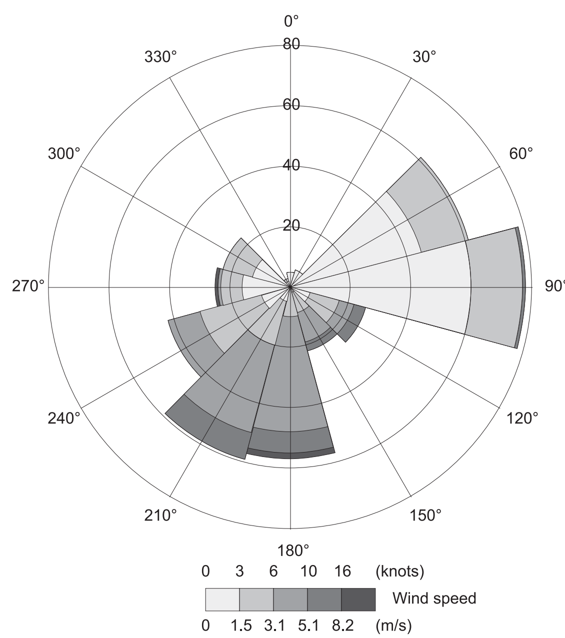
Quim. Nova, Vol. 30, No. 7, S1-S3, 2007

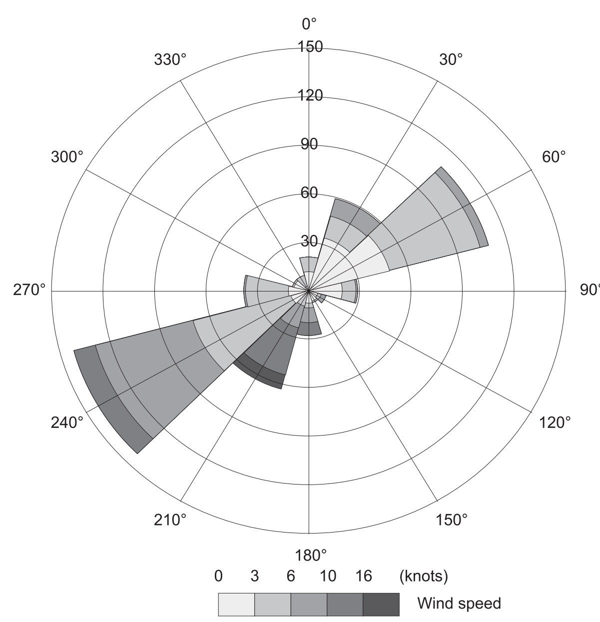
Material Suplementar

ASSESSMENT OF AIR QUALITY IN VIANA DO CASTELO, PORTUGAL, IN THE SCOPE OF THE POLIS PROGRAMME

Célia Alves*
Centro de Estudos do Ambiente e do Mar, Departamento de Ambiente e Ordenamento, Universidade de Aveiro, Campus de Santiago, 3810-193 Aveiro, Portugal
Mário Tomé
Escola Superior de Tecnologia e Gestão, Instituto Politécnico de Viana do Castelo, Av. do Atlântico, 4900-348 Viana do Castelo, Portugal



Campo da Agonia



Lg. João Tomás Costa

Figure 1S. *The wind rose plots for the two monitoring sites*

*e-mail: celia.alves@ua.pt

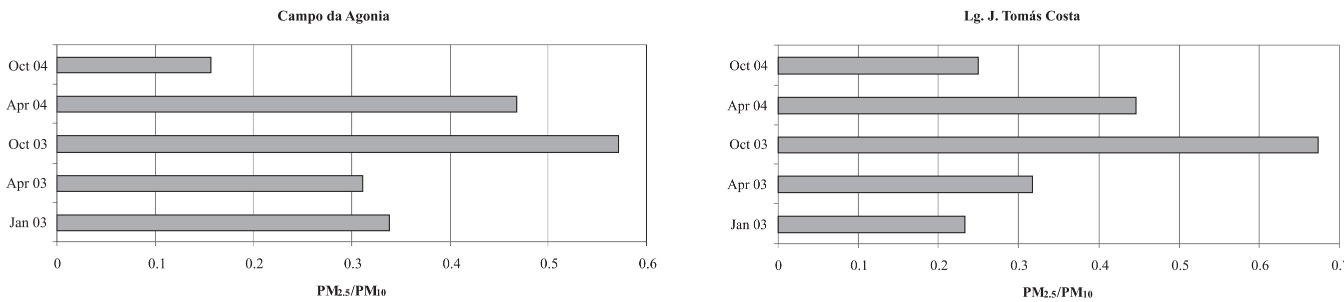


Figure 2S. *$PM_{2.5}$/PM_{10} ratio for Viana do Castelo obtained during the five campaigns at the two monitoring sites*

