REPORT

Air pollution levels in Estonia

Mapping campaigns during 2005 - 2006

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Summary

As part of the EU Commission Phare Programme, Project No. 2002/000-579.07.01 – Development of Estoninan Air Quality Management System, measurements of air pollution levels in Estonia have been carried out as four mapping campaigns during 2005-2006.

The measurements have been performed by the Swedish Environmental Research Institute (IVL) in co-operation with the Environment Department, Tallinn City Government, Conexor Sensus AB and the Swedish Meteorological and Hydrological Institute (SMHI).

Air pollution concentrations of nitrogen dioxide (NO_2), sulphur dioxide (SO_2), volatile organic compounds (VOCs) and ozone (O_3) were measured using the IVL Diffusive Samplers. Measurements were carried out in very busy urban street environments as well as in remote background areas in the countryside during four monthly campaigns.

Although the duration of measurements in each campaign in Estonia was one month or less, the calculated average values from all campaigns have been used as an indication of longtime average levels.

In comparison to EU annual limit values for SO_2 and benzene the measured levels in Estonia appear to be well below these levels. For NO_2 the measured average concentrations at the most exposed site were approximately 20% below the EU annual limit value (40 $\mu g/m^3$) for protection of health.

For ozone there is no limit values. Instead e.g. target values and information thresholds have been defined. Most of the sites showed average O_3 levels around 40 $\mu g/m^3$, a yearly average concentration level (40 $\mu g/m^3$) defined as an information level for protection of materials. However, it is difficult to draw to far reaching conclusions from this since monitoring of O_3 was performed mainly during July/August and December 2005, while the concentrations were twice as high in April 2006.

Contents

1 Introduction

As part of the EU Commission Phare Programme, Project No. 2002/000-579.07.01 – Development of Estoninan Air Quality Management System, measurements of air pollution levels in Estonia have been carried out as four mapping campaigns during 2005-2006.

The measurements have been performed by the Swedish Environmental Research Institute (IVL) in co-operation with the Environment Department, Tallinn City Government, Conexor Sensus AB and the Swedish Meteorological and Hydrological Institute (SMHI).

Air pollution concentrations of nitrogen dioxide (NO_2), sulphur dioxide (SO_2), volatile organic compounds (VOCs) and ozone (O_3) were measured using the IVL Diffusive Samplers. The mapping campaigns were carried out in April, July-August and December 2005 and April-May 2006. NO_2, SO_2 and O_3 were sampled as monthly means, whilst VOCs were sampled during one week of each campaign.

The monitoring sites were classified into four types according to the surroundings, the degree of exposure to road vehicle emissions and street ventilation conditions. Measurements were carried out in very busy urban street environments as well as in remote background areas in the countryside.

All practical matters related to the sampling have been undertaken by the Environment Department, Tallinn City Government. Sampling preparation, chemical analyses and reporting have been made by IVL.

In March 2005 IVL visited Tallinn for discussions about siting and practical arrangements concerning the campaigns. During a study visit in Stockholm, arranged for a delegation from Estonia, IVL also gave presentations on emission inventory and air quality monitoring strategies in Sweden as well as on EU directives and the diffusive sampling technique.

2 Background

2.1 EU limit values for air pollutants

The EU directive 96/62/EG (1996) includes the basic principles for an EU strategy on air quality. In the directive it is stated that measurements have to be made in urban areas of more than 250 000 inhabitants, in zones where the limit values are exceeded and in zones where concentration levels are lower than the limit but exceed a certain upper assessment threshold, given as a percentage of the respective limit values for the pollutants.

In order to achieve as good knowledge as possible of the air quality in different parts of the respective countries, measurements and modelling should be combined. After a first assessment has been completed, a combination of models and measurements can be used in areas where concentration levels are lower than the upper assessment threshold. If concentration levels are higher, measurements are required. If the levels are considerably lower, that is below the lower assessment threshold, modelling is enough to determine the air quality. For the specific pollutants,

daughter directives have been worked out. In Appendix 1 the EU limit values for SO_2, NO_2, O_3 and benzene are presented.

In September 2005 the EU Commission also presented a proposal for a Thematic Strategy on Air Pollution (COM(2005) 446) and a Directive on Ambient Air Quality and Cleaner Air for Europe (the "CAFE" Directive) (COM(2005) 447).

2.2 Monitoring technique

The diffusive sampling technique (see Figure 1) is a useful tool for determination of e.g. temporal and geographical distributions of air pollutants. The use of diffusive samplers, in combination with a careful selection of measurement sites, can generate a rapid and cost-effective support to air quality management.

The technique is based on the concept of molecular diffusion, where the gas molecules diffuse into a sampler where they are quantitatively collected. The samplers are easy to handle; small, light, soundless, and do not require electricity or calibration in the field. Each sampler gives average air concentration with continuous time coverage up to a month.

The diffusive sampler can be used for measurements of a variety of air pollutants. Here, samplers for SO_2, NO_2, O_3, and VOC (benzene, toluene, o-xylene, m-p-xylene, octane, butylacetate, ethylbenzene and nonane) have been used. For air quality mapping passive samplers are placed at 50- 500 locations depending on the size and heterogenity of the inventory area. The sampling period is normally 1-4 weeks. A technical description of the IVL Diffusive Samplers is found in Appendix 2.

Figure 1 IVL Diffusive Samplers

2.3 Classification of sites for mapping

Mapping was performed in 5 urban areas in Estonia; the cities of Kohtla-Järve, Jõhvi, Narva, Tartu and Pärnu, see Figure 2. In addition, a number of sites were distributed also in remote areas all over the country. The location of sites were divided into four categories as presented in Table 1. In the table the approximate area representativity (resolution) of the different site categories is also indicated.

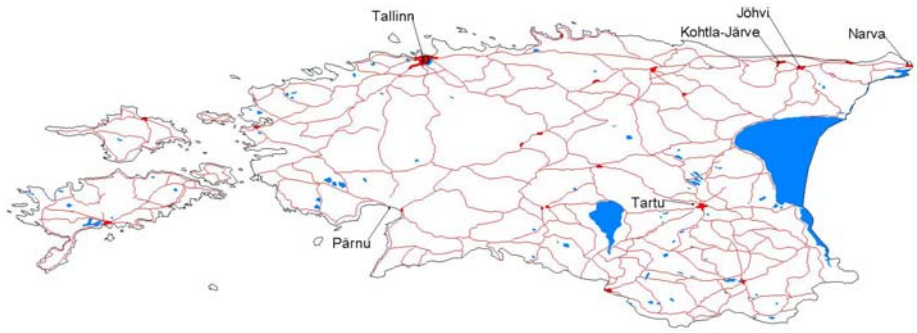


Figure 2 Location of cities where mapping campaigns were performed (except Tallinn).

Table 1 Site classification

Site category	Site description	Area of representativity
B	busy street environment, good ventilation	1.5 * 1.5 km
C	residential area	1.5 * 1.5 km
D	general urban air pollution level, local background/roof top	4 sites in each city
E	remote background (countryside)	50 * 50 km

2.4 Measurement programme

2.4.1 Mapping campaigns

Monitoring was performed during 4 campaign periods; April, July/August and December 2005 and April/May 2006. The sampling period for SO_2, NO_2 and O_3 was about 1 month. The VOC samplers were exposed for one week during each of the campaigns. During the last period VOC was sampled 2 single weeks at a few sites.

The combination of parameters varied between the different campaigns. The measurement programme is shown in Appendix 3, where the number of sites in the different areas and categories are summarized.

2.4.2 Special campaigns

In addition to the mapping campaigns a number of special campaigns were run in parallell, mainly using the same sampling periods. In Appendix 3 a summary table of these measurements is found.

3 Results

All results, both from the mapping campaigns and the special campigns, are presented in Appendix 4.

3.1 Sulphur dioxide, SO_2

3.1.1 Background sites

The concentration of SO_2 in background air during the first campaign (April 2005) is shown in Figure 3. The monthly mean concentration levels were between 0,5 – 1,5 µg/m³ except in the northeastern part where two sites showed values between 3,0 – 3,5 µg/m³.

During the other monthly campaigns the number of background sites for SO_2 were very few. Results from 3 sites indicate slightly higher mean values during April 2006 than the year before. However, the concentration levels were less than 2 µg/m³.

