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The impact of agricultural soil erosion on soil phosphorus cycling

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Soils play a key role in controlling the cycling of nutrients and carbon through the lithosphere and biosphere, yet estimates of the influence of soil on phosphorus cycling does not conventionally take into account erosion, lateral movement and soil mixing. Here, we synthesize data on the global fluxes of soil phosphorus moving over agricultural landscapes as a result of erosion processes. We demonstrate how the mobilization and deposition of soil can have significant impacts on phosphorus cycling causing lateral P similar in magnitude to those induced by fertilizer application and crop removal. This has consequences for primary productivity, which in turn influences the replacement of carbon and nitrogen. Our analysis demonstrates why soils must be viewed as dynamic systems in time and space if we are to understand their role in the phosphorus cycle.