

# **Artificially retuning the global weathering thermostat to cool the planet over the 21<sup>st</sup> Century**

DAVID J. BEERLING<sup>1</sup>

<sup>1</sup>Department of Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN  
(d.j.beerling@sheffield.ac.uk)

Artificial enhancement of the chemical weathering sink for CO<sub>2</sub> via distribution of pulverized silicate rocks across terrestrial landscapes might offer a macro-engineering strategy to offset anthropogenic C-emissions. I will describe recent global carbon cycle modelling demonstrating that enhanced weathering over one third of tropical land could lower end-of-century atmospheric CO<sub>2</sub> by over 200 ppm depending on application rate and rock type. Significant unexploited opportunities exist for further deployment of enhanced weathering in the biofuel sector. Increased land-ocean alkalinity fluxes that arise substantially reverse end-of-century anthropogenic ocean acidification, even under a 'business-as-usual' carbon emissions scenario, helping maintain the viability of tropical coral reefs. Enhanced weathering may offer a scalable climate change mitigation option, but major issues of cost, and social acceptability, should encourage urgent efforts to phase-down fossil fuel emissions.