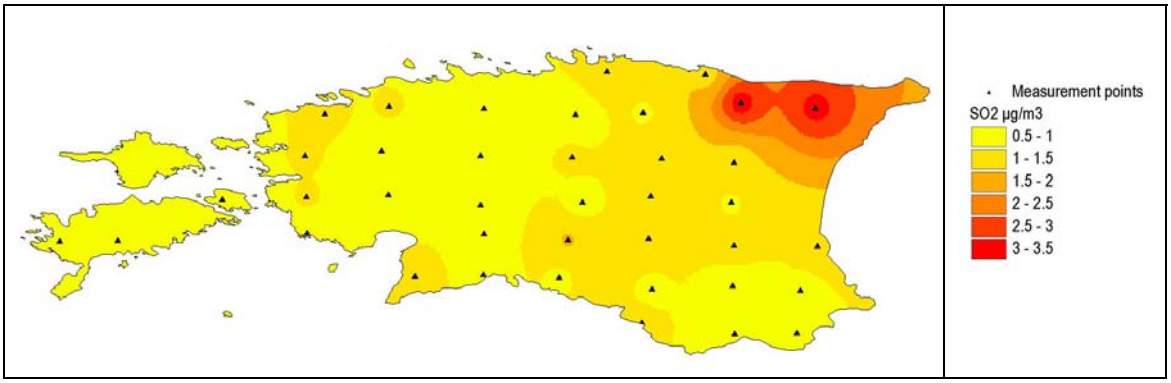


Figure 3 SO_2 (µg/m³) at background sites, April 2005.

3.1.2 Urban sites

In urban areas the SO_2 concentrations were somewhat higher than in the countryside. Figure 4 illustrates the mean values for the different site categories and campaign periods in each of the five cities. However, except for period 1 (April 2005) monitoring was, in most cases, only performed at 1-3 of the sites.

In Kothla-Järve the SO_2 levels observed were more than twice as high as in the other cities. The differences between the different site categories were in general quite small.

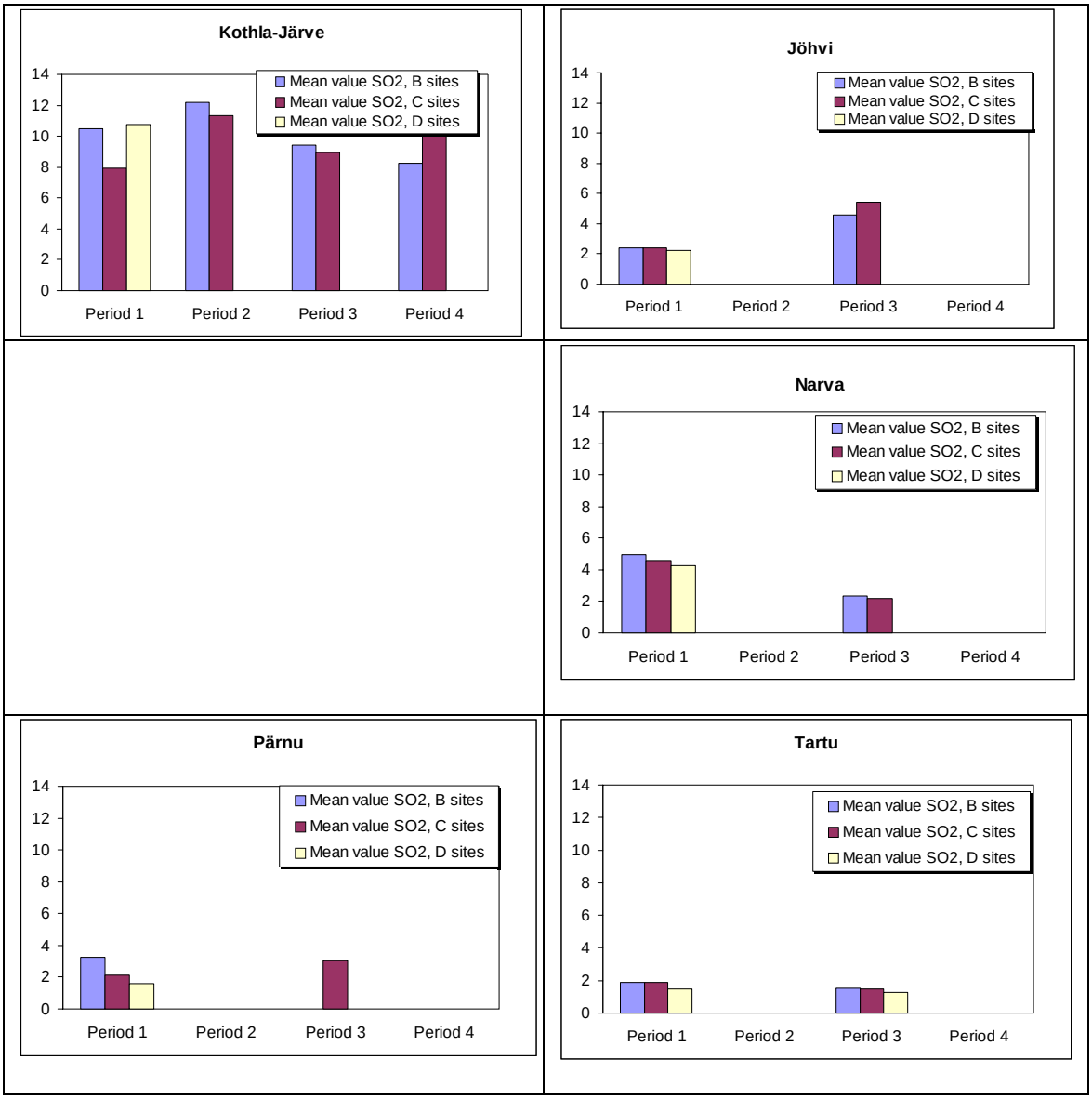


Figure 4 Mean values of SO_2 (μg/m³) for the different site categories and campaign periods in each of the five cities.

In Figure 5 maps of the SO_2 concentrations in Narva, Tartu and Pärnu during July are presented. In Narva the highest mean values, between 7-8 μg/m³, were observed at 2 sites. In the other 2 cities the levels were less than 4 μg/m³.

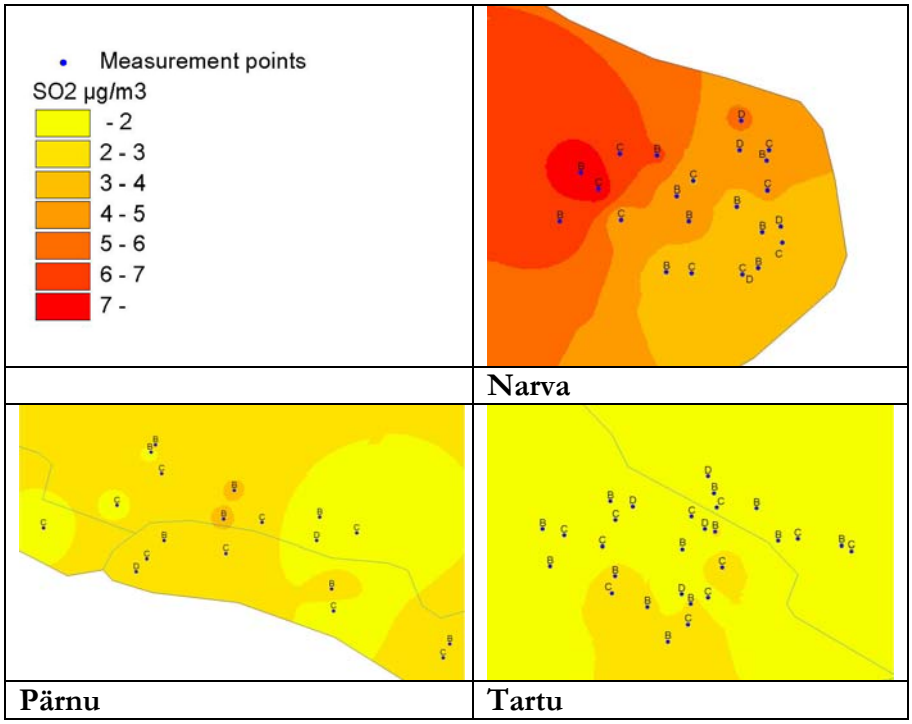


Figure 5 SO_2 (µg/m³) in urban areas, April 2005.

3.2 Nitrogen dioxide, NO_2

3.2.1 Background sites

The concentration of NO_2 in background air during the first three campaigns is shown in Figure 6. The highest monthly mean concentrations were observed in December 2005, with mean levels between 3-4 µg/m³ in a large part of the country. In July/August 2005 the background concentration of NO_2 was mainly less than 1,5 µg/m³.

For April 2006 results from a few sites indicate similar mean levels of NO_2 as in April the previous year, see Figure 7.

