International Conference on Environmental Epidemiology & Exposure

Conférence internationale d'épidémiologie et d'exposition environnementales

ISEE / ISEA

Science, Population Diversity, Caution and Precaution

SEPTEMBER 2-6, 2006

Cité des Sciences et de l'Industrie

PARIS

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Abstract Book

stress. This phenomenon has been reported following
probably a result of the precautionary measures taken during the emergency period. When planning public
communication.

MM4-PD-09 CONCENTRATIONS AND MASS DISTRIBUTION OF ATMOSPHERIC PARTICLES : INFLUENCE OF FOREST FIRES

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Forest fires are an old phenomenon in Portuguese forests. The fire episodes during 2005 were one of the worst in Portuguese history being associated with 16 deaths. As the extent of fires is increasing nowadays, concentrations of some air pollutants, especially of particulate matter (PM), are higher, leading to higher risk to human health. Thus, to evaluate the potential risk to public health, the work here reported studied PM related to fires during May to September 2004 and 2005 with the following objectives: (i) to evaluate the increase of PM_{10} concentrations; (ii) to evaluate the increase of exceedances of PM_{10} daily limits; and (iii) to evaluate the influence on particle mass distribution.
The sites selected were: (i) TR_1 and TR_2 both influenced mainly by traffic and located in Oporto Metropolitan Area; (ii) BG_1 and BG_2 considered as background ones with rural localization. PM_{10} concentrations were obtained through beta radiation attenuation method. Gravimetric mass distribution was obtained at site BG_2 using constant flow samplers combined with PM_{10} and $PM_{2.5}$ EN LVS sampling heads.
As extent of fires was generally higher in 2005, at both sites TR_1 and TR_2 average PM_{10} concentrations were higher for all months of the analysed period. Nevertheless, fires in August 2005 were much bigger than during other months, therefore only PM_{10} monthly averages of August 2005 and 2004 were significantly different. At site BG_1 average PM_{10} concentrations were also higher, however as located in mountainous area with forests where the influence of forest fires emissions was stronger, significant differences were also observed comparing May and June.
In August 2005 the days exceeding PM_{10} daily limit increased 38% and 49% due to the highest extend of fires for TR_1 and TR_2, respectively, nevertheless those exceedances were not significantly different comparing the other months. At site BG_1 the days exceeding the PM_{10} daily limits were 6 and 16 in 2004 and 2005, respectively; still the highest increase (from 0 to 11) was observed for August, showing the strong impact of fires emissions and confirming previous results of monthly averages comparison.
Evaluating the mass distribution during August 2005 at site BG_2 the average $PM_{2.5}/PM_{10}$ ratio was 0.67 (days without fires) and 0.87 (days with fires). This increase was probably caused by higher $PM_{2.5}$ concentrations generated by fires. Considering the health effects of smaller PM fractions it may be concluded that fires strongly increase the potential risks for public health.

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FUNDAÇÃO CALOUSTE GULBENKIAN

LEPAE Laboratório de Engenharia de Processos, Ambiente e Energia

Concentrations and Mass Distribution of Atmospheric Particles: Influence of Forest Fires

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Objectives

To evaluate the potential risk to public health related with forest fires during May to September 2004 and 2005 with the following objectives:

- to evaluate the increase of PM_{10} concentrations
- to evaluate the increase of exceedances of EU 24-h PM_{10} limits
- to evaluate the influence on particle mass distribution

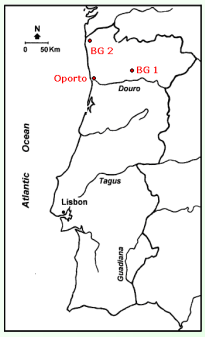
Experimental

Site TR_1 ⇄ **Site TR_2**

influenced by traffic emissions
located in **Oporto** Metropolitan Area, Portugal

without anthropogenic emissions
located in rural mountainous area

Site BG_1 ⇄ **Site BG_2**



METHODOLOGY

PM_{10} beta radiation attenuation method:

