



Pesticide load dynamics during stormwater flow events in Mediterranean coastal streams: Alexander stream case study

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Cultivated land is a major source of pesticides, which are transported with the runoff water and eroded soil during rainfall events and pollute riverine and estuarine environments. Common ecotoxicological assessments of riverine systems are mainly based on water sampling and analysis of only the dissolved phase, and address a single pesticide's toxicological impact under laboratory conditions. A clear overview of mixtures of pesticides in the adsorbed and dissolved phases is missing, and therefore the full ecotoxicological impact is not fully addressed. The aim of this study was to characterize and quantify pesticide concentrations in both suspended sediment and dissolved phases, to provide a better understanding of pesticide-load dynamics during storm events in coastal streams in a Mediterranean climate. High-resolution sampling campaigns of seven flood events were conducted during two rainy seasons in Alexander stream, Israel. Samples of suspended sediments were separated from the solution and both media were analyzed separately for 250 pesticides. A total of 63 pesticides were detected; 18 and 16 pesticides were found solely in the suspended sediments and solution, respectively. Significant differences were observed among the pesticide groups: only 7% of herbicide, 20% of fungicide and 42% of insecticide load was transported with the suspended sediments. However, in both dissolved and adsorbed phases, a mix of pesticides was found which were graded from "mobile" to "non-mobile" with varied distribution coefficients. Diuron, and Tebuconazole were frequently found in large quantities in both phases. Whereas insecticide and fungicide transport is likely governed by application time and method, the governing factor for herbicide load was the magnitude of the stream discharge. The results show a complex dynamic of pesticide load affected by excessive use of pesticides, which should be taken into consideration when designing projects to monitor riverine and estuarine water quality.