

Quantifying the erosion effect on current carbon budget

The idea of offsetting anthropogenic CO₂ emissions by increasing global soil organic carbon (SOC), as proposed during COP21 in the 'four per mil' initiative, is notable. JRC scientists coupled soil erosion into a biogeochemistry model, running at 1 km² resolution across the agricultural soils of the European Union (EU). Based on data-driven assumptions, the simulation took into account also soil deposition within grid cells and the potential C export to riverine systems, in a way to be conservative in a mass balance. In comparison with a baseline without erosion, we estimated a net C loss or gain of -2.28 and +0.79 Tg yr⁻¹ of CO₂eq, respectively, depending on the value for the short-term enhancement of soil C mineralization due to soil disruption and displacement/transport with erosion. Erosion fluxes were in the same order of current carbon gains from improved management. Even if erosion could potentially induce a sink for atmospheric CO₂, strong agricultural policies are needed to prevent or reduce soil erosion. Data on eroded soil organic carbon and improvements of past release:

