

Quantifying carbon dioxide removal via enhanced weathering from porewater data: initial results from field trials in Scotland

AMY L MCBRIDE¹ AND XINRAN LIU²

¹Heriot-Watt University

²UNDO Carbon Ltd

Presenting Author: almcbride143@gmail.com

Enhanced Weathering (EW) has emerged as a promising carbon dioxide removal (CDR) strategy, with tens of dedicated EW commercial entities having been set up in the last three years. UNDO is one such entity, with commercial operations across the Northern UK and Eastern Canada.

Commercial entities selling carbon dioxide removal, like UNDO, are required to measure, verify and report how much CO₂ has been removed at regular time intervals. However, different methods of CO₂ removal quantification are likely to produce different numbers, depending on where the measurement has taken place. For example, a soil based measurement vs a pore water sample, and shallow (e.g. 5 cm) vs deep (e.g. 2 m) sampling depth for either method.

We propose an approach that uses pore water concentrations in conjunction with climate and plant water content data to more robustly estimate carbon dioxide removal per unit area of land, as new pore water data is generated. This approach allows us to estimate the amount of charge-balanced bicarbonate/carbonate ions that are transported past a certain depth point. This approach aligns with several standards that mandate measurements up to a depth of 30 cm for verification purposes.

Furthermore, our method is compared against other indicators of weathering processes, such as exchangeable cations and soil carbonate precipitation, as well as through comparison with geochemical models. For these calculations and comparisons, we will use data from field trials that have been running for between 1-2 years.