

## **Environmental Change at Hólsfjöll, NE Iceland in light of soil properties and rate of eolian deposition.**

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Vegetation degradation and soil erosion has for long dominated the Hólsfjöll area, North-east Iceland. Degradation processes include encroaching sand and other soil erosion types. The area is in the vicinity of a major glacial river, Jökulsá á Fjöllum, which is sometimes subjected to catastrophic floods. The soils are continually becoming deeper due to a steady deposition of eolian materials and tephra from various sources. The soils are Andosols, which have a natural tendency to accumulate carbon during soil formation, carbon that subsequently becomes buried due to the eolian additions.

The purpose of the study is to evaluate and explain ecosystem changes in the Hólsfjöll area over the past 3000 years. The main research tools are deposition rates of eolian sediments, based on tephrocronology, and changes in carbon contents in the soils. It is assumed that low contents represent unstable environments with rapid eolian deposition, while high contents indicate stable periods with little erosion. Eight soil profiles were excavated and measured, and soil samples were taken at 2.5 cm increments down to the “a-tephra” (AD 1477) but less frequent to the H3 tephra (Hekla 2800 BP) and below it.

The rate of eolian deposition for the past 500 years ranges from 0.5-1.8 mm/yr, which is quite high, but typical of areas near the deserts in NE Iceland. Carbon ranges from 0.9 – 5.8 %C and is lowest around AD 1600, in early 17<sup>th</sup> century and around 1820, but differences are not the same throughout the area. Carbon content is lowest in the part of profiles representing periods of rapid eolian deposition, but high rate of deposition causes a higher total carbon (kg/m<sup>2</sup>) to be buried in the profiles. The data is used to infer suggestions about the history of environmental change at Hólsfjöll area.