

**Uses of stable isotopy  $^{13}\text{C}$  and  $^2\text{H}$   
ratio analysis as indicator of PAH  
sources in urban environment.  
Example of small watershed near  
Paris : Orge river, France.**

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Polyaromatic hydrocarbon (PAHs) are a group of organic compound formed by petrogenic and pyrolytic process. Known as a hazardous compound to humans and its environment, PAHs are one of the main sources of contamination in French river. Several tools have been developed to estimate the contribution of each pyrolytic process. One of the most common is the molecular diagnostic ratios techniques. Several studies around the world try to identify the major source of PAH in several environmental matrices with this techniques with success. In some cases, sampling conditions and presence of multiple sources prevent accurate identification. The use of PAH molecular diagnostic ratio has been criticized for its uses as tracer in complex matrices like soils, sediments, waters etc. Other techniques exist like uses of isotope signatures ( $\delta^{13}\text{C}$ ,  $\delta^2\text{H}$ ) of PAH for source identification. Moreover,  $\delta^{13}\text{C}$  analysis on individual PAHs is a well established technique already used in several studies. However, very few studies use  $\delta^2\text{H}$  as source tracer on individual PAH and none in France.

Our study consists on the analysis of PAH  $\delta^2\text{H}$  and  $\delta^{13}\text{C}$  signature in small watershed in the south of Paris with a very high urbanization's gradient. The result was compared to the signature of 6 different sources (Gas boiler, diesel car, gasoline car, oil heating, wood fireplace and parking to represent bulk vehicle exhaust) and the few publications on this subject. The result shows a strong pyrolytic signature with two major sources: vehicle exhaust and gas boiler. The originality of our work lies in the analysis of the two isotopic ratios in complementarity, for each one of the PAHs. Our results highlight the interest of that new tool for HAP tracing in various environmental sub-compartments.

Much work remains to be done in order to use this tool as an efficient tracer as: prospect all the signatures of each source, conduct a larger sampling campaign and test the different parameters that may affect the  $^2\text{H}$  in PAHs.