

An Enhanced Weathering experiment with an organic rich soil from northern Germany

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Accompanying an Enhanced Weathering (EW) field trial within the project Carbdown in Bramstedt, Northern Germany[1], laboratory column experiments are used to test the effects of rock powder application on the weathering reaction and CO₂ consumption by EW. The used material is a commercially available product sold for soil amelioration (Eifelgold) - a basanite rich in nepheline, a Na-K silicate mineral. Four rates of Eifelgold application (0, 4, 10, 40 kg/m²) and four precipitation regimes (400, 800, 1200, 1600 mm/a) are tested. Samples are collected every two weeks for about a half year now from each column. The weathering peak based on concentrations of dissolved cations and alkalinity appeared after around two months. The presence of fertilizer applied to the soil before retrieving it for the experiment from the field resulted in strong NO₃ leaching in the first month. Increasing both, application rates and precipitation, increases the EW effect, observed by weathering products in the soil solution draining the columns. The extrapolated CO₂ consumption is in the range of 0.5 to 3.0 t CO₂ ha⁻¹ a⁻¹. Further investigation evaluates the evolution of the CDR potential with time, as after about half a year, the column systems didn't reach an equilibrium state. The used Northern German soil is organic rich, and significant DOC leaching is observed, correlating with increasing treatment rates, which makes a connection to the applied rock material probable.

[1] Carbon Drawdown Initiative. Available from:
<https://www.carbon-drawdown.de>.