Surfactant case study: Increasing the ecological relevance of chemical risk assessments using geospatial approaches

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Abstract (2,500 character limit, including spaces):

This poster, along with its companion PPP case study poster, provide the foundation for the similarly titled platform presentation. Review of these posters prior to viewing the platform will provide helpful background information. A key rationale for making geo-referenced chemical risk assessment is that it provides assessments that can be tailored to local landscape/watershed abiotic characteristics and ecology to account for spatial heterogeneity within river basins. Since heterogeneity is often reflected in localised specific environmental objectives and protection goals, spatially explicit assessments can better relate to landscape/watershed scale environmental management objectives than can current generic chemical environmental risk assessment frameworks. In 2017 ECETOC initiated a Task Force to investigate current capabilities in making spatially explicit chemical risk assessment (from both an exposure and effects perspective). After comprehensive research for applicable and available data, we investigated techniques and methods for combining disparate data sets using 2 case studies and identified some of the challenges of using different levels of taxonomic, spatial and temporal resolution in geo-referenced risk assessments. The results of our case studies give an indication of the potential value of making geo-referenced chemical risk assessments as well as the limitations to current capability. In this surfactant case study, georeferenced aquatic exposures to a surfactant used in domestic cleaning products for 350 wastewater treatment plants (WWTPs) in the German State of Hessen were examined and compared to biomonitoring data. Predicted environmental concentrations (PECs) were generated from emissions based on per capita product usage, connectivity to municipal sewage treatment plants, and removal efficiency geographically linked to local river flow and dilution factors. PECs were converted to Exposure-Toxicity Ratios (ETRs) using available ecotoxicity data. Water Framework Directive biological monitoring data obtained from local authorities was used to determine the ecological state for algae, macrophytes, macroinvertebrates and fish. Biomonitoring data locally downstream of WWTP discharges (n=794) were spatially linked to surfactant ETRs and analyzed. This poster will present the source data, processing methods, and results from three levels of relating georeferenced exposure and biomonitoring data.