Geophysical Research Abstracts, Vol. 9, 11214, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-11214

Granulometric distribution of metals in urban soils receiving pavement runoff and snowmelt

K. Howerter (1), J. Sansalone (2)

(1) Halff and Associates, Dallas, Texas, USA, (2) University of Florida, Environmental Engineering Sciences Department, 218 Black Hall, Gainesville, Florida, 32611, USA, jsansal@ufl.edu, Fax: +352 392 3076

Metals and particulate generated by anthropogenic activities, such as traffic and transported in wet and dry deposition can result in contamination of urban soils. These metals and particulates are transported to soils in rainfall-runoff and snowmelt. The particulate residuals that accrete in the surficial layer of urban soils encompass a wide size gradation from 1 to greater than 10,000 μm. This study examines the hypothesis that such contamination of surficial soils on nearly a continual basis can be analyzed and explained as a function of the soil/residual granulometry. Data for this study analyzed the gradation-based physical characteristics for 10 urban transportation land use sites with soil/residual complexes and an urban residential reference site of clayey glacial till. Particle density of the soil/residual complexes ranged from 2.1 to 2.8, with the lower particle density associated with particles less than 100 μm. For each site, specific surface area increased with decreasing particle size; however the predominance of total surface area was associated with the coarser size fractions, except for the clayey glacial till reference site. This reference site was not influenced by traffic. The analysis for metals such as lead, copper, cadmium and zinc demonstrated that more than 50% of the metal mass was associated with sand size particles. Although snowmelt concentrations were much higher than rainfall-runoff, the granulometric distributions of metal mass were similar in both. Study results are similar to rainfall-runoff and snowmelt distributions. The results allow characterization of existing surficial contamination and source area management of loading when considering potential fate and control of metals transported by urban drainage and are distributed across the soil/residual size gradation.