GEMAS: Use of monitoring data for risk assessment of metals in soil.

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For a number of years, Europe has legislation in place (e.g. the REACH regulation) to ensure chemicals are produced and used safely in Europe. Accurate risk assessments of metals in the soil compartment at regional scale were, however, difficult due to the absence of a robust harmonised monitoring database. The background concentration of metals in soils typically varies orders of magnitude at a national or continental scale. Similarly, soil properties affecting the fate, behaviour and bioavailability of metals in the terrestrial environment, e.g., pH, clay content, organic matter content, effective cation exchange capacity, vary strongly among soil types. High (bioavailable) metal concentrations may result in toxic effects to terrestrial organisms, while low concentrations of essential elements may entail a risk for deficiency and suboptimal ecosystem functioning. A sound risk assessment on toxicity or deficiency of elements in soil takes into account this spatial variation. Data availability for all these properties, however, differs largely across countries or regions, and where data is lacking, conservative assumptions are often made. Differences in data availability, therefore, preclude accurate risk assessments on a large (e.g., regional or continental) scale and it makes comparison of country or region specific assessments difficult. The GEMAS project filled this important data gap by providing high quality European wide geo-referenced data on metal concentrations and properties influencing metal bioavailability in agricultural and grazing land soil. The GEMAS data provide a strong basis for more robust risk assessments in Europe, taking into account the spatial variability of both exposure (metal concentrations) and bioavailability of metals in soil. The results allow for a uniform approach for assessment of the risks for both toxicity and deficiency. The use of the GEMAS monitoring data for regional and local risk assessments will be discussed and illustrated with examples for Cu and Mo, which occur in soil as a cation and an oxyanion, respectively. This presentation will hence demonstrate the value of the GEMAS data for compliance work with Europe's Chemicals Legislation.