

UNDO

PUTTING CARBON IN ITS PLACE



WHO ARE UNDO?

- UK-based carbon removal scale-up
- Scaling enhanced rock weathering (ERW)
- UK, US & Australia-based operations
- Part of Stripe Climate portfolio
- Leading Science & Research team
- Target to remove 1bn. tonnes by 2030



"OUR RESPONSE TO CLIMATE CHANGE IS THE DEFINING MOMENT FOR THE PLANET WITH NOTHING LESS THAN OUR SURVIVAL AT STAKE. ONLY IF WE ACT BOLDLY AND QUICKLY WILL WE AVERT A DISASTER THAT IS ALREADY UNFOLDING."

- Jim Mann, CEO

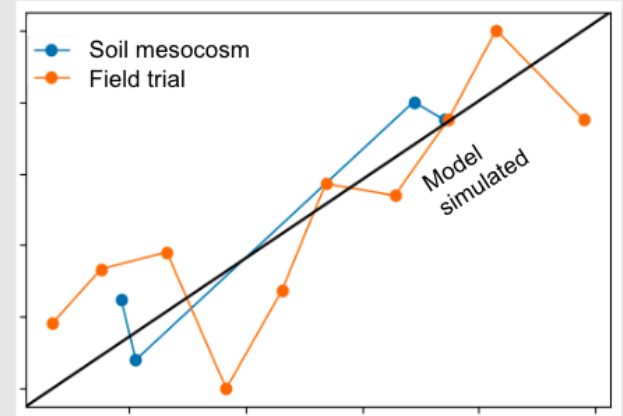
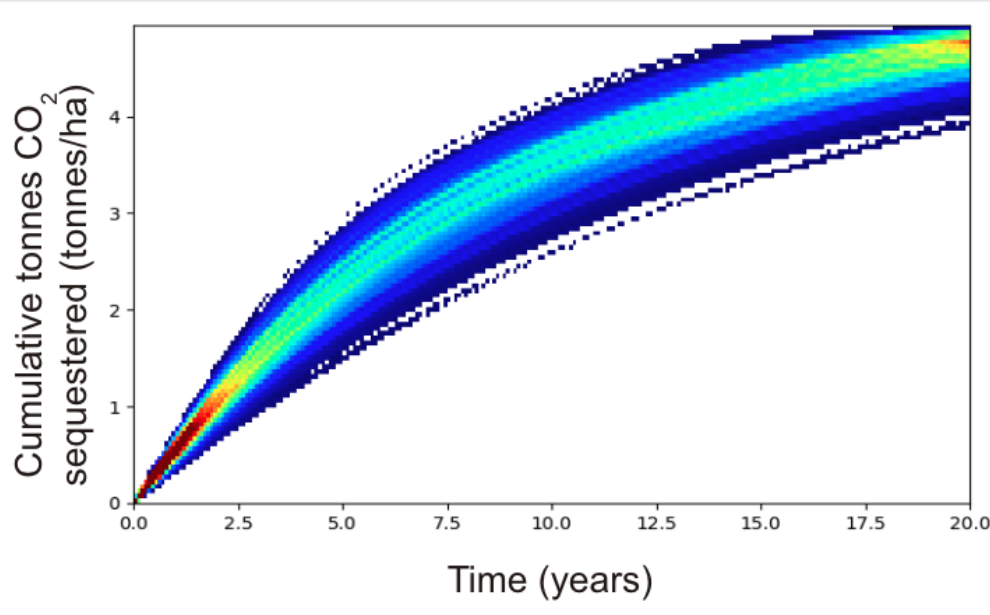
UNDO'S MODEL AND MEASURE APPROACH

MODEL



UNDO's models project how quickly CO₂ will be removed from the date of spread

TRUE UP WITH PUBLISHED AND IN-HOUSE
FIELD AND MESOCOSM DATA



THE UNDO ERW WEATHERING MODEL

The UNDO model uses a location-specific ID geochemical soil profile model.

This factors in multiple external conditions to develop weathering curves for specific operations in different geographies.