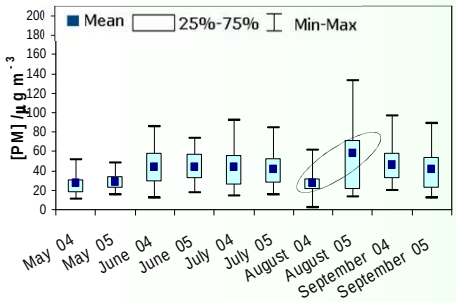
- MSI 100 I et E (Environment S.A.)

PM_{10}, $PM_{2.5}$ gravimetric mass determination:

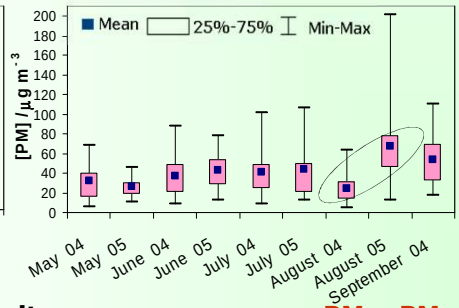
- Bravo H2 (TCR TECORA) constant flow samplers combined with PM_{10}, $PM_{2.5}$ sampling heads in accordance with norm EN12341
- Polytetrafluoroethylene (PTFE) membrane filters (2 μm porosity)

Results

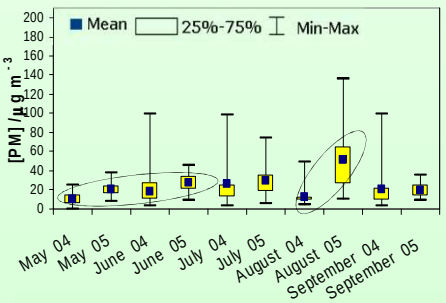
PM_{10} at TR_1



PM_{10} at TR_2



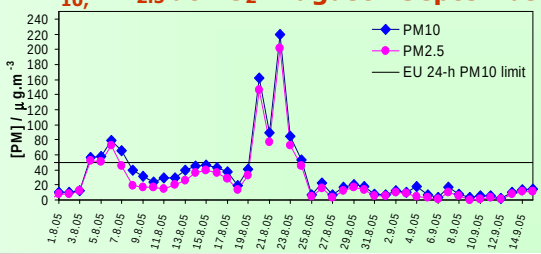
PM_{10} at BG_1



Exceedances of EU 24-h PM_{10} limits

Site	Number of days exceeding EU 24-h PM_{10} limit from May to September		Number of days exceeding EU 24-h PM_{10} limit during August		Increase of exceedances of EU 24-h PM_{10} limits comparing August 2004 and 2005 [%]
	2004	2005	2004	2005	
TR_1	36	43	2	13	38
TR_2	21	35	2	18	49
BG_1	6	16	0	11	35

PM_{10}, $PM_{2.5}$ at BG_2: August - September 05



Conclusions

At sites TR_1 and TR_2 significant differences of PM_{10} concentrations were observed in August 2005, when forest fires were much bigger than in other months.

As site BG_1 is situated in a mountainous area, where the influence of forest fires is stronger, significant differences of PM_{10} were observed also in May and June 2005.

For all the sites, the highest increase of days exceeding 24-h PM_{10} limit was observed in August 2005.

Evaluating particle mass distribution at BG_2, the average $PM_{2.5}/PM_{10}$ ratio was 0.67 for days without fires and 0.87 for days with fires. This increase was probably caused by higher $PM_{2.5}$ concentrations generated by fires. Considering the health effects of smaller PM fraction, it may be concluded that fires strongly increase the potential risk for public health.

Acknowledgments: Authors are grateful to Fundação Calouste Gulbenkian and to Fundação para Ciência e Tecnologia (SFRH/BD/24228/2005) for the financial support of this work.