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Assesment of pesticide fluxes to surface water using Uranine in Colombia

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In the highlands of Colombia, potato farmers maximize their yields by the application of pesticides. Properly applied pesticides can significantly reduce yield loss and improve product quality; however their misuse leads to human health and environmental problems, i.e. water bodies contaminated with pesticides. Due to the lack of control regarding local pesticide use, unmeasured hydrological parameters and use of local water runoff as a drinking water supply, an assessment of the impact of agricultural practice on water quality is mandatory as first stage. In order to accomplish this, our study assesses pesticide fluxes to surface water using the tracer Uranine.

The experimental area La Hoya main basin (3 km^2) contains the Pantano Verde river which flows into the Teatinos river in the Boyaca region (Colombia). Some facts such as the deep soils in the area and the importance of the unsaturated zone for the sorption and degradation of pesticides suggest a lack of contaminants in groundwater. However, due to the humid conditions, steep slopes and an intensive agricultural with high pesticide use, we expect surface water to be highly contaminated. In order to assess pesticide pathways, a tracer (Uranine), detectable at very low amount was used. Four local farmers applied the tracer instead of the pesticide mixture covering a total surface of 1.2 10^{-2} km^2. Meteorological data were measured every 15 min with one compact meteorological station installed within the basin and water flow and water sampling were obtained using an ISCO-6700 water sampler, during one week every 10 min in the outlet of Pantano Verde River. In addition, three pairs of membranes were installed down the river and collected 1 week, one month and 4 months after the experiment to measure tracer accumulation. The tracer in water was analysed using a fluorescent spectrometer. Results of this study show first variations of tracer concentration in water in La Hoya basin and constitute an initial steep in assessing the impact of agricultural practices in the local water quality under the influence of pesticides.