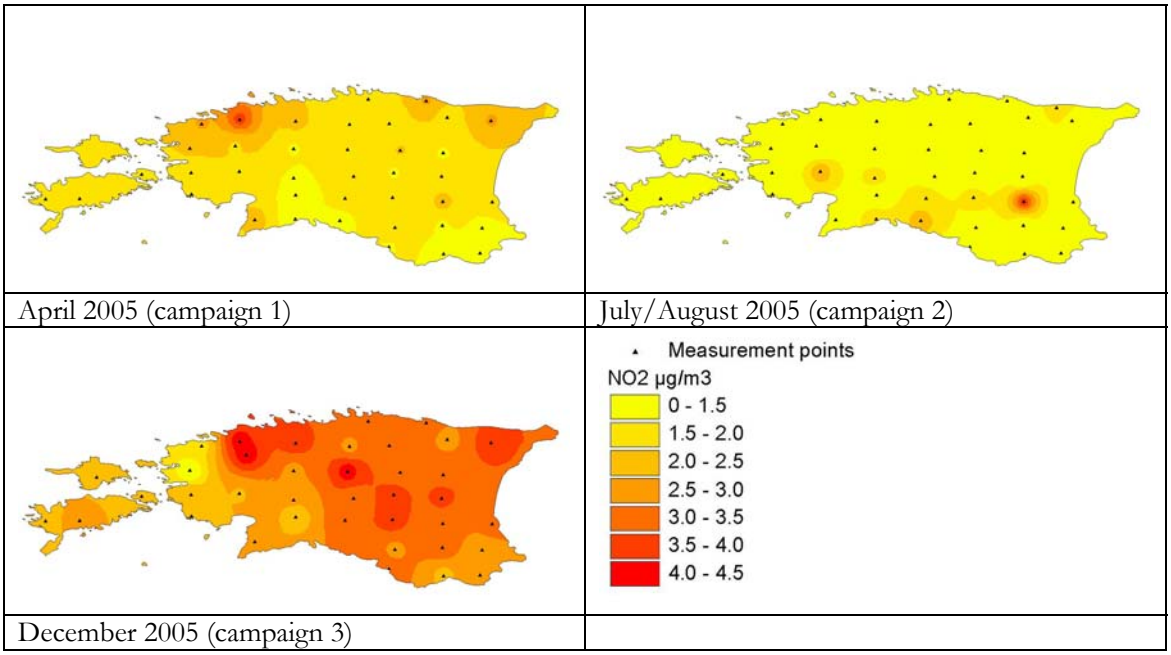


Figure 6 NO_2 (µg/m³) at background sites in April, July/August and December 2005.

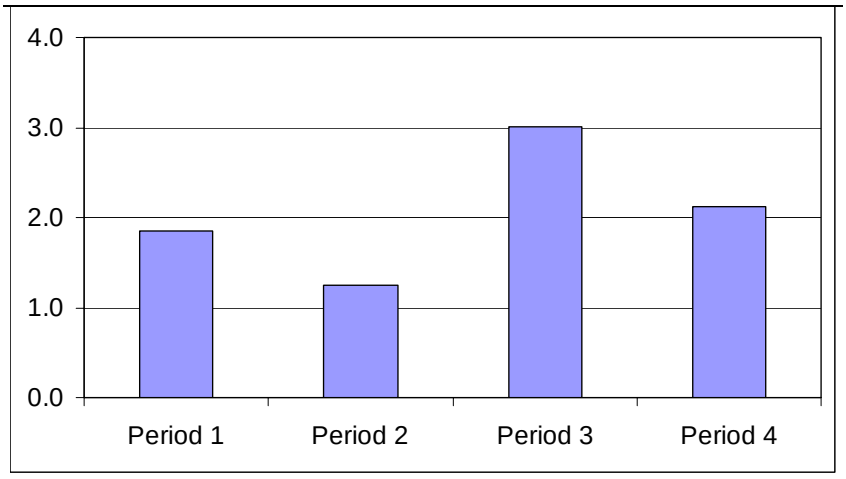


Figure 7 Mean values of NO_2 (µg/m³) at background sites during the different campaign periods.

3.2.2 Urban sites

As expected the NO_2 concentrations were higher in urban areas than in the countryside. Figure 8 illustrates the mean values for the different site categories and campaign periods in each of the five cities. However, except for period 1 (April 2005) monitoring was, in many cases, only performed at one or a few sites for each category.

As can be seen from Figure 8 there was a quite clearly pronounced difference between the site categories, where the B sites generally showed at least about 30% higher NO_2 concentrations compared to C and D sites. The mean NO_2 level at B sites in Narva, Pärnu and Tartu were between 15-23 μg/m³ , while lower concentrations (7-13 μg/m³) were observed in Kothla-Järve and Jöhvi.

In common with results at the background sites the results for the urban areas indicate somewhat lower pollution levels during July/August 2005 (campaign 2), at least at the C and D sites.

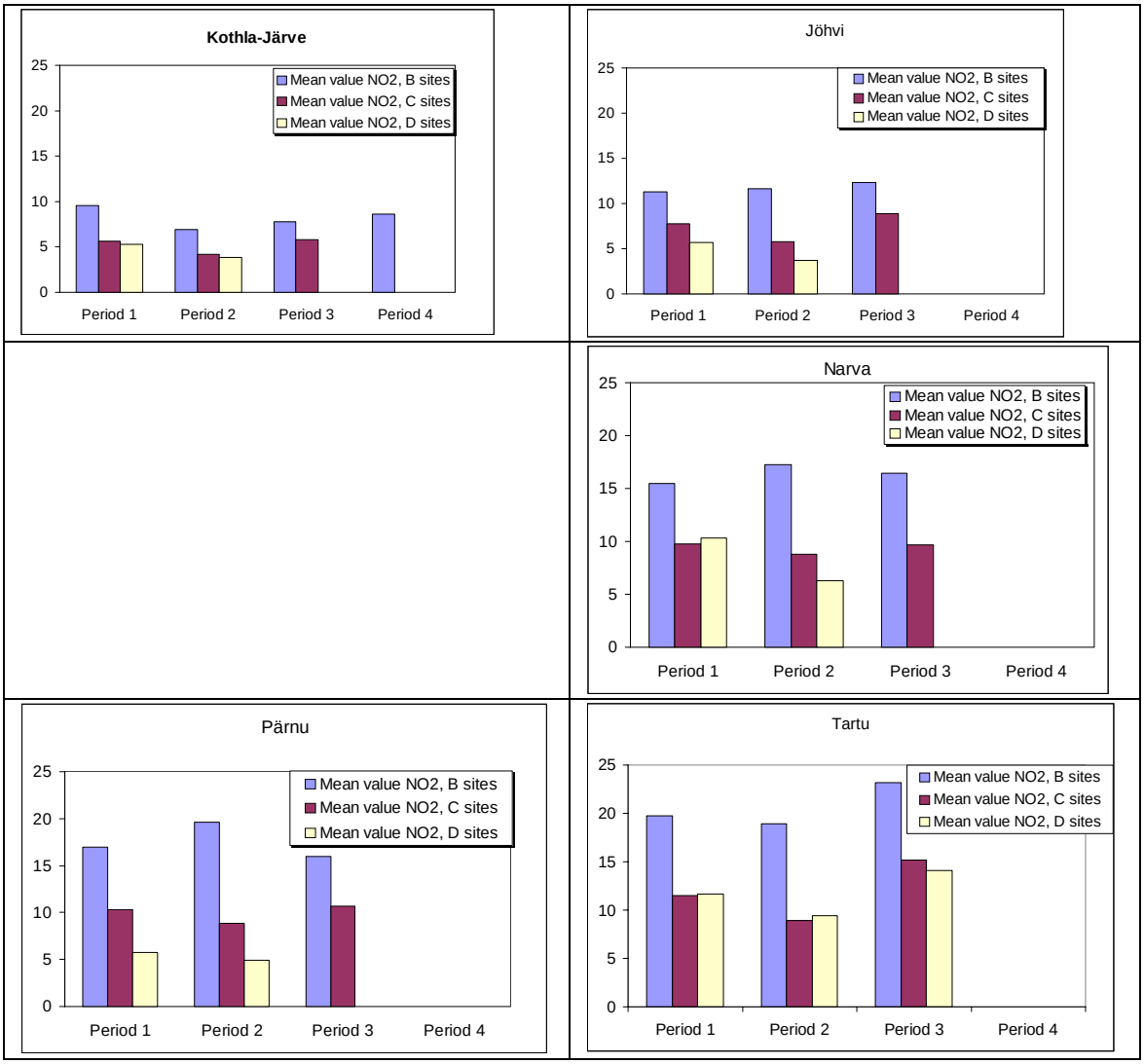


Figure 8 Mean values of NO_2 (μg/m³) for the different site categories and campaign periods in each of the five cities.

