Mapping the effect of soil metal concentration on terrestrial organisms at regional scale (Wallonia - Belgium)

Aubry Vandeuren[*1], Benoit Pereira[†1], Philippe Sonnet[‡1], and Koen Oorts[§2]

[1]Université catholique de Louvain, Earth and Life Institute - Environment – Belgium
[2]ARCHE Consulting – Belgium

Abstract

High levels of metal concentrations in soils constitute a threat to terrestrial organisms leading possibly to a loss of biodiversity and/or soil functions. Ageing/Leaching factors and soil parameters such as organic matter content, clay content, pH and clay content are known to influence the toxicity of the soil metal content. For years Wallonia has collected a large amount of georeferenced soil analyses and was able to constitute a database that covers the whole region with high spatial resolution. The first aim of this study is to map the effect of metals on terrestrial organisms taking into account soil parameters as well as Ageing/Leaching factors. This is done by computing the species sensitivity distribution on each point of a grid of 70 000 points using the PNEC Calculator methodology, which relies on chronic toxicity data for terrestrial organisms and Ageing/Leaching factors derived from EU REACH reports. The second aim of this study is to compare the sensitivity distribution function to the predicted concentration of metals at each point of the grid to compute the potentially affected fraction (PAF) of organisms. The PAF due to zinc and copper concentrations have been computed. For copper, the PAF is below 5% everywhere in Wallonia. For zinc, the PAF is higher than 10% in the Liège area which is impacted by atmospherical fallout from the past non-ferrous metal smelting plants.

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[*]Speaker
[†]Corresponding author: benoit.pereira@uclouvain.be
[‡]Corresponding author: philippe.sonnet@uclouvain.be
[§]Corresponding author: koen.oorts@arche-consulting.be