

# Atmospheric cations particulate phase: a comparison study using two sampling system in São José dos Campos and Cachoeira Paulista (SP).

**Caroline K. Ostermann (IC); Noéli L. Garcia (PG); Welison M. Guimarães (IC); Mariana A. Souza (PG); Stéphanie P. Crispim (TM); Carlos D. Meneghetti (TM); Maria C. Forti (PQ)\*. Instituto Nacional de Pesquisas Espaciais. INPE (CCST)–Centro de Ciências Terrestres. Av. dos Astronautas,1758. São José dos Campos/SP**

[caroline.ostermann@gmail.com](mailto:caroline.ostermann@gmail.com);  
[mariana.asouza@yahoo.com.br](mailto:mariana.asouza@yahoo.com.br);  
[cristina.forti@inpe.br](mailto:cristina.forti@inpe.br);

[noelli\\_14@hotmail.com](mailto:noelli_14@hotmail.com);  
[stephane.crispim@gmail.com](mailto:stephane.crispim@gmail.com);

[welison\\_nga@yahoo.com.br](mailto:welison_nga@yahoo.com.br);  
[daniel.meneghetti@inpe.br](mailto:daniel.meneghetti@inpe.br);

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## Introduction

The objective of this study is to compare the cationic species Na<sup>+</sup>, K<sup>+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup> in the aqueous extract of particulate matter (PM) using two sample systems (AMDic<sup>1</sup> and DELTA<sup>2</sup>) at two different sites São Jose dos Campos (SJC) and Cachoeira Paulista (CP) during the period from 08/2013 to 10/2014 totalizing 24 samples for each sampler and each site.

## Results and Discussion

In tables 1 and 2 it is presented the statistics for the chemicals, for the two sites, CP and SJC respectively, and the two sampler. Values with same letter for the same species indicates statistically significant difference between samplers for same site and with same symbol for the same species indicates statistically difference between sites.

The comparison between samplers at CP indicates a difference between Ca<sup>2+</sup> for the fine fraction and K<sup>+</sup> for the coarse ones however for the other species the concentration are equivalent between both samplers for both modes. For SJC it is observed a difference for K<sup>+</sup> in the coarse fraction and Na<sup>+</sup> for the fine ones while for the other no difference was observed. Roughly, it is possible to consider that both samplers are complimentary for the major cations: they are useful and of easy handling for concentrations measurement.

**Table 1.** Statistics for cations concentrations for the DELTA and AMDic (Fine and Coarse modes) samplers for CP site (AVG: arithmetic mean values; STD: standard variation).

nmol.m <sup>-3</sup>	Na <sup>+</sup>	K <sup>+</sup>	Mg <sup>2+</sup>	Ca <sup>2+</sup>
DELTA				
AVG	*3,57	b0,956	*0,897	*ab1,66
STD	4,62	1,07	1,04	1,95
AMDic-Fine				
AVG	#2,94	2,27	#0,714	a#4,39
STD	2,02	1,76	0,291	2,78
AMDic-Coarse				
AVG	\$4,99	\$b31,5	\$1,45	b\$6,12
STD	7,21	84,9	1,13	3,92

The comparison between both sites indicates (figures with symbols) significant differences for all

studied species being SJC atmospheric concentration larger than the ones found in CP, which was expected. K concentrations obtained with AMDic present no difference that can be attributed to the low values that are near the detection limit of the method.

**Table2** - Statistics for cations concentrations for the DELTA and AMDic (Fine and Coarse modes) samplers (AVG: arithmetic mean values; STD: standard variation) for SJC site.

nmol.m <sup>-3</sup>	Na <sup>+</sup>	K <sup>+</sup>	Mg <sup>2+</sup>	Ca <sup>2+</sup>
DELTA				
AVG	a*13,5	b2,70	*2,99	*7.04
STD	14,8	1,98	2,77	6.75
AMDic-Fine				
AVG	a#5,16	1,86	#1,67	#8,25
STD	2,95	1,35	2,52	6,45
AMDic-Coarse				
AVG	\$8,45	\$b13,7	\$2,72	\$10,8
STD	8,75	18,9	3,92	6,28

The values with symbols for the same species and different site are statistically significant different indicating that this contribution comes from the local sources characteristics that is observed for Ca<sup>2+</sup> for the DELTA and fine and coarse mode of AMDic.

## Conclusions

Both sampling systems are valid and they are complimentary as the samples obtained represents diverse fractions of the particulate matter. However if a proper cyclone is adapted in to the air intake it is expected a full equivalence between both. As expected SJC atmospheric concentrations are larger than the ones in CP.

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