In Figure 9, Figure 10, and Figure 11 maps of the NO_2 concentrations in Narva, Tartu and Pärnu during the first three campaign periods are presented. As mentioned above the highest levels were observed in Tartu, where 36 μg/m³ were measured as a monthly mean (April 2005) at one site.

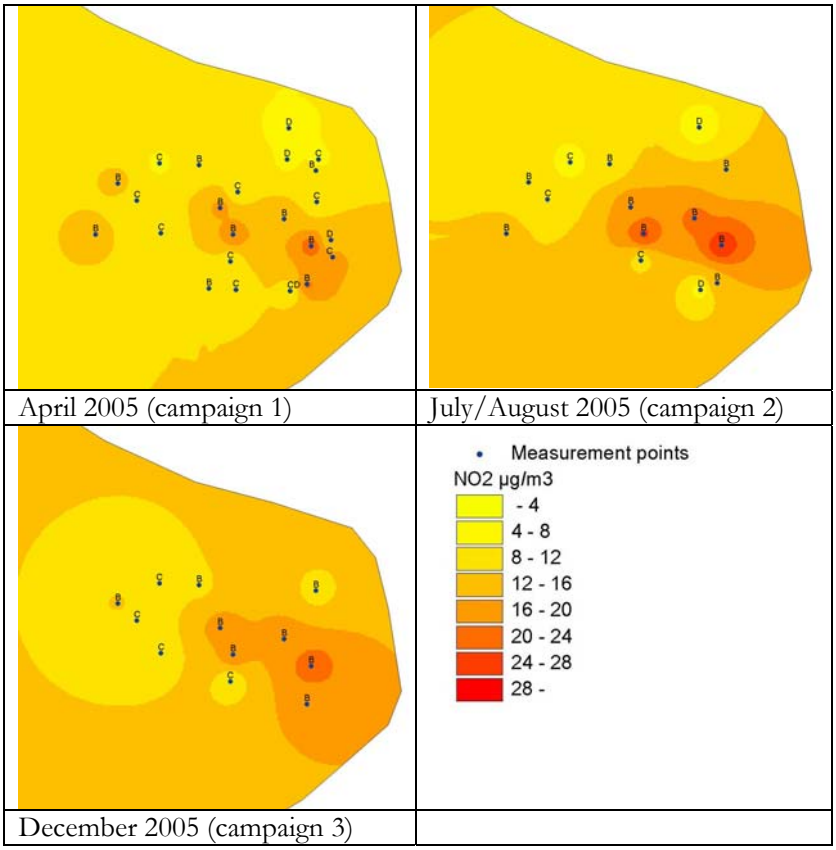


Figure 9 NO_2 (µg/m³) at urban sites in Narva during April, July/August and December 2005.

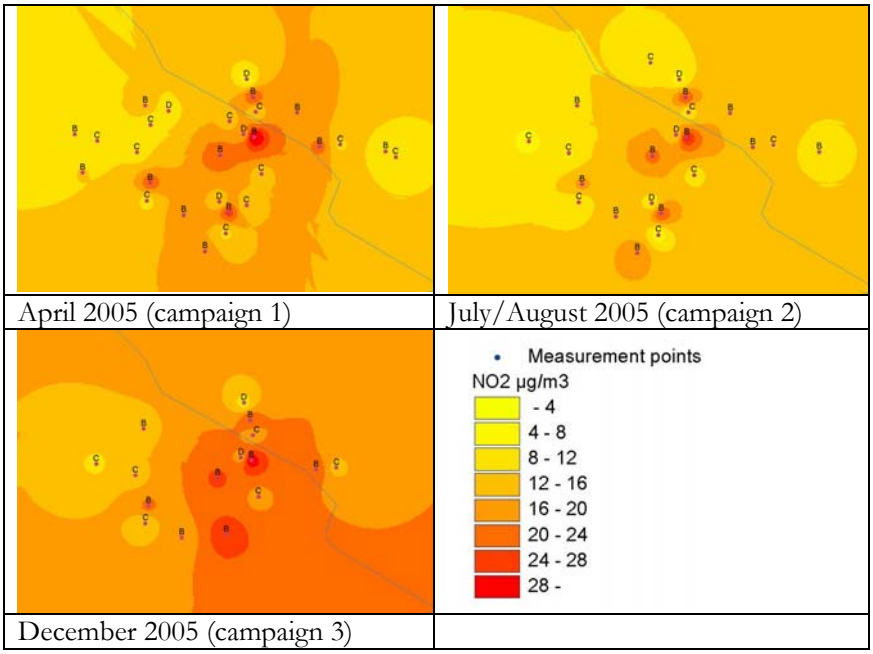


Figure 10 NO_2 (µg/m³) at urban sites in Tartu during April, July/August and December 2005.

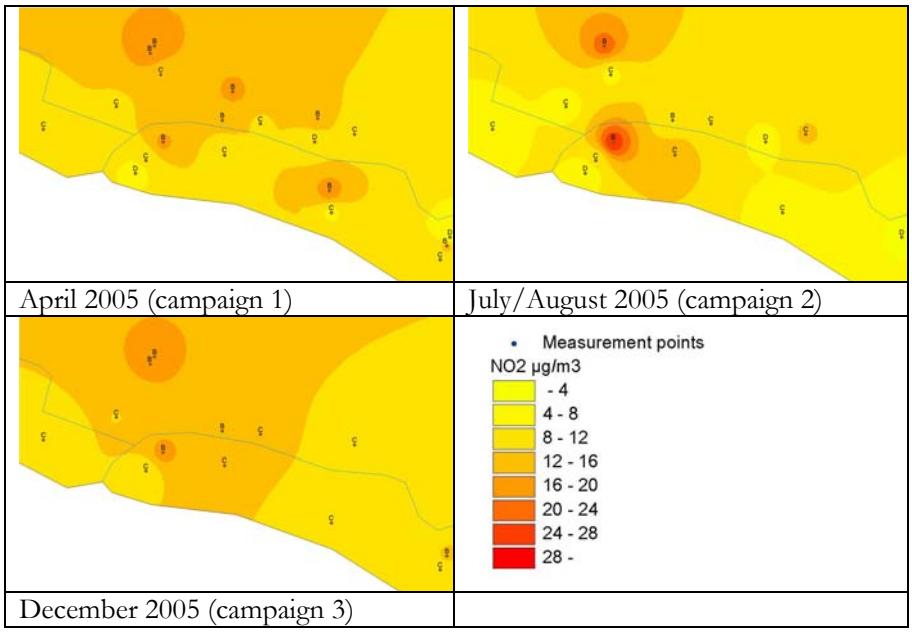


Figure 11 NO_2 (µg/m³) at urban sites in Pärnu during April, July/August and December 2005.

3.3 Ozone, O_3

3.3.1 Background sites

The concentration of O_3 at background sites during the campaigns in July/August and December 2005 are shown in Figure 12. The O_3 levels were sligthly higher in July/August than in December, at least in the eastern part of Estonia, with monthly means mainly around 35-40 µg/m³.

In April 2006 O_3 was monitored only at three sites, but the results showed dramatically higher monthly mean values, ca 90 µg/m³, see Figure 13.

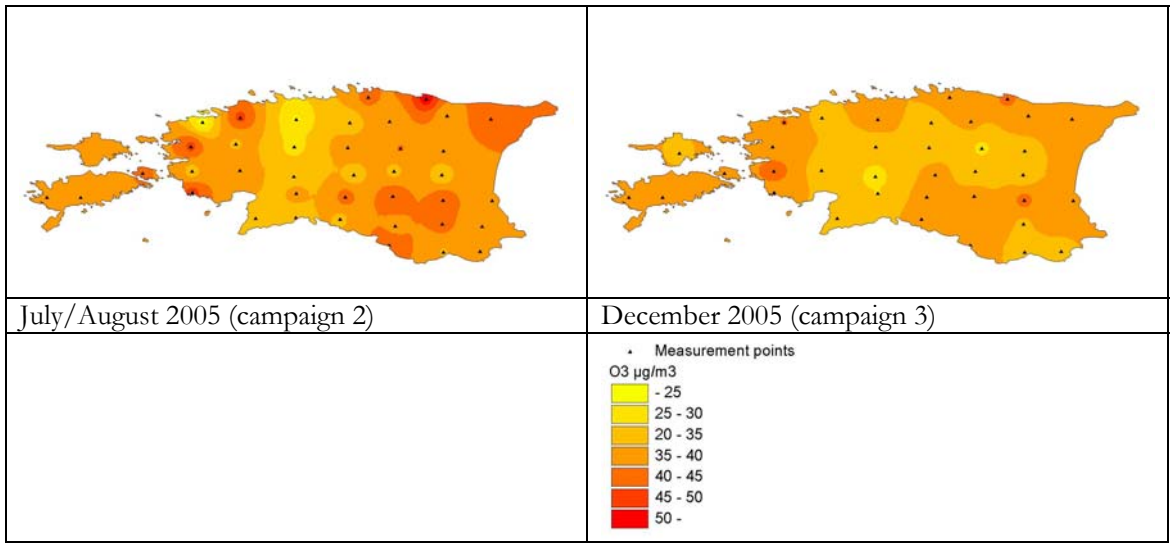


Figure 12 O_3 (µg/m³) at background sites in July/August and December 2005.

