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Diffuse pollution of soil and water: Long term trends at large scales?

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Industrialization and urbanization, which consequently increased pressure on the environment to cause degradation of soil and water quality over more than a century, is still ongoing. The number of potential environmental contaminants detected in surface and groundwater is continuously increasing; from classical industrial and agricultural chemicals, to flame retardants, pharmaceuticals, and personal care products. While point sources of pollution can be managed in principle, diffuse pollution is only reversible at very long time scales if at all. Compounds which were phased out many decades ago such as PCBs or DDT are still abundant in soils, sediments and biota. How diffuse pollution is processed at large scales in space (e.g. catchments) and time (centuries) is unknown. The relevance to the field of processes well investigated at the laboratory scale (e.g. sorption/desorption and (bio)degradation kinetics) is not clear. Transport of compounds is often coupled to the water cycle and in order to assess trends in diffuse pollution, detailed knowledge about the hydrology and the solute fluxes at the catchment scale is required (e.g. input/output fluxes, transformation rates at the field scale). This is also a prerequisite in assessing management options for reversal of adverse trends.