



Screening level assessment of agricultural pesticides as a pressure factor on European waters

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Currently about 400 chemical substances are reported in use as agricultural pesticides in Europe. However, little knowledge is available about their actual use patterns, emission rates, and consequently expected concentrations in the environment. In this contribution, we use a simple screening model for the evaluation of pesticide concentrations in soil and water, and we apply it to a number of pesticides, for which some monitored values of concentration are available and used for comparison with computed concentrations. The model relies on practically attainable information such as reported pesticide usage data, land cover, and pan-european soil organic carbon content, runoff rates and temperature-dependent degradation rates.

After validating the model, we apply it to compute environmental risk indicators that aim at depicting the cumulative effect of pesticides in Europe. These indicators are in essence weighted sums of concentrations of the different chemicals, where weights are ratios of threshold concentrations such as LC50 or NOEC. The model implies simple and easy-to-track computations, and only exploits widely available information on pesticide emissions and properties. Indicators can be used for the assessment of pesticides in Europe for a generic year. A comparison between different years is discussed, yielding indications on the current trends in pesticide contamination at the continental scale.

This type of analysis helps identifying pressure factors in agricultural catchments, and their spatial and temporal trends, and may support the identification of priority hazardous substances for river basin management planning within the Water Framework Directive.