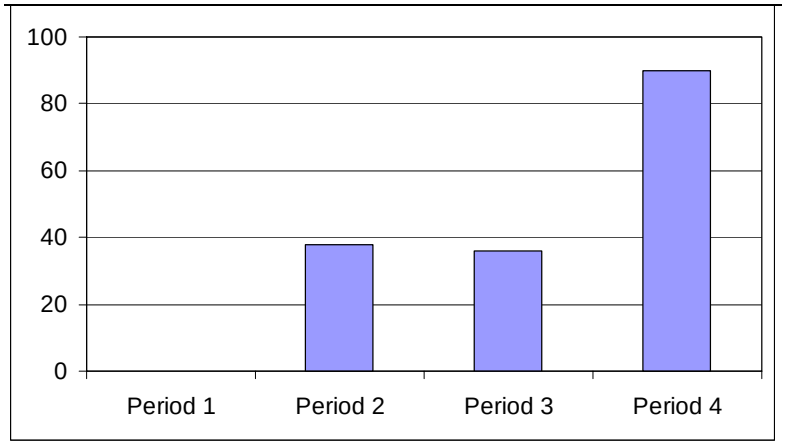


Figure 13 Mean values of O_3 (µg/m³) at background sites during the different campaign periods.

3.3.2 Urban sites

Figure 14 illustrates the mean values of O_3 for the different site categories and campaign periods in each of the five cities. However, in all urban areas monitoring was only performed at 1-3 sites for each category. As for the background sites the concentrations were lower in December than during the spring and summer periods. During July/August 2005 the highest levels were observed in Kothla-Järve and Pärnu (>50 µg/m³).

No clear difference between the site categories could be seen. Only campaign 3 in Tartu showed the expected pattern, where the O_3 mean concentration was somewhat lower at the sites close to the traffic.

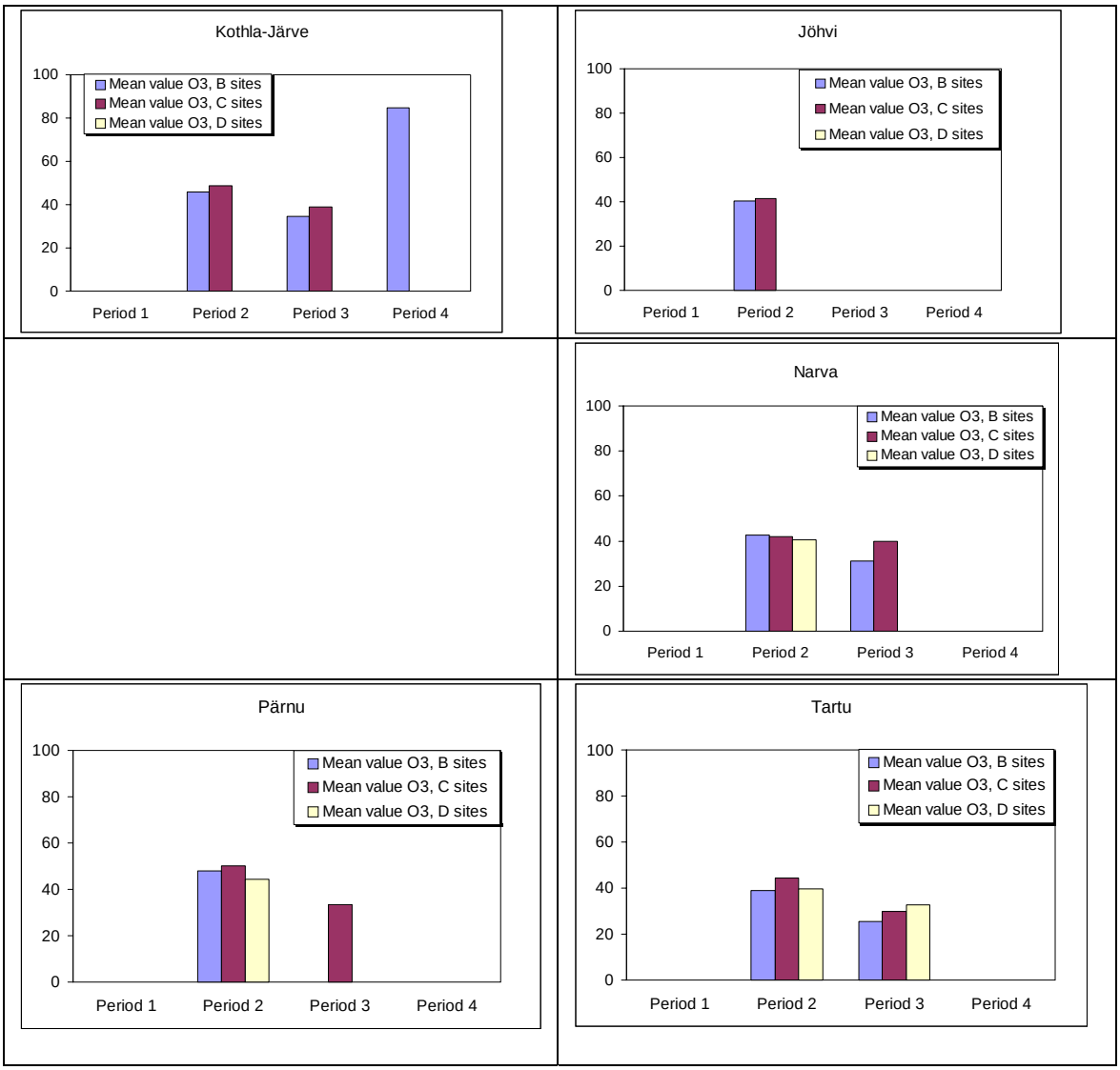


Figure 14 Mean values of O_3 (µg/m³) for the different site categories and campaign periods in each of the five cities.

3.4 Volatile organic compounds, VOC

As mentioned in Chapter 2.2 8 different VOC compounds were monitored. Since benzene is the component regulated by the EU directives, only these results are presented here.

3.4.1 Background sites

The concentration of benzene in background air is shown in Figure 15 for the campaigns in April and December 2005 respectively. The highest monthly mean concentrations were observed during

December, with mean levels generally between 1,0 – 1,5 µg/m³ in the eastern part of the country. In April 2005 the background concentration was mainly less than 1,5 µg/m³.

The lowest mean concentration of benzene at the background sites, ca 0,15 µg/m³ was measured in July, see Figure 16.

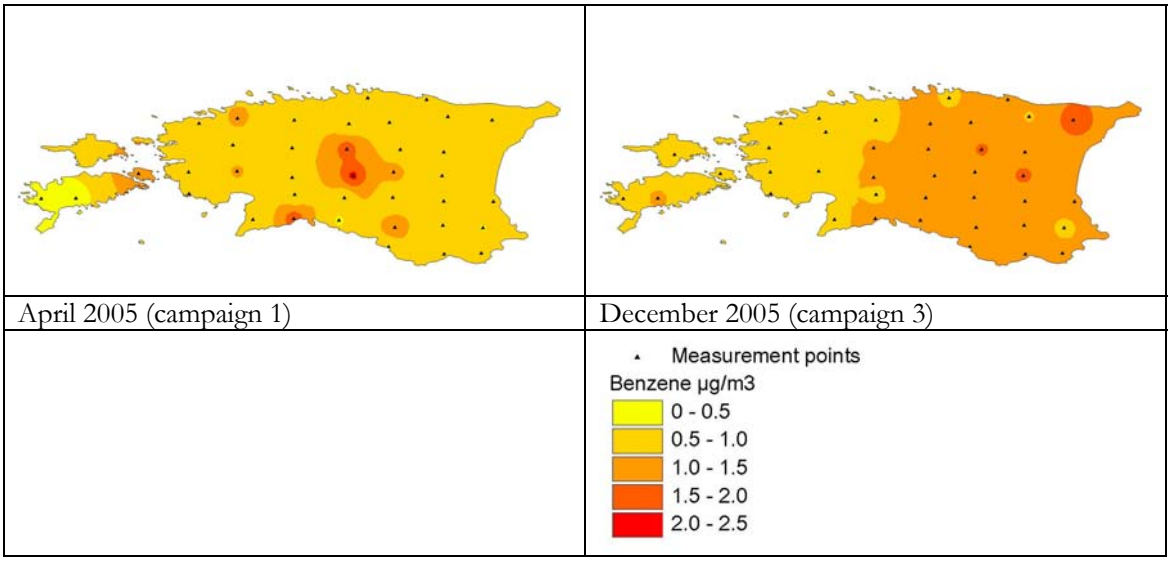


Figure 15 Benzene (µg/m³) at background sites in July/August and December 2005.

