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Comparative geochemistry of urban soils in Cork and Wexford, Ireland

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Many soils in urban areas in Europe show metal enrichment linked to anthropogenic activity, especially soils in close proximity to roads and industry. This is concerning because of potentially frequent interactions between the public and contaminated urban soils and also because certain metals linked to anthropogenic enrichment are systemic toxicants, e.g. As, Cd, Cr, Hg and Pb. In Ireland, data on anthropogenic enrichment of urban soils with metals exist for only two urban centres (Dublin and Galway). Here, we studied urban soils from sites in Cork City and County Wexford. Cork has experienced > 200 years of industrial development, with many former brownfield and industrial sites among its public parks. In contrast, County Wexford is less developed but is suspected to show relatively high concentrations of geogenic soil metals. We collected XRF data on metals in urban soils from ten sites in Cork city and ten sites in County Wexford. At all Cork sites, Pb is highly enriched in soils, with concentrations up to ten times greater than natural background levels. Fe, Mn and Zn are moderately enriched at each site, with concentrations typically two to five times natural background levels. Metal concentrations in Cork are systematically higher at sites in the city centre relative to suburbs. In Wexford, soil concentrations of As, Cu, Rb and Sr slightly exceed natural background levels for most sites. Higher concentrations, i.e., two to three times greater than natural background levels, occur only for Fe, Pb and Zn and co-occur in sites that are more urbanised. These patterns of metal enrichment are consistent with trends in soil metal concentration across Europe. Future assessments of urban soils in Ireland will benefit from a new national policy on methodological frameworks for soil analysis in line with forthcoming European legislation.