

EGU22-3563

<https://doi.org/10.5194/egusphere-egu22-3563>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Initial processes of soil formation on Relict Charcoal Hearths (RCHs) in the Tauer Forest (Brandenburg, Germany)

Alexandra Raab¹, Minhye Kim¹, Alexander Bonhage¹, Anna Schneider¹, Thomas Raab¹, and Albrecht Bauriegel²

¹BTU Cottbus-Senftenberg, Geopedology and Landscape Development, Cottbus, Germany (raabalex@b-tu.de)

²Landesamt für Bergbau, Geologie und Rohstoffe Brandenburg (LBGR), Cottbus, Germany

In the Tauer Forest, a woodland area north of the city of Peitz (Brandenburg, Germany), extensive charcoal burning was carried out from the mid-16th century to the mid-19th century resulting in numerous Relict Charcoal Hearths (RCHs). The most prominent feature of the soils on RCHs is the anthropogenically modified 20-30 cm thick RCH substrate that buries the former forest soil. The RCH substrate is a quite heterogenous mixture of mineral and organic compounds which were modified through heat during charring. It is characterized by its black color resulting from charcoal fragments (from fine dust to decimetre size pieces), lower bulk density, and higher porosity.

After their use, the charcoal production sites were abandoned and soon became overgrown. Soil formation could commence in this anthropogenically modified RCH substrate. During recently conducted field work on RCHs in the Tauer Forest we detected features of initial podzolisation (bleaching of quartz grains) within this RCH substrate. To further investigate initial processes of soil formation (acidification, podzolisation, accumulation of soil organic matter) on RCHs, two different RCH sites were selected in the Tauer Forest: one RCH site in the forest district Tannenwald and one RCH site in the forest district Kleinsee.

The Tannenwald site (RCH no. 29958) is situated in the western part of the Tauer Forest. It is an inland dune area with a coniferous forest (*Scots pine*, *Pinus sylvestris* L.) plantation. The forest soils are Podzols and the soils on the RCHs are classified as Spolic Technosols. The dense undergrowth consists of mainly blueberry (*Vaccinium* L.). Dendrochronological ages (determination by K-U Heußner, DAI Berlin) of charcoal pieces proof, that the charcoal hearth was used after 1655.

The Kleinsee site (RCH no. 29424) is situated in the eastern part of the Tauer Forest. The parent material is sand from glaciofluvial sediments of the Weichselian glaciation. The forest soils are Brunic Arenosols (Protospodic) and the soils on the RCHs are classified as Spolic Technosols (Arenic). The deciduous forest is dominated by sessile oak (*Quercus petraea* (Matt.) Liebl.). The undergrowth is only scarce with some ferns (sporadic), blueberry (*Vaccinium* L.), some shoots of rowan (*Sorbus aucuparia* L.) and some moss. There is no dendrochronological age available from the RCH, but RCHs nearby were dated from the 18th to the 19th centuries.

At both sites, three soil monoliths were sampled on the RCH platform and three monoliths from the natural forest soil as reference soils. The soil monoliths were sampled continuously in 3 cm vertical spacings. Following lab analyses were carried out: pH (CaCl₂), pH (H₂O), total carbon (TC), total nitrogen (TN), CEC_{eff} and total concentrations of selected elements. Analyses of pedogenic Fe are in progress. First results of these study will be presented and discussed.