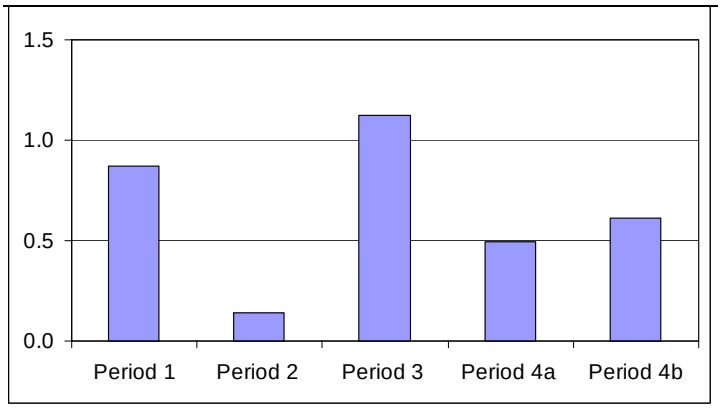


Figure 16 Mean values of benzene (µg/m³) at background sites during the different campaign periods.

3.4.2 Urban sites

The benzene concentrations were higher in urban areas than in the countryside. Figure 17 shows the mean values for the different site categories and campaign periods in each of the five cities. However, monitoring was performed at a limited number of sites for each category. Maps of the benzene concentrations in Narva, Tartu and Pärnu during some of the campaign periods are presented in Figure 18, Figure 19 and Figure 20.

The pollution load between the different campaign periods was similar to the pattern for the background sites, except for Pärnu where the mean concentration of benzene was at the same level during April (campaign 1) as in December (campaign 3). In most cases higher concentrations were observed at the B sites than at the C and D sites.

In general, the mean concentration at the B sites was about 1-2 μg/m^3, except in December 2005 when the mean benzene level in Tartu was 3,7 μg/m^3. The highest individual monthly mean of benzene (5,4 μg/m^3) was measured in Tartu during the same mapping campaign.

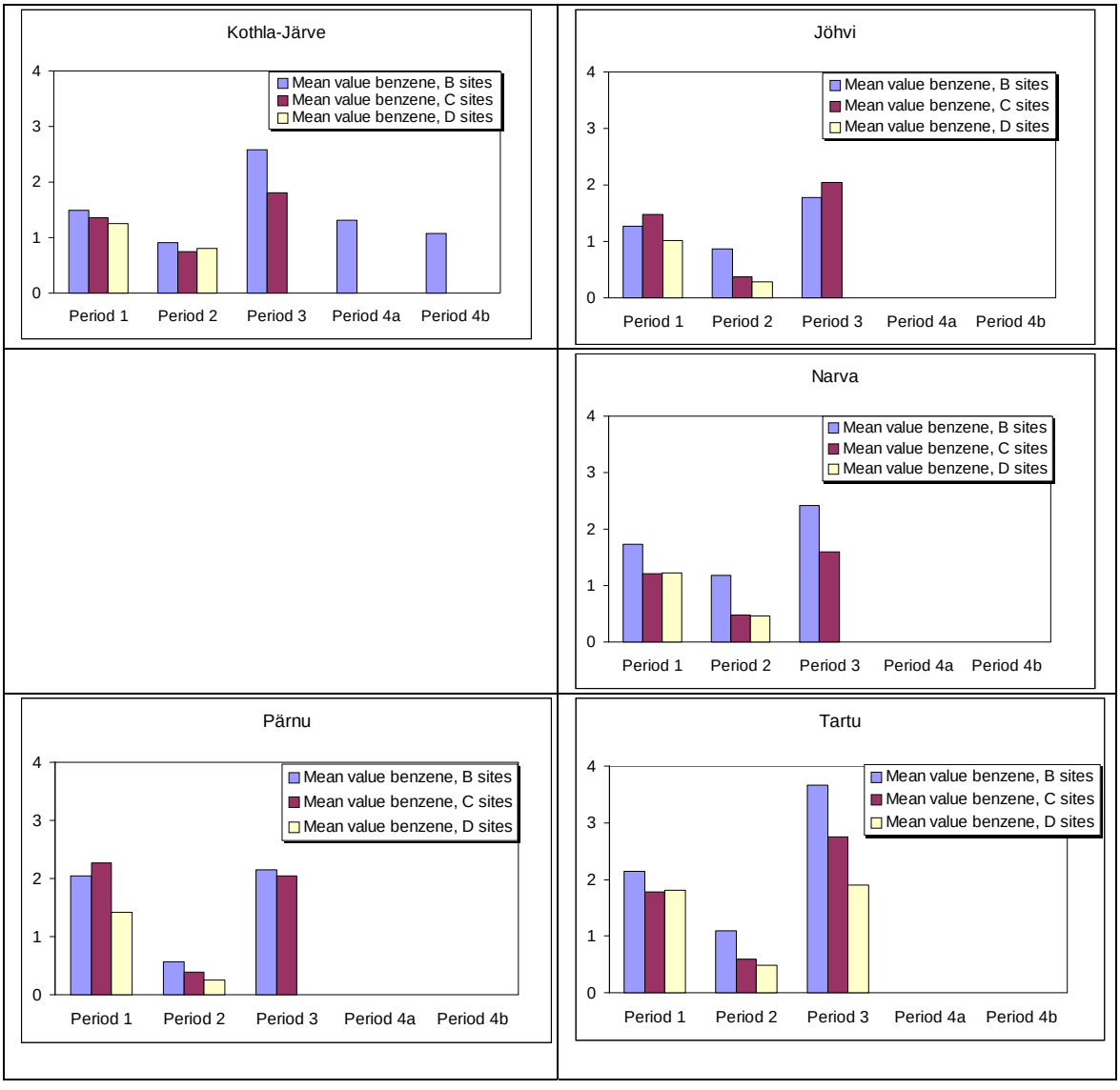
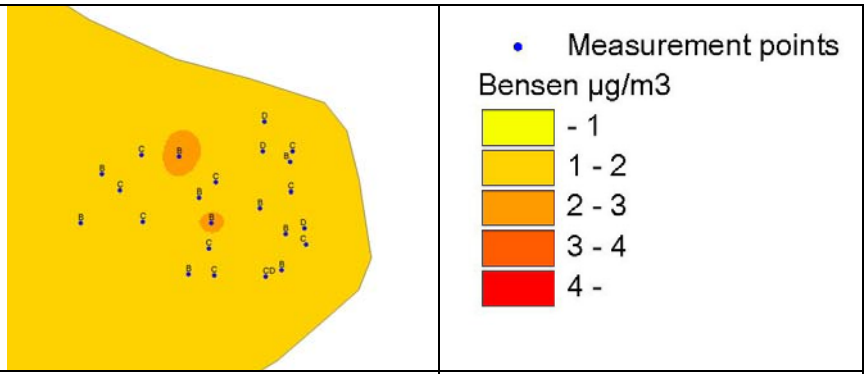
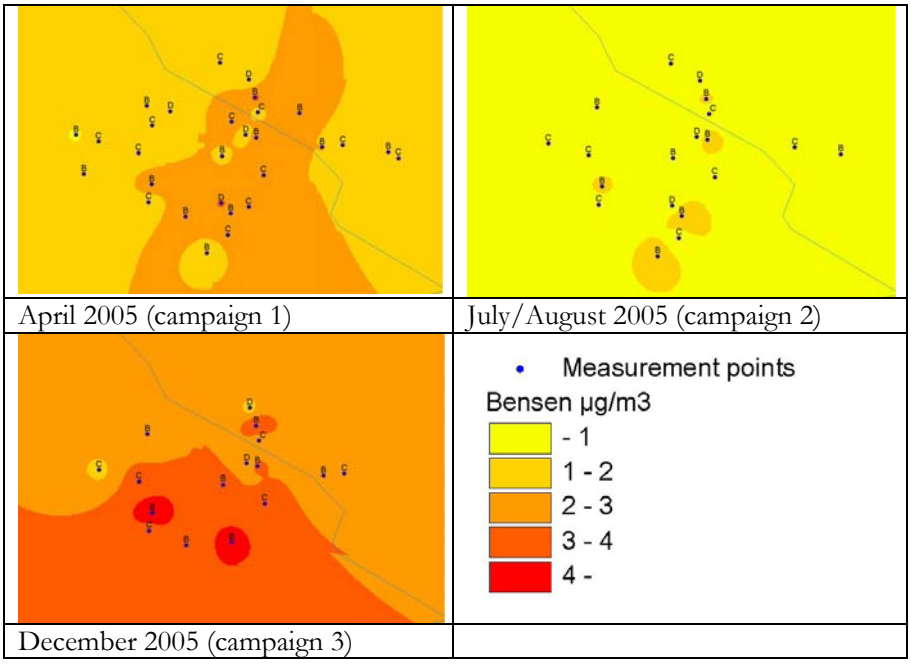


