Evolution of *n*-Alkanes in PM samples collected in São Paulo, Brazil (2000-2010)

P.C. Vasconcellos[1], Sofia Caumo[1] and J.B. De Andrade[2]

[1]Departmento de Química, Universidade de São Paulo, 05509-000, Brazil
[2]Departmento de Química Geral e Inorgânica, Universidade Federal da Bahia, Salvador, 40170-290, Brazil
Keywords: organic aerosols, n-alkanes in the atmosphere, biomass burning emissions, vehicular emissions
Presenting author email: perola@iq.usp.br

N-alkanes determination is interesting to study the origin and fate of atmospheric aerosols (Alves, 2008). They are ubiquitous in urban, continental or marine samples. They can be derived from both biogenic and anthropogenic sources which can be differentiated based on their *n*-alkanes distribution. Their relatively low reactivity and volatility make them interesting tracers of both atmospheric transport and particle origin.

Samples were collected for over ten years (from 2000 to 2010). All measurements were done in the campus of the University of São Paulo (SPA) using high-volume sampler (PM_{10}) and in 2000, total suspended particles (TSP). Samples collected during winter time (2000, 2002, 2003 2008, 2010) were collected in intensive campaigns (n=10-15 samples, in each campaign). Two extensive sampling (all over the year) were done collecting 26 samples (2001-2002) and 33 samples (2003-2004), those collected every 15 days. In the total, over 150 samples were analyzed.
Winter samples (Figure 1) were collected aiming to study the period with strong events of air pollution. Total *n*-alkanes concentrations presented variations ranging from 32 ng m^{-3} (PM_{10}, 2003) to 103 ng m^{-3} (TSP, 2002).

Colder and drier months (June to September) favored the pollutants accumulation. Besides, biomass burning plumes are often observed arriving of the vicinities from May to November to this site.

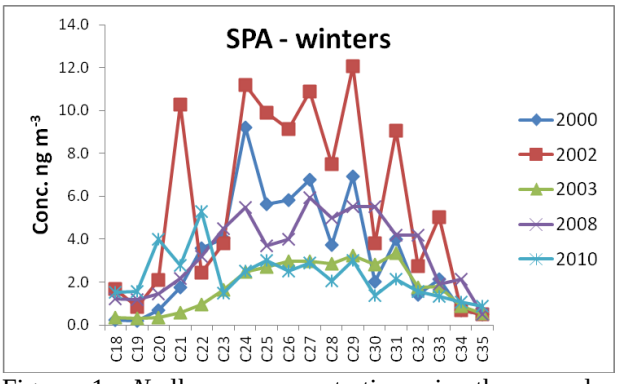

Figure 1. *N*-alkanes concentrations in the samples collected in the wintertime.

The relative contribution of biogenic emissions is assessed by wax normal alkanes index (Figure 2). In the average, considering all samples, the anthropogenic sources (biomass burning) were responsible for over 80% of these *n*-alkanes (higher than C_{25}) emissions.
The carbon preference index (CPI), a diagnostic parameter close to 1 indicated also the strong contribution of anthropogenic contaminants in PM coming from vehicular emissions (Vasconcellos *et al*, 2011).

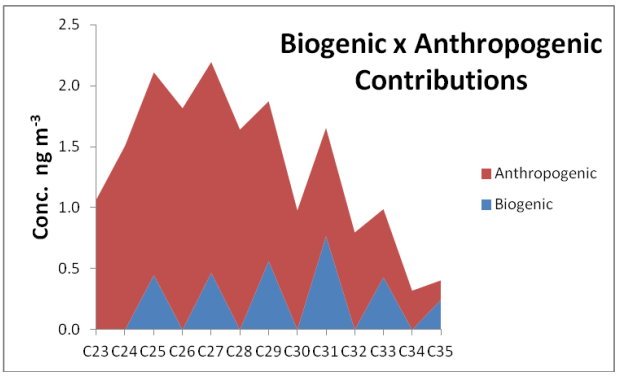

Figure 2. Relative contributions of the sources of *n*-alkanes.

In the extensive campaign (2003, Figure 3) where samples were collected all over the year, samples collected during the summer and fall campaigns presented the highest concentrations, differently of particulate matter concnetrations (higher in the wintertime).

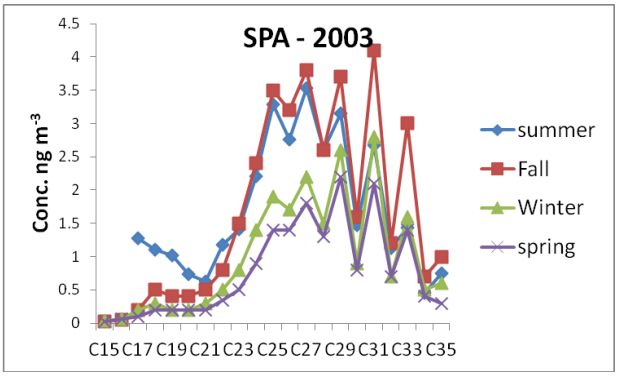

Figure 3. *N*-alkanes concentrations of the samples collected in the extensive campaign (2003).

In general *n*-alkanes lower than C_{25} (anthropogenic emission) were less abundant than those higher, emitted by biogenic (tropical vegetation) and by anthropogenic sources (sugarcane burning).

This work was supported by INCT – Energia e Ambiente and by NUANCE project (FAPESP).

Alves, C. (2008) *Ann. Bras.Acad. Sci.*80, 21-82.
Vasconcellos, P.C. et al. (2011) *Atmos. Environ.* 45, 5770-5777.