope with these conditions, trees rely on a variety of physiological and morphological strategies. Among these, internal water storage within the stem may play a crucial role in sustaining transpiration during periods of limited water availability. We are offering a Bachelor's or Master's thesis focused on understanding how mature beech trees transport water within their stems—both radially and axially—and how this contributes to maintaining tree water balance. This study is part of a broader investigation into water dynamics in forest ecosystems, examining interactions between overstory trees, regeneration, and soil under different forest management strategies.

You will:
- Work with water stable isotopes (^{2}H, ^{18}O) to trace water movement within stem.
- Participate in labelled water injection experiments in tree stems to track internal water transport.
- Analyze and interpret results alongside soil and stem moisture data.

Requirements

- Interest in forest water cycles
- A willingness to work both in the field and in the lab

Experimental site Rabenstein

Supervision
Prof. Dr. Natalie Orlowski
Dr. Kyohsuke Hikino
M.Sc. Miriam Kreher

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You are welcome to write the thesis either in English or in German.
If you are curious, don´t hesitate to get in touch!

Literature

-Kerstin Treydte, Marco M Lehmann, Tomasz Wyczesany, Sebastian Pfautsch, Radial and axial water movement in adult trees recorded by stable isotope tracing, *Tree Physiology*, Volume 41, Issue 12, December 2021, Pages 2248–2261, https://doi.org/10.1093/treephys/tpab080

-Orlowski, N., Kraft, P., Pferdmenges, J., and Breuer, L.: Exploring water cycle dynamics by sampling multiple stable water isotope pools in a developed landscape in Germany, Hydrol. Earth Syst. Sci., 20, 3873–3894, https://doi.org/10.5194/hess-20-3873-2016, 2016.

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