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Since the 1990s, platinum is widely used in automotive catalytic converters in Europe. However, only few environmental data about this element are available. The aim of this study was:
- in a first part, to detected changes that may occur on the concentration and the distribution of platinum in urban and peri-urban environment over the 20-years last period, to evaluate the long term urban soil retention capacity;
- in a second part, to investigated the sorption capacity of soil components.
The study was conducted on samples from a peri-urban area, particularly on soil and sediment. The soil was sampled along an highway (Nantes ring road, western France) and the sediment was sampled in a detention pond receiving highway runoff waters. The first site is a motorway which was opened in 1993 with an average daily traffic of 24,000 vehicles. To date, the average daily traffic is about 50,000 vehicles. The second site is a detention pond which receives highway runoff from the Cheviré bridge. This road started to operate in 1991 and the bridge supported an average daily traffic of about 50,000 vehicles. Now, the traffic is about 98,000 vehicles/day.
A physico-chemical analysis of the samples was carried out to identify the nature of pollutants and to determine their concentrations. The first result concern the evolution of pollutant concentrations in the environment, taking into account the changes such as the use decrease of Pb in gasoline (until its ban in 2000) and the widespread use of automotive catalytic converters.
The results obtained show an increase of platinum concentrations with time in the detention pond sediments. Platinum concentrations are ranged from 47 to 144 μg.kg-1. For roadside soil the higher concentration (106 μg.kg-1) was found in the road dust collected close to the road pavement. This accumulated dust can be remobilised by wind, traffic and runoff. Then, there is a decrease of concentration with the distance from the road.
The second part of the study was carried out to determine the association of platinum with the soil and sediment constituting phases using solid micro-analyses techniques, including X-ray fluorescence microscopy and transmission electron microscopy. These results show that the composition of soil has an influence on the sorption and the mobilization of Pt.