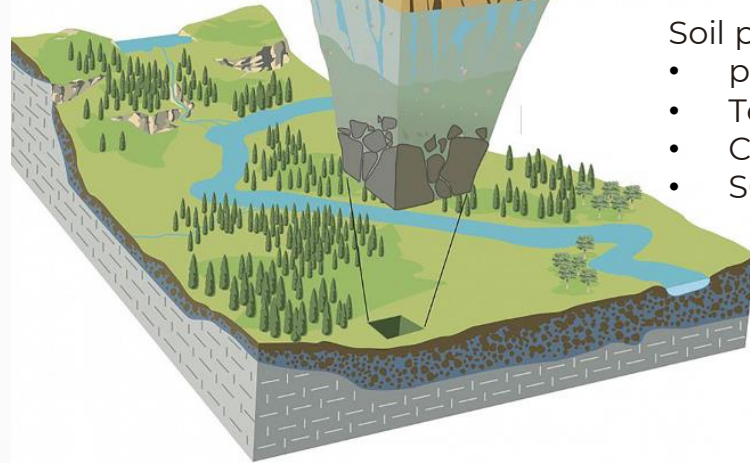
The model is continually enhanced utilising the in-field data our team receives from projects.

Climate

- Temperature
- Precipitation ± irrigation

Atmosphere

- Atmospheric CO₂
- Soil CO₂ partial pressure



Basalt

- Mineralogy
- Particle size and surface area
- Application density

Soil parameters

- pH
- Texture
- CEC
- SOC

HOW WE APPROACH MEASUREMENT

There are several handles to show that weathering has taken place:

- Products of weathering (Ca, Mg, Na, K and increase in pH).
- Fate of the CO₂ sequestered through the reaction of carbonic acid and hydroxide ions released during the weathering process.
- Co-benefits, such as yield

To date, no single method has proven accurate in quantifying the amount of CO₂ sequestered, but are rather indications that weathering is taking place. Hence the need for model predictions and improvement of these through data gathered in the field.

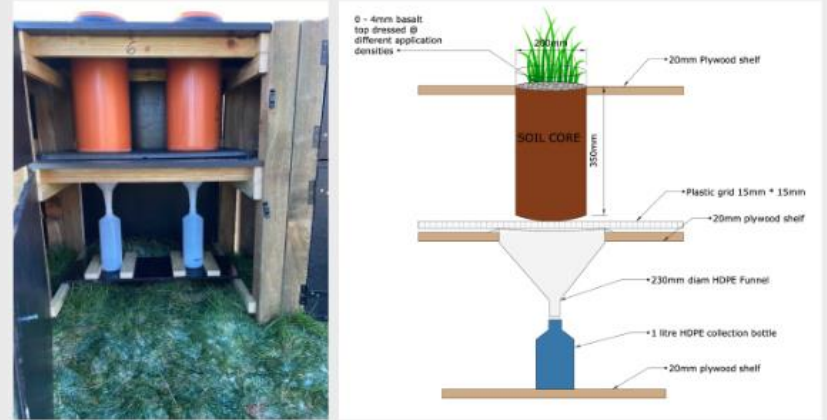
Our approach to date has been to deploy all existing MRV approaches in our field and mesocosm trials combined with innovation for new techniques.

UNDO FIELD MESOCOSMS

Field-adjacent soil mesocosms incorporate the complexity of field conditions, with the added ability to take a wider range of measurements on a higher frequency.

They also allow for a more controlled basalt application for ground truthing of the model.

