Prioritization of substances for national ambient monitoring in Switzerland

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Introduction: In Switzerland, surface waters are protected by the Swiss Water Protection Ordinance (OEaux), which stipulates that the water quality shall be such that: the water, suspended matter and sediments contain no persistent synthetic substances to ensure the protection of aquatic life. Current sediment quality assessment in Switzerland mainly consists of physico-chemical analyses, with metals and to a lesser extent polycyclic aromatic hydrocarbons and polychlorinated biphenyls being most commonly quantified. Sediments, however, may accumulate a large number of substances including, e.g. pesticides, insecticides, pharmaceuticals and veterinary products, and industrial chemicals that are released to surface water bodies from numerous point and non-point sources. A number of these substances have been prioritized for surface water monitoring [1,2]. However, these prioritization exercises have targeted water-phase chemicals only, while recognizing the need for "a completely different assessment and monitoring strategy for substances likely to be bound to suspended particles" [1]. For the preparation of recommendations for sediment quality assessment in Switzerland, a screening system was implemented for the identification and ranking of substances relevant to particulate matter and sediments. We will present the implemented screening system and the first results in the context of developing and providing methodologies for monitoring sediment quality in Switzerland, in particular in relation to future development of sediment quality criteria.

Methods: The screening approach was largely based on the NORMAN (network of reference laboratories, research centers and related organizations for monitoring emerging environmental substances) system and was carried out in four steps: 1) identification of candidate substances; 2) selection of sediment relevant substances; 3) classification of substances into different categories each with specific recommendations for monitoring and data acquisition according to available exposure and effect data; 4) ranking within each action category according to several exposure, hazard and risk scores. A subset of these sediment-relevant substances was then prioritized for the derivation of sediment quality criteria.

Results and discussion: For the adaptation of this prioritization system several decisions had to be made to deal with considerable data gaps for this environmental compartment in Switzerland. For example, monitoring data was absent for a large number of substances thus we had to rely on available exposure data from other countries assessed for relevance to the national situation. Accordingly, the resulting list of sediment-relevant substances is in good agreement with the EU list of priority substances. We classified sediment-relevant substances in five action categories: 1) substances with enough monitoring data from Swiss sediments and identified environmental risks; 2) substances with limited monitoring data; 3) substances with no or limited ecotoxicological data; 4) substances with no environmental data for Swiss sediments; 5) substances with enough monitoring data and no identified risks. This classification appears useful in setting monitoring and regulatory agencies priorities. It has also the advantage of being suitable for continuous update. In such situation, an adaptive monitoring strategy appears as an effective long-term solution for the implementation of sediment quality assessment strategies in Switzerland. The enrichment of the database with new entries from the implemented actions and measurement campaigns may re-classify substances according to refined assessment.

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