

Carbon and soil pH in Icelandic volcanic soils in relation to topography and land cover.

Björn Traustason¹(bjorntr@lbhi.is), Ólafur Arnalds² og Guðrún Gísladóttir¹.

¹Department of Geology and Geography, Faculty of Science, University of Iceland, ²Agricultural University of Iceland.

Volcanic soils (Andosol) are the most abundant soil type in Iceland. Icelandic volcanic soils are unique due to their young age, frequent volcanic activity and severe soil erosion. Soil is formed by different landscape and environmental factors. The aim of this research is to study the relationship between landscape factors and soil properties. Based on the results, Brown Andosol, the most abundant soil class in Iceland, was sub-classified. The final output is a soil map with better resolution than the current map.

The research areas are three, in northwest part of Iceland, western part of Iceland and the southwestern part of Iceland. A total of 91 soil samples were taken on 3 landscape gradients every 1500 m from the lowlands towards to Langjökull glacier. The purpose for this research is to investigate how landscape, vegetation, eolian deposition and soil erosion affect soil properties. For each soil sample 5 sub-samples were combined. Landscape and environmental factors were recorded in the field and carbon, pH-value and C/N measurements were done in a laboratory.

Correlation and Principal Component Analysis were used to analyze relationship between environmental factors and soil properties.

Changes in soil properties can be explained by vegetation cover, eolian rate, soil erosion and vegetation class. Carbon content is higher and pH-value lower in rich vegetated land where eolian deposition rate is low and soil erosion limited. Carbon content is lower and pH-value higher where soil erosion is severe. Carbon content is lower and pH-value higher in poorly vegetated land than under rich vegetated land.

Many of these environmental factors which influence soil properties are related. Poorly vegetated land is more common in the highlands where soil erosion is severe and eolian rate high. Rich vegetated land is more abundant in lowlands where soil erosion is little and eolian rate low. This gradient is possible to use for further development of soil classification. Further division of Brown Andosol is suggested based on the results and digital mapping procedure using the vegetation classification of the Nyttjaland project and soil erosion classification by Agricultural Research Institute of Iceland and Soil Conservation Service of Iceland.

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