

## Isotopic, elemental and molecular composition of Lago Coari, AM, Brazil

<sup>a</sup>Cunha T S, <sup>b</sup>Simões E V, <sup>c</sup>Landau L, <sup>d</sup>Bernardes M C

Lake Coari was studied through geochemical parameters to understand its hydrochemical function and assess possible environmental impacts arising from the hydrocarbon exploration activities at Petroleum Province of Urucu and from the Solimoes River Oil Terminal (TSOL). Likewise, this work includes an assessment of the possible impacts from Coari City and its anthropogenic activities pushed by exponential population growth during last 2 decades. To achieve this task it was characterized the composition of organic matter (C/N ratio, sterols, lignin, and n-alkanes molecular contents) in surface sediments and in short cores at the inlet and inside the lake. This approach intends to understand the spatial and seasonal distribution of organic matter from natural and anthropogenic sources. Higher C and N values and C/N ratio close to 8 were found within the lake, suggesting a predominance of autochthonous organic matter. Higher lignin content was found toward the lake inlet. Despite the lower levels of organic matter, refractory lignin predominance was related to vascular plants input by the Solimões River. The sediment profiles showed larger fluctuations in sediment composition at the inlet of the lake and greater stability within the lake. However, there have been two events of increased (at 6

and 20cm P4-inlet; 4 and 18cm P10-center) related to vascular plants material input during intense rainfalls. This could also be related to increased soil erosion from exposed areas due to land cover changes. Another event characterized by a sterol concentration peak (10cm P10-center) suggested a period of prolonged drought whereas a lower water volume intensified the primary production biomass. The results of aliphatic hydrocarbons (n-alkanes) were considered typical of uncontaminated sediment samples with a predominance of n-alkanes C29 and C31, typical of vascular plants. The mean carbon preference index (CPI) of 2.21 and the mean ratio of terrigenous to aquatic n-alkanes (TAR) of 41.7 confirmed this source. The absence of unresolved complex mixture and the even predominance of odd chaining pairs of n-alkanes compounds confirm the absence of petrogenic contamination. The organic compounds distribution suggested a natural sources predominance switching between allochthonous (soils with vascular plant debris) and autochthonous producers (phytoplankton). Even with the increase of Coari City and Petroleum neighbor activities the possible impacts measured by those organic compounds were not yet detected in these analyzed sediments.

<sup>a</sup> Instituto de Engenharia Nuclear (IEN), Laboratório de Impactos Ambientais (LIMA), Ilha do Fundão, Rio de Janeiro, RJ, CEP:21941-972 (tcunharj@gmail.com)

<sup>b</sup> Instituto Federal de Ciência e Tecnologia do Rio Grande do Sul (IFRS), Campus Feliz, RS, Brasil, CEP:95770-000

<sup>c</sup> Universidade Federal do Rio de Janeiro, Programa de Engenharia Civil (UFRJ-PEC-COPPE), Ilha do Fundão, Rio de Janeiro, RJ, Brasil, CEP:24941-909

<sup>d</sup> Universidade Federal Fluminense, Departamento de Geoquímica, Instituto de Química 5 andar, Campus Valonguinho, Niterói, RJ, Brasil, CEP:24020-141