

## Evaluation of anthropogenic inputs of hydrocarbons in sediment cores from a tropical Brazilian estuarine system.

M.Sc. Thais R. Silva, M.Sc. Silvia R. P. Lopes, Ph.D. Baastian A. Knoppers, Dra. Débora A. Azevedo.

Universidade Federal do Rio de Janeiro, Instituto de Química

thaisrsilva@hotmail.com

Brasil, Rio de Janeiro

Copyright 2012, ALAGO.

This paper was selected for presentation by an ALAGO Technical Committee following review of information contained in an abstract submitted by the author(s).

### Introduction and Aim.

The Mundaú-Manguaba estuarine-lagoon system (MMELS) constitutes one of the most representative ecosystems of the state of Alagoas, NE Brazil. Approximately 30% of the lower surrounding drainage basin is covered by sugar cane and a total of 250,000 inhabitants contribute untreated effluent to the system. Given the relevance of MMELS for the region, it is important to evaluate the role that sugar cane agricultural practices and industry has played on the degradation of the ecosystem over the years, and the facilities and expansion of urban areas and industrial segments. This study aims to provide the temporal trends and sources of aliphatic and polycyclic aromatic hydrocarbons over the past few decades, as well as to evaluate anthropogenic inputs from this region.

### Materials and Method.

Short sediment cores from MMELS were collected in 2007 at five sites: Manguaba Lagoon (C03 and C09), Mundaú Lagoon (C06 and C07) and Mundaú River (C08). About 4 g of each dry sediment was extracted with the ASE DIONEX 100 system. The extracts were concentrated and fractionated using an activated silica gel column. The analyses were carried out using GC-FID and GC/C/IRMS for n-alkanes and GC/MS for PAHs and biomarkers.

### Results.

The total aliphatic hydrocarbon (TAH) concentrations ranged from 27.8-139.5  $\mu\text{g g}^{-1}$ . Only core C07 presented values above 100  $\mu\text{g g}^{-1}$ , being considered contaminated by aliphatic hydrocarbon. The presence of the unresolved

complex mixture (UCM), hopanes and steranes indicated petrogenic contribution. The characteristics of n-alkanes based on the terrigenous/aquatic ratio (TAR), carbon preference index (CPI) and average chain lengths (ACL) showed that the terrigenous input predominated. The

16PAH concentrations ranged from 29.2 to 222.7  $\text{ng g}^{-1}$ . The PAH isomeric ratios reflected a pattern of mainly pyrogenic input. The  $\delta^{13}\text{C}$  values of individual n-alkanes (C16-C33) varied between -22.6‰ and -34.2‰, suggesting a dominance of  $^{12}\text{C}$ -enriched n-alkanes that originated from C3 plants and lacustrine algae.

### Conclusions.

The data reflect the changing through time, how anthropogenic inputs have influenced the organic contents of this system. All sediment samples are contaminated by PAHs and petroleum hydrocarbons, with some considered polluted, but the pollution has been diluted by natural inputs.