

# Investigative Study on Behaviors of Polycyclic Aromatic Hydrocarbons from Atmosphere to Water Environment in Da Nang, Vietnam

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Key Words: Polycyclic Aromatic Hydrocarbons, Pathways, Soil Infiltration, Vietnam

## 1. Background and Objectives

Polycyclic Aromatic Hydrocarbons (PAHs) have been studied for their distribution and runoff behavior. There are, however, few studies computing PAHs loading to water bodies taking into account both of point and non-point source. This study aimed to estimate main pathway of PAHs from the atmosphere to water bodies in Da Nang city and to examine measures reducing PAHs loading to water bodies.

## 2. Materials and Methods

Dry deposition, rain water, road runoff, combined sewer water (CSO) and treatment plant effluent were collected in Da Nang in Sep.~Oct.2018, 2019. Samples were absorbed on a solid phase cartridge and brought back to Japan. 16 PAHs were measured by GC-MS/MS. PAHs loadings on each pathway were estimated by integrating concentrations and water flow rates in Phu loc river basin (34.6 km<sup>2</sup>). Soil infiltration experiments were conducted to examine reduction ratio of PAHs.

## 3. Results and Discussion

**Figure 1** shows the annual  $\Sigma$  16PAHs load pathways in Phu Loc river basin. On sunny and rainy days, 18,865 g and 11,115 g dropped from the atmosphere to urban area. 27,295 g flowed from urban area to the river as road runoff. 5,934 g flowed from point source of households, industry and treatment plant to the river.

**Figure 2** shows the contribution ratio of PAHs loading to water bodies at each pathway. The largest contribution ratio for all PAHs was of road runoff (29~83%). Loading from non-point source was dominant. **Figure 3** shows the reduction ratio of PAHs loading to water bodies by soil infiltration treatment. When the treatment was applied to road runoff and CSO, reduction ratios of PAHs loading to water bodies were 59~86% for PAHs with 5 or more rings.

## 4. Conclusion

Main PAHs pathway in urban river basin in Da Nang was urban road runoff. Moreover, the soil infiltration treatment likely reduces PAHs loading to water bodies.

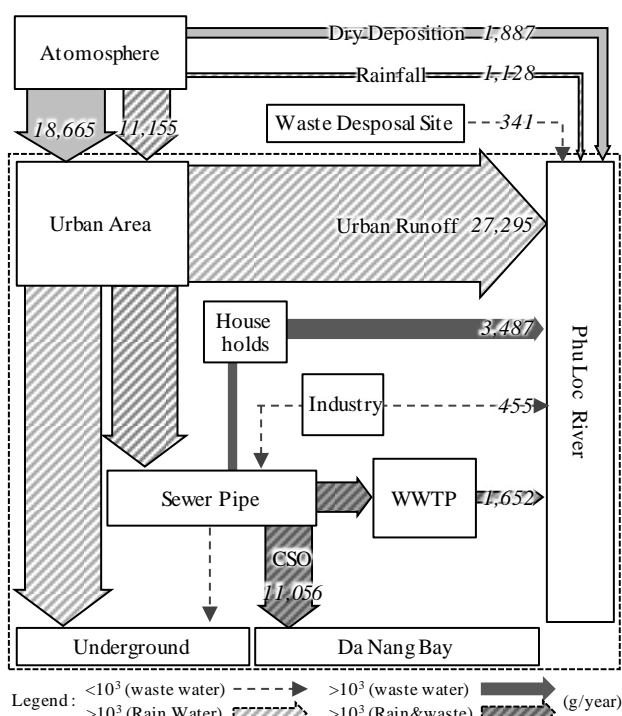


Fig.1 The annual  $\Sigma$ 16PAHs load pathways in Phu Loc River Basin

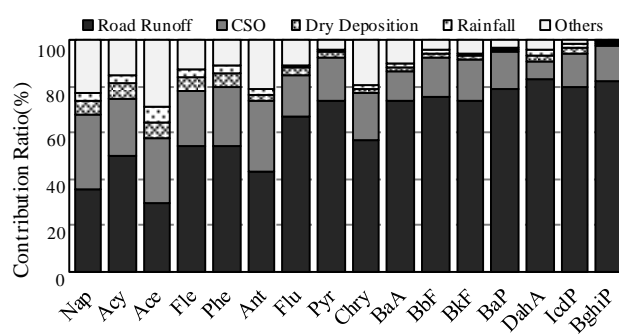


Fig.2 The Contribution ratio of each pathway to PAHs load to water area

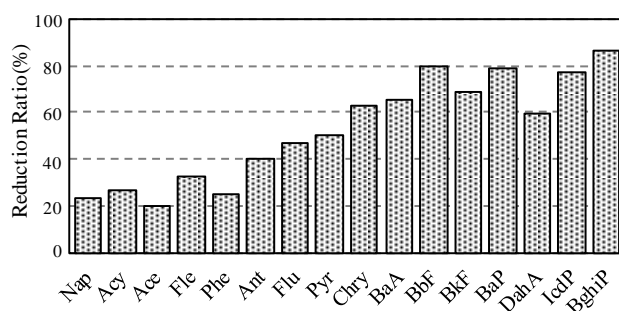


Fig.3 The reduction ratio of PAHs load to water bodies by soil infiltration treatment