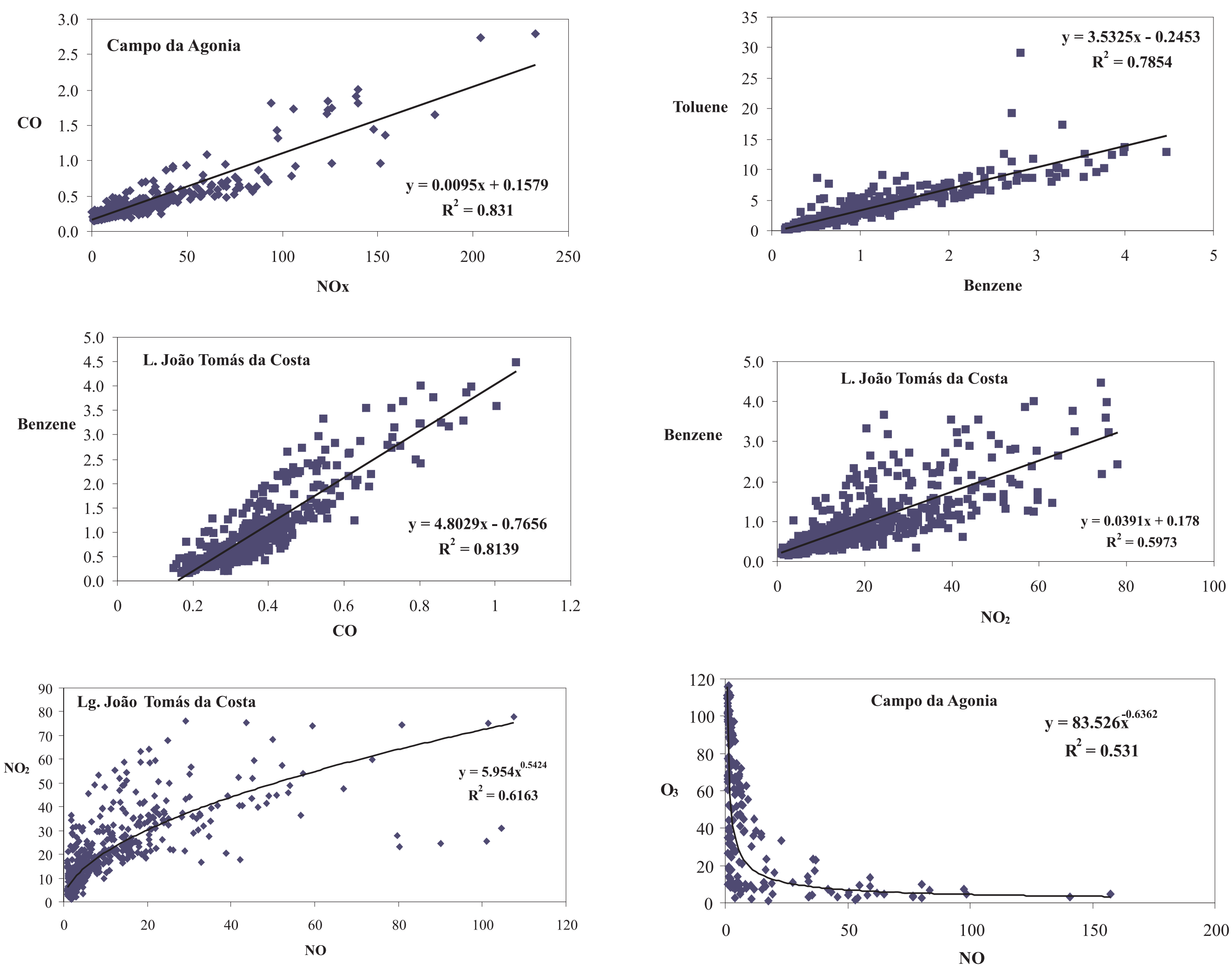


Figure 3S. *Some relationships between air pollutants*

Multiple regression analysis was applied to the gaseous and particulate atmospheric compounds to verify the relationships between the monitored levels and meteorological factors. Some of the regression equations that were obtained, as well the respective statistic parameters, are given in Table 1S. If the *t* values associated with each one of the variables and the *F* observed value are higher (absolute value) than the critical values for the respective degrees of freedom (d_f), then the calculated coefficients have statistical predictive significance. As seen from the equations, only 19 to 43% of atmospheric pollutants depend on meteorological variables.

