

Trace metals adhered to urban sediments. Results from fieldwork in Poços de Caldas, Brazil

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The urbanization process has consequences such as the introduction of new sources of pollution and changes in the natural environment, like increase of impervious areas that accumulate pollutants between rainfall events. The pollution caused by the washing of accumulated sediment on the gutters, ultimately carried to water bodies through the stormwater drainage system, stands out in this process.

This study aimed to quantify and characterize the sediments accumulated in the gutters of roads in an urban area of Poços de Caldas (MG), Brazil. Fieldwork took place during the period of 21.05.2013 to 27.08.2013. Main goal was to investigate the process of accumulation of dry sediments on impervious surfaces and find how this process relates with the urban occupation. More specific goals were to quantify the average mass and characterize the granulometric distribution of accumulated sediments, and identify the occurrence of trace metals Zn, Cu, Ni, Cd, Cu and Pb in the fraction of sediments with diameter smaller or equal to $63\mu\text{m}$. The samples were weighed to find the aggregate mass and then sieved through meshes of $63\mu\text{m}$, $125\mu\text{m}$, $250\mu\text{m}$, $600\mu\text{m}$, $1180\mu\text{m}$, and $2000\mu\text{m}$ for the granulometric analysis. Samples of the sediment fraction smaller than $63\mu\text{m}$ of diameter were subjected to analysis by Energy Dispersive X-Ray Fluorescence (EDXRF) and Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) for the identification of trace metals.

We found that the aggregate mass of accumulated sediments varies in time and space and is particularly influenced by the land use of the sampling areas. Areas under construction produced more sediments than built areas or areas without construction. This study may serve as an input for creating diffuse pollution control and mitigation strategies towards the reduction of accumulated pollutants in the urban environment of Poços de Caldas. Pb and Zn shown the highest concentrations. The heavy metal concentration decreases after wet periods, showing that runoff carries these elements.