

Stratigraphy and shape of relict charcoal hearths in Connecticut, USA

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Relict charcoal hearths (RCHs) are anthropogenic geomorphic features with an average diameter of 12 m found in many forests of Central Europe and in the eastern USA wherever pre-industrial iron production took place or other industries demanded the production of charcoal. To expand the knowledge about their geoarchaeological significance and their legacy effect on soil properties and forest ecosystems, we propose a method for a generalized description of soil stratigraphy on RCHs. We studied 154 soil profiles at 52 RCH sites alongside two 1 km transects in Litchfield County, Connecticut, USA. The sites can be classified based on the slope inclination, with sites on $< 4^\circ$ mostly having a single-layered stratigraphy and an elevated circular shape, while sites on slopes $> 4^\circ$ mostly are built as levelled and multilayered platforms. The latter have two or more charcoal rich technogenic Auh-layers separated by intermediate Auh-layers mostly consisting of mineral substrate. Based on average layer thicknesses and their dependence on the sites slope inclinations, we propose a model with two idealized RCH shapes with slope controlled properties that allow for an easy computation of site diameters and elemental stocks. With ongoing advances in remote sensing of RCH sites, our proposed model can help to further understand the effects of historic land use on a landscape scale.

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