

Hydrocarbon characterization and flow rates appraisal in a tropical estuary

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Particulate material from the main rivers of Rio de Janeiro Metropolitan Area (RJMA) were studied to determine the origin of polycyclic aromatic hydrocarbons (PAHs) and the input into Guanabara Bay. Sampling were performed monthly from September 2012 to August 2013, ensuring a robust characterization. The rivers were chosen as to represent the major runoff to the bay (Figure1) including significant drainage basins. Water flow rates obtained from Brazilian National Water Agency (ANA) were used to calculate the total hydrocarbon flow.

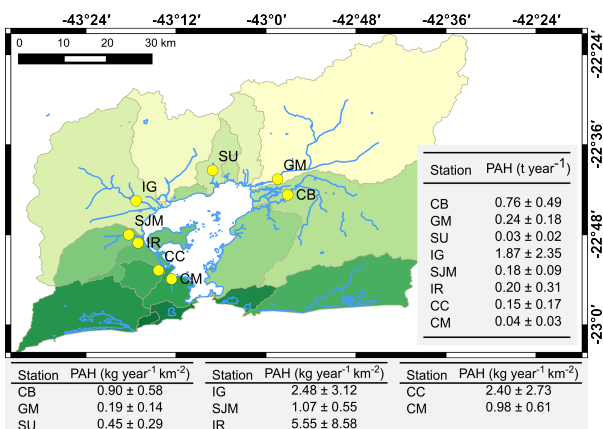


Figure 1: Station location and drainage basins in RJMA with each respective PAH input into Guanabara Bay.

Despite the highest total PAH contribution to the bay (t year⁻¹) derives from Iguaçú River (IG), the total hydrocarbon input normalized by the drainage basin area (kg year⁻¹ km⁻²) highlights Irajá as the most contaminated drainage basin. The hydrocarbon input by drainage basin area, instead of total input by rivers, stresses the impact of urban settlement on contamination. The industrial area (Northwest – Iguacú River) appears as the major PAH source in both evaluation procedures. Mass balance shows the examined rivers contribute with about 30% of the total PAH input to the bay's north area. The PAH export to the open coastal area accounts for about 1% of the total estimated inputs.