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Urban soil geochemistry of two Nordic towns: Hämeenlinna and Karlstad

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Abstract

Urban soil geochemical mapping was carried out using the same sampling and analytical protocols in two Nordic towns: Hämeenlinna in Finland and Karlstad in Sweden. Aqua regia extractable concentrations of 53 elements determined in urban topsoil (0–10 cm) were compared statistically, including cluster and factor analysis, and spatially for selected elements (As, Au, Hg, Ni and Pb). Soil parent material and land use were re-classified before comparison to give a standardised classification for the two towns. Four land use classifications are used: sensitive land, industrial, green areas, and parks. Concentrations of potentially hazardous elements are often elevated in clay and fine-grained human-made soil. Comparison of land-use types revealed that the median concentration of almost all studied elements was highest in industrial areas.

Keywords: URGE; Potentially hazardous elements; Land use; Geogenic; Anthropogenic

1. Introduction

Urban geochemical mapping has become a tool for evaluating the quality of the urban environment, and is a rapidly developing discipline in applied environmental science (Johnson et al., 2011). Urban areas in some