
In the course of pre-industrial mining, charcoal was produced in many low mountain ranges until the mid to late 19th century. Even today there are numerous relics from former charcoal hearth sites, so-called Relict Charcoal Hearths (RCH), for example in Upper Lusatia, Saxony. The soils at such sites have been changed substantially. As charcoal residues are left, RCH soils are carbon-enriched, which can affect the soil's water retention capacity and nutrient supply. Old RCHs may thus influence diverse ecosystem processes upon till today.

"Effects of historical Relict Charcoal Hearths on tree growth in Upper Lusatia, Saxony"

Within two tree-ring based master theses at TU Dresden, it will be investigated if RCHs influence the growth and the climate sensitivity of the trees that grow on them. RCHs will be identified within the study area Hoyerswerda using a digital elevation model (DEM). During a visit of the study area, the study sites will be determined and drill cores will be taken from trees growing directly on and next to the RCHs.

In the first tree-ring based master thesis, the climate sensitivity of tree growth will be compared between the two tree cohorts; possible differences will be related to variation in micro-site conditions. The second thesis will focus on the water-use efficiency of the tree cohorts as well as on their water supply. For this purpose, both dual-isotope analyses of the tree-ring material, which provide deep insights into tree physiological responses, as well as isotope analyses of water in the soil are planned, the latter allowing to detect differences in source water (i.e. precipitation or soil water) between the RCH and its' direct surroundings.

The two aforementioned master theses will be complemented by a master thesis at BTU Cottbus-Senftenberg with a strong focus on soil science. The working title of this third thesis reads:

"Effects of historical charcoal burning on soil properties in Upper Lusatia, Saxony"

The study aim is to explore differences in main soil properties between RCH soils and non-RCH soils (control) of the study region. In coordination with two tree-ring master theses, soil profiles will be dug, described and composite samples will be taken from RCHs and control sites. At the BTU lab following parameters will be analyzed: Munsell soil color, bulk density, texture, pH, C_{org} content and CEC. Data must be discussed using statistical methods.

All mentioned theses are part of ongoing/planned research and are supervised by the Chair of Forest Growth and Woody Biomass Production at the TU Dresden and by the Chair of Geopedology and Landscape Development at the Brandenburg University of Technology in Cottbus-Senftenberg.

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