Soil basalt applications: a climate change mitigation technique with benefits for planet and people?

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In recent years, enhanced weathering applications whereby silicate rock is crushed and mixed with top soil layers has received widespread attention due to its significant carbon sequestration potential whilst providing co-benefits for plant growth in agricultural systems (e.g., by increasing plant drought resistance and soil pH). Utilizing a precipitation manipulation experiment with basalt and forage grasses performed in the AnaEE-ESFRI FATI system at the UAntwerp as an example, we discuss potential co-benefits for crop and forage grass production, as well as pitfalls and knowledge gaps relating to soil basalt applications. What role do these applications have on the path to net zero? In which scenario's can basalt application both improve crop productivity and soil carbon sequestration? How has the field advanced over the past few years? What are the do's and don'ts? Given the ultimate goal of such applications is reducing greenhouse gas forcings on timescales relevant to mitigate climate change, we argue that researchers and stakeholders should opt for more holistic measurements and longer term studies.