

CONTROLS ON THE SPATIAL DISTRIBUTION AND TEMPORAL VARIATION OF ORGANIC TRACERS IN THE SEDIMENTS OF THE PARIS SEWERAGE SYSTEM.

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The urban environment is made up of a complex and changing mosaic of spatial patterns. To what extent the spatial heterogeneities of this mosaic determine the quality of life or social, economic or health inequalities? Within the framework of the ANR EGOUT project (egout.cnrs.fr), we assume that the spatial distribution and temporal evolution of mineral and organic tracers archived in the sediments of the Parisian sewerage networks can help deciphering the diversity of aboveground conditions, and their temporal trajectory.

We compiled the geochemical results acquired before cleaning out operations on sediments accumulated in more than 100 silt traps (STs) that line the sewerage network of the City of Paris. Each ST is cleaned every 1 to 3 years and receive sediments that transit through the Parisian combined (wastewater and stormwater) sewer system. These analyses concern granulometry, metals, polychlorinated biphenyls (PCBs), but also 16 polycyclic aromatic hydrocarbons (PAHs). These regulatory analyses (which guide the nature of the sediments treatment processes to be implemented) have been available since the year 2000, with cleaning out, and thus measurement frequencies, varying from one ST to another. They therefore allow addressing not only geochemical spatial disparities but also their temporal evolution.

In order to assign these results to the corresponding catchment areas for every ST, we first defined the catchment areas of each ST. The TIGRE 7 information system of the City of Paris was used to distinguish each sub-network draining the sediments to each ST. Two spatial scales of drainage (wet and dry weather), but also a sedimentary cascade system could be highlighted. The catchment areas of each ST were then defined by linking individual connections of the sub-network to individual addresses and cadastral parcels. For this presentation, we only focus on PAH distribution.

Here are the most striking results from the exploitation of existing geochemical data:

- Based on concentration ratios (Ayrault et al., 2008), PAHs mainly result from wood or coal combustion (*Figure 1*).
- The concentration of PAHs has been decreasing in ST sediments since 2000. This decrease could reflect the development and increase of district heating connections.
- PAH levels and types differ from one ST to another, as already noted by Rocher et al. (2004). These differences probably indicate local specificities in PAH production of each catchment area. Cross-referencing our data with other spatialized data related to potential PAH sources (road traffic, heating, etc.) should allow us to better understanding the factors that control their presence in sewer sediments.

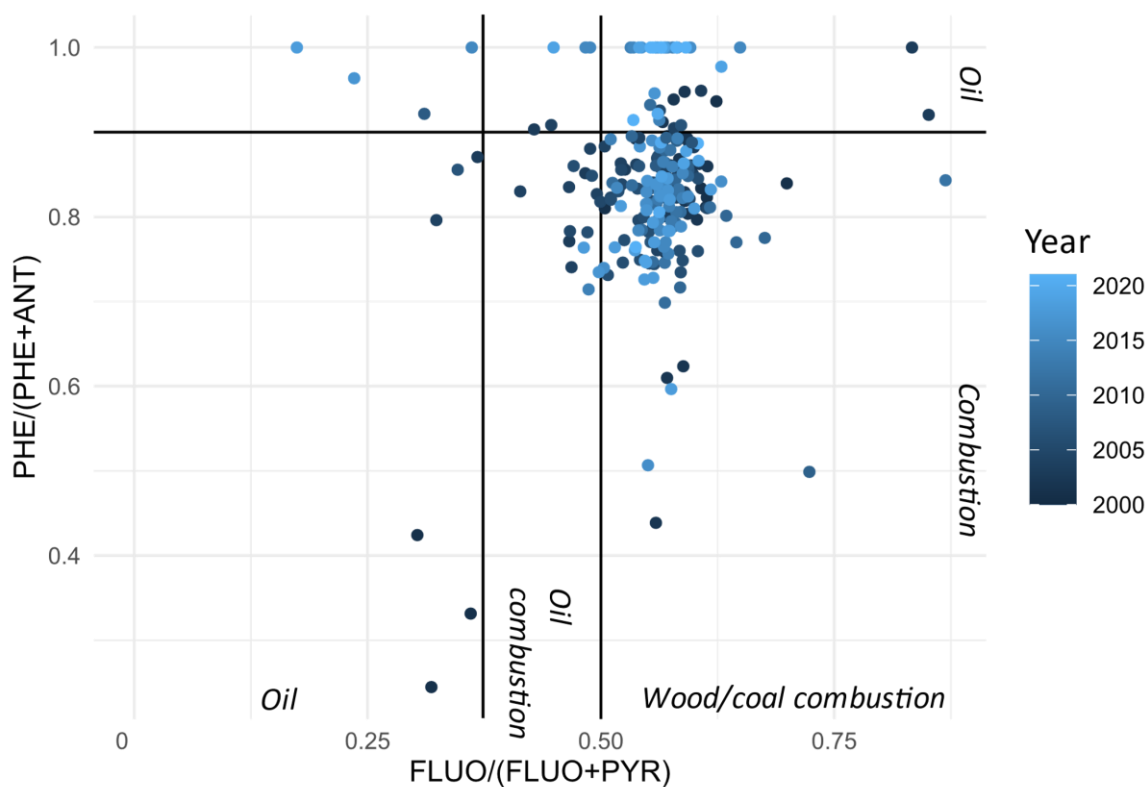


Figure 1 Source of production of PAHs recorded in the sediments of the Parisian sewerage network according to Ayrault et al. (2008).

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ROCHER Vincent, GARNAUD Stéphane, MOILLERON Régis, CHEBBO Ghassan. 2004. « Hydrocarbon Pollution Fixed to Combined Sewer Sediment: A Case Study in Paris ». *Chemosphere* 54 (7): 795-804. <https://doi.org/10.1016/j.chemosphere.2003.10.011>.