Figure 17 Mean values of benzene (μg/m^3) for the different site categories and campaign periods in each of the five cities.



April 2005 (campaign 1)

Figure 18 Benzene (µg/m³) at urban sites in Narva during April 2005.



April 2005 (campaign 1) | July/August 2005 (campaign 2)

December 2005 (campaign 3)

Figure 19 Benzene (µg/m³) at urban sites in Tartu during April, July/August and December 2005.

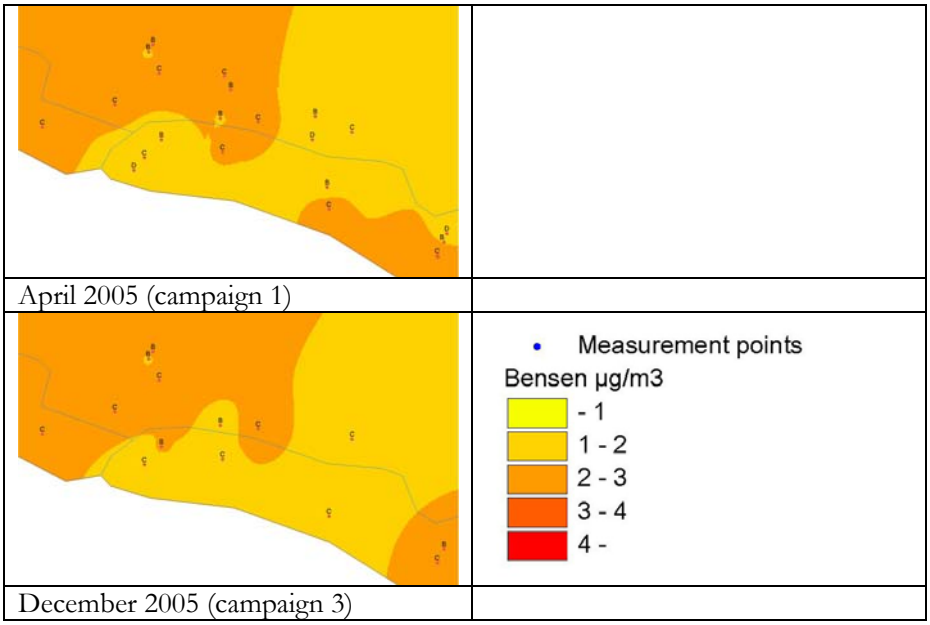


Figure 20 Benzene (µg/m³) at urban sites in Pärnu during April and December 2005.

3.5 Special campaigns

One of the smaller campaigns to study special situations were run as a road effect study in August 2005. The site were located ca 28 km from Tallinn along Tartu highway with open fields on both sides of the road, see Figure 21. Samplers for NO_2 and O_3 were mounted across the road, with 5 samplers on each side at a separation of about 25 m.

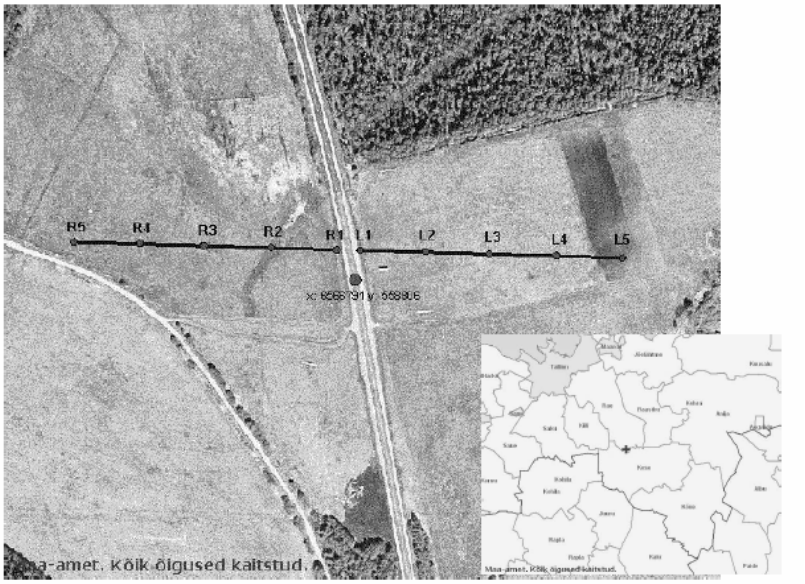


Figure 21 Road site along Tartu highway, ca 28 km from Tallinn.

The results are shown in Figure 22. A decrease in the NO_2 concentration of about 30-40% was observed, in parallel with slightly increased O_3 levels, at a distance of about 100 meter from both sides of the road.

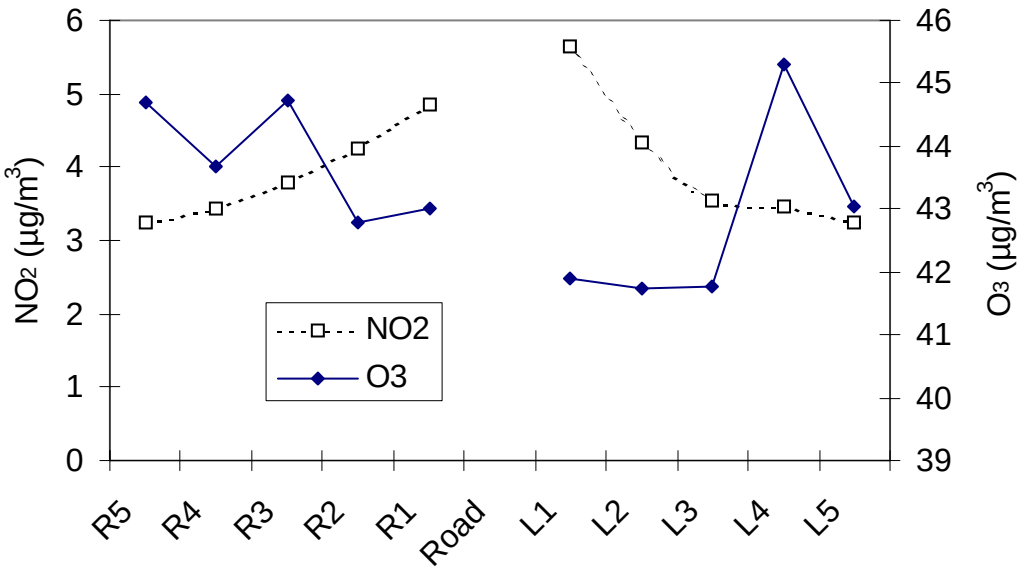


Figure 22 Concentrations (µg/m³) of NO_2 and O_3 across Tartu highway.

4 Comparison to EU limit values

Although no regular annual measurements have been performed during these campaign measurements in Estonia, the calculated average values from all campaigns would give an indication of longtime average levels. The EU limit values for the components of interest for this study are presented in Appendix 1.

In comparison to EU annual limit values it seems that for SO_2 the measured levels in Estonia would be well below the limit value, 20 μg/m^3, for protection of ecosystems. The highest average value, 13 μg/m^3, was observed at one B site in Kothla-Järve. In the same city a few other sites also experienced mean concentrations at the same order of magnitude as the upper assessment threshold (12 μg/m^3).

For NO_2 the measured average concentrations at the most exposed site (Tartu, B site) were approximately 20% below the EU annual limit value (40 μg/m^3) for protection of health, but the upper assessment threshold (32 μg/m^3, requiring measurements) were exceeded.