Table 1S. Multiple regression analysis (least square method), $y = a_1 x_1 + a_2 x_2 + b$, where y is the dependent variable (air pollutants), x_1 and x_2 are the independent variables (meteorological parameters), a_1 and a_2 are the coefficients of regression and b is the constant of regression (significance level = 5%)

Equation	r^2	t_1	t_2	d_f	t_{crit}	F_{obs}	F_{crit}	Site
NO_2 = -0.2154 (T) + 0.5228 (RH) – 4.5916	0.3361	-3.22	0.45	403	1.65	50.99	3.04	Campo da Agonia
O_3 = 10.2260 (T) + 3.87701 (WS) – 18.3208	0.4259	12.22	8.68	405		150.21		
NO_2 = -4.2800 (T) – 1.1260 (WS) + 42.7200	0.3187	-10.85	-5.35	405		94.74		
O_3 = 4.7014 (T) + 0.0337 (Radiation) – 4.2279	0.2646	7.70	3.28	333		59.92		
Toluene = 0.0552 (T) - 0.1503 (RH) – 0.5412	0.2248	3.68	-0.70	331		23.99		
Benzene = 0.0207 (T) - 0.0531 (RH) – 0.1755	0.2860	4.43	0.80	333		33.14		
Toluene = -9.57×10^{13} (RH) + 0.0541 (WS) – 0.1520	0.2250	0.27	3.52	330		19.16		
Benzene = -4.47×10^{13} (RH) + 0.0202 (WS) – 0.0539	0.2864	-0.41	4.42	330		26.48		
Toluene = 0.0552 (T) - 0.15031 (HR) – 0.5400	0.2248	3.67	-0.70	331		23.99		
Benzene = 0.0580 (WS) – 0.2345 (Rain) + 1.4932	0.2261	0.89	-9.69	333		59.64		
Toluene = 0.0469 (WS) – 0.2345 (Rain) + 1.4930	0.2260	0.88	-9.69	333		59.64		
PM_{10} = -5.6979 (T) + 2.7000 (WS) + 8.8840	0.1904	-8.18	7.27	405		42.63		
NO_2 = -3.1321 (T) + 0.9165 (WS) + 14.0801	0.2103	-11.13	5.07	549	1.65	73.10	3.03	Lg. João Tomás Costa
NO_2 = -3.4004 (RH) + 0.2072 (WS) + 1.5940	0.2513	-12.21	5.48	548		61.30		
O_3 = 7.1557 (T) + 2.2441 (WS) + 14.5461	0.3303	14.60	7.12	549		135.37		
CO = -0.0333 (RH) + 0.0023 (WS) + 0.0126	0.2452	-12.38	6.35	548		59.33		
CO = -0.0303 (T) + 0.0050(WS) + 0.3598	0.1897	-11.05	-2.85	549		64.25		
SO_2 = -0.5464 (T) + 0.6343 (WS) – 4.1255	0.2767	-7.11	12.84	549		104.99		
SO_2 = -0.4889 (RH) - 0.0444 (WS) + 0.4892	0.2997	-6.36	-4.25	548		78.19		
SO_2 = 0.8728 (Radiation) - 0.0044 (T) – 8.1795	0.2400	11.07	-4.27	477		76.27		
Benzene = -0.1884 (RH) – 0.0215 (WS) + 0.0942	0.3139	-10.36	11.50	476		72.58		
Toluene = -0.7219 (RH) + 0.0849 (WS) + 0.3694	0.2996	-9.85	11.26	476		67.87		
Xylenes = -0.5162 (RH) + 0.0616 (WS) + 0.3571	0.2173	-7.52	8.73	476		44.06		
PM_{10} = -0.0536 (RH) + 0.4298 (WS) + 3.6146	0.2086	-0.14	8.00	548		48.16		
$PM_{2.5}$ = -1.2311 (RH) + 0.2607 (WS) + 2.2407	0.2047	-4.82	7.52	548		47.00		