

Tephra Bag Citizen Science Project: can volcanic ash help to reduce the amount of CO₂ in the air?

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Overview

Tephra is **volcanic ash** that has the potential to capture CO₂ from the atmosphere in a process called **chemical weathering**. Hence, tephra could act as a potential geological-based solution for **climate change** by reducing the greenhouse gases in the atmosphere.



In this ongoing interdisciplinary citizen science project, we are investigating the potential of plant-enhanced chemical weathering by **burying a teabag with volcanic ash in a local soil** together with planted ryegrass. In parallel, we are studying children's perceptions of climate change and the carbon cycle.

The **Tephra Bag Citizen Science Project** is directed towards primary school children in fifth and sixth class in Ireland (11-12 years old) and aims to gather data on tephra weathering rate in Irish soils while engaging different publics – teachers, primary school children and their families – around the possibilities offered by negative carbon emission technologies for climate change.

Methodology – natural science



To execute the experiment, the primary school children receive a toolkit that contains:

- A volcano box with a volcano diagram
- A protocol booklet with the experiment explanation
 - 4 pots
- **Volcanic ash in teabags**
 - Ryegrass seeds
 - Water measuring mug
- A sensor that can measure soil moisture, temperature and pH

The children (citizen scientists) take weekly **measurements** and monitor if there are any changes in the soil pH. Additionally, a **leachate sample is collected** at the beginning and the end of the experiment to check whether there are any changes in water composition, which would suggest that the weathering occurred.

Methodology – social science

To evaluate the project, a questionnaire is administered at the beginning and the end of the Tephra Bag Citizen Science experiment. In parallel, we wish to investigate school children's **perceptions** of climate change and the carbon cycle through the questionnaire, in which children are asked to sketch climate change, and about their emotions, knowledge, attitude and behaviour around climate change.

Future plans

Further school visits (September if possible) and teacher engagement; Zooniverse webpage development.