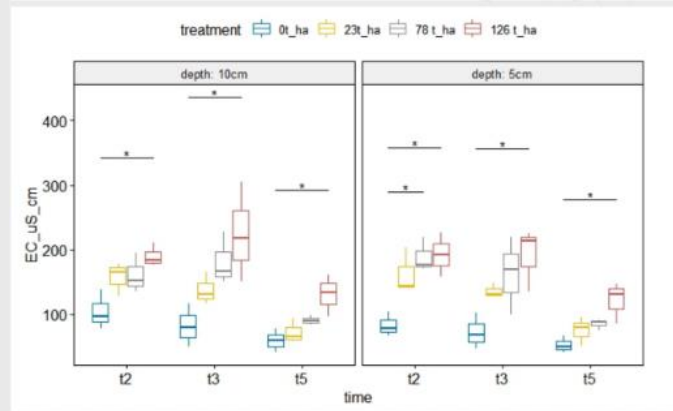
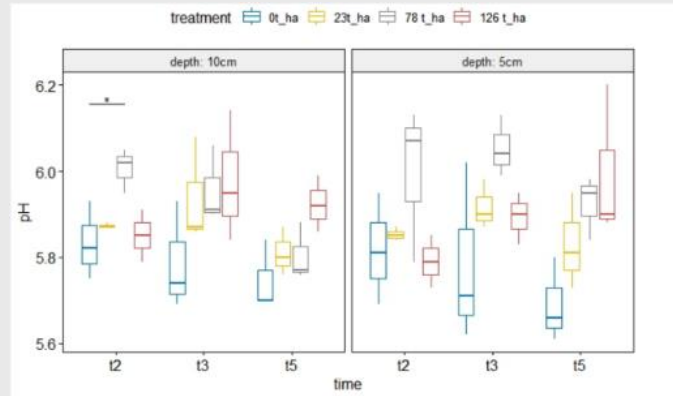
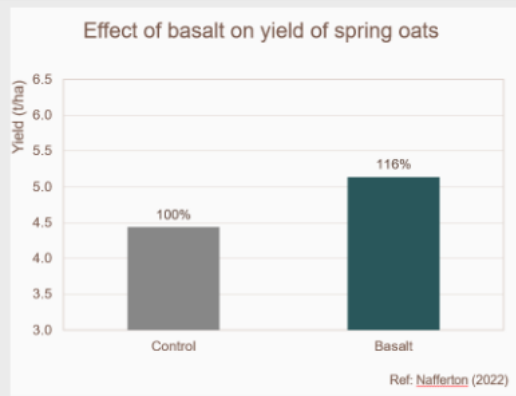
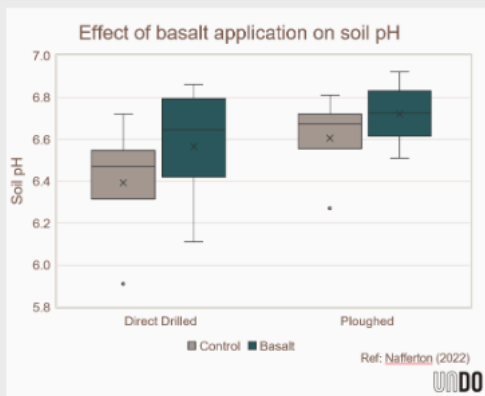
This approach is well documented to measure an enhanced weathering signal in a closed system (e.g., Ten Berge et al., 2012; Renforth et al., 2015; Dietzen et al., 2018; Kelland et al., 2020, Pogge von Strandmann et al., 2021; Amann et al., 2020, Amann and Hartmann, 2022; Vienne et al., 2022, Amann et al., 2022).



UNDO SOIL SAMPLING

Our UK Nafferton pH trials are trending in the right direction, especially combined with yield results.

Phase 2 trial pore water analysis pH and electroconductivity are also all trending in the right direction.



ALTERNATIVE MRV APPROACHES

We are also implementing a range of ‘non-core’ MRV approaches, gathering a range of additional project data to ensure we are in the best position for verification:

These include:

- TI Cation Ratio
- In-field sensors
- Rare Earth ICP-MS
- Bicarbonate sensor R&D

MEASUREMENT	ANALYSIS	MEASUREMENT	ANALYSIS
Porewater EC	Rhizon sample; EC meter	Porewater, pH and total alkalinity	Rhizon sample; auto-titrator
Porewater, cations	Rhizon sample; ICP-MS	Porewater, major anions	Rhizon sample; ion-chromatography
Leachate, pH and alkalinity	Effluent sample; auto-titrator	Leachate, major anions	Effluent sample; ion-chromatography
Leachate, EC	Effluent sample; EC meter	Leachate, cations	Effluent sample; ICP-MS
pH and EC	Soil slurry sample; pH/EC meter	Initial and final soil, cations	Oven-dried soil sequential extraction and ICP-MS
Exchangeable cations	Oven-dried soil extraction and ICP-MS	Integrated soil moisture, timeseries	Laboratory balance
Plant, aboveground and root biomass	Oven-dried sample, balance	Plant, cation content (incl. potentially harmful elements)	Digested sample and ICP-MS

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THANK YOU

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