For ozone there is no limit values. Instead e.g. target values and information thresholds have been defined. For protection of human health these values are mainly based on hourly averages. A yearly average concentration level (40 μg/m^3) is defined as an information level for protection of materials. Most of the sites showed average O_3 levels around this value. However, it is difficult to draw to far reaching conclusions from this since monitoring of O_3 was performed mainly during July/August and December 2005, while the concentrations were twice as high in April 2006.

The EU limit value for benzene as an annual average of 5 μg/m^3 was not exceeded at any site as a mean for the monitoring periods. One mean value above the upper assessment threshold was observed, but the monitoring data from that site only covered monitoring during campaign 3 (B site in Kothla-Järve).

Appendix 1 EU limit and target values

SO_2 ($\mu g/m^3$)	Time period	Limit value	Lower assessment threshold	Upper assessment threshold	Date by which l.v. is to be met
Hourly value for protection of human health	1 hour	350 The value must not be exceeded more than 24 times/year	-	-	1 Jan. 2005
24-hour value for protection of human health	24 hours	125 The value must not be exceeded more than 3 times/year	50 40% of 24 hour limit value	75 60% of 24 hour limit value	1 Jan. 2005
Annual value for protection of ecosystems. Not to be applied close to sources.	1 year and during winter season (1 oct-31 march)	20	8 40% of limit value for winter season	12 60% of limit value for winter season	19 July 2001
NO_2 ($\mu g/m^3$)	**Time period**	**Limit value**	**Lower assessment threshold**	**Upper assessment threshold**	**Date by which l.v. is to be met**
Hourly value for protection of human health	1 hour	200 The value must not be exceeded more than 18 times/year	100 50% of hourly limit value	140 70% of hourly limit value	1 Jan. 2010
Annual value for protection of human health	1 year	40	26 65% of limit value	32 80% of limit value	1 Jan. 2010
Annual value for protection of vegetation. Not to be applied close to sources.	1 year	30 As the sum of nitrogen oxides, NO_2+NO	19.5 65% of limit value	24 80% of limit value	19 July 2001
Benzene ($\mu g/m^3$)	**Time period**	**Limit value**	**Lower assessment threshold**	**Upper assessment threshold**	**Date by which l.v. is to be met**
Annual value for protection of human health	1 year	5	2	3,5	1 Jan. 2010

For ozone there are no limits values. Instead target values and long-term objectives as well as information and alert thresholds have been defined.

O_3 ($\mu g/m^3$)	**Time period**	**Target value / Information level**	Target value for
Target value for the protection of human health	maximum daily 8-hour mean	120 $\mu g/m^3$ not to be exceeded on more than 25 days per calender year averaged over 3 years	2010
Target value for the protection of vegetation	AOT40, calculated from 1 h values May-July	18 000 $\mu g/m^3$*h averaged over 5 years	2010
Information level - materials	1 year	40 $\mu g/m^3$	-

Appendix 2 Technical description of the IVL Diffusive Samplers

Technical description – chemisorption (SO_2, NO_2, O_3)

In diffusive sampling the pollutant is transported to the sorbent by molecular diffusion (or permeation). The average sampling rate (sorbed amount per unit time divided by the ambient concentration e.g. ml min^{-1}) is a temperature-dependent constant for a given pollutant and sampler. The sampler consists of a tube which has a cap on one end containing an filter, impregnated with a solution specific to absorb the pollutant to be measured. The gas is transported into the tube through the open end by molecular diffusion.

From Fick's law it can be calculated that the trapped amount is directly proportional to the ambient pollutant concentration, the exposure time, the diffusion coefficient in air for the pollutant in question and the cross-sectional area of the tube. The collected amount is further inversely proportional to the distance that the gas has to pass by molecular diffusion.

To protect the sampler from the wind artefact that creates a turbulent diffusion inside the sampler the inlet is protected with a very porous membrane. The membrane is protected from mechanical damage by a stainless steel screen.

Dimensions of the IVL diffusive sampler

Diameter: 25 mm
Length of tube: 12 mm

Technical description – adsorption (VOC)

- Volatile organic compounds are collected using diffusive samplers consisting of a tube of stainless steel (Perkin Elmer), packed with Tenax TA®.
- The sampler collects VOC by diffusion (following Fick's 1 law), the driving force being the concentration gradient established between air and the adsorbent.
- During storage and transport the tubes are capped in both ends using Swagelok® caps and PTFE® ferrules. When sampling, one of the Swagelok caps is removed and replaced by a diffusion cap.
- To avoid the migration of water droplets from outside the cap into the front gauze, a special, brimmed diffusion cap has been developed. During sampling, the diffusion tube is oriented vertically with the diffusion cap down.
- A field blank consisting of a capped sampling tube is mounted in parallel with the diffusion tube.
- Analyses are performed by high resolution GC-FID.
- The concentrations are calculated from the amount found in the tube, using a given formula including the uptake rate and the sampling time.

Dimensions of the IVL VOC sampler
Diameter (brimmed diffusion cap): 30 mm
Length of tube including end caps: 100 mm

	SO_2	***NO_2***	***O_3***
Comparison with active technique	± 10% *(filter pack)*	±5% (*imp. glass filter)*	± 5% (*UV-monitor)*
Analytical detection limit	0.2 µg/m^3, 1 month exposure	0.1 µg/m^3, 1 month exposure	1 µg/m^3, 1 month exposure
Storage time (incl. exposure)	5 months	5 months	3 months

	VOC
Comparison with active technique	>± 15% *(BTX monitor)*
Analytical detection limit ***1 week exposure*** ***benzene, toluene*** ***ethyl benzene, xylenes*** ***octane, nonane, butyl acetate***	 0.2 µg/m^3 0.1 µg/m^3 0.1 µg/m^3
Storage time (incl. exposure)	5 weeks (storage **not** in refrigerator)

Appendix 3 Measurement programme

The number of sites for each city, divided in site categories and components for each campaign period.

Background sites

Background NO2	Period 1	Period 2	Period 3	Period 4
E	39	40	38	12

Background O3	Period 1	Period 2	Period 3	Period 4
E	0	39	36	3

Background SO2	Period 1	Period 2	Period 3	Period 4
E	39	3	5	3

Background VOC	Period 1	Period 2	Period 3	Period 4 a/b
E	38	21	38	2/2

Narva

Narva NO2	Period 1	Period 2	Period 3	Period 4
B	10	9	8	0
C	10	3	4	0
D	3	2	0	0

Narva O3	Period 1	Period 2	Period 3	Period 4
B		3	1	0
C		2	1	0
D		1	0	0

Narva SO2	Period 1	Period 2	Period 3	Period 4
B	10	0	2	0
C	9	0	1	0
D	3	0	0	0

Narva VOC	Period 1	Period 2	Period 3	Period 4
B	10	9	8	0
C	10	3	4	0
D	3	1	0	0

Kothla-Järve

Kothla-Järv	Period 1	Period 2	Period 3	Period 4
B	4	8	6	1
C	6	5	3	0
D	2	1	0	0

Kothla-Järv	Period 1	Period 2	Period 3	Period 4
B		2	3	1
C		1	1	0
D				

Kothla-Järv	Period 1	Period 2	Period 3	Period 4
B	4	4	5	4
C	6	1	3	1
D	2	0	0	0

Kothla-Järv	Period 1	Period 2	Period 3	Period 4
B	4	5	6	2
C	6	4	4	0
D	2	1	0	0

Jöhvi

Jöhvi NO2	Period 1	Period 2	Period 3	Period 4
B	6	7	4	0
C	6	3	2	0
D	2	1	0	0

Jöhvi O3	Period 1	Period 2	Period 3	Period 4
B		2	0	0
C		1	0	0
D				

Jöhvi SO2	Period 1	Period 2	Period 3	Period 4
B	6	0	3	0
C	6	0	2	0
D	2	0	0	0

Jöhvi VOC	Period 1	Period 2	Period 3	Period 4
B	6	7	4	0
C	6	2	2	0
D	2	1	0	0

Pärnu

Pärnu NO2	Period 1	Period 2	Period 3	Period 4
B	8	3	5	0
C	9	8	8	0
D	3	3	0	0

Pärnu O3	Period 1	Period 2	Period 3	Period 4
B	-	3	0	0
C	-	8	3	0
D	-	3	0	0

Pärnu SO2	Period 1	Period 2	Period 3	Period 4
B	8	0	0	0
C	9	0	3	0
D	2	0	0	0

Pärnu VOC	Period 1	Period 2	Period 3	Period 4
B	8	3	5	0
C	9	5	9	0
D	3	2	0	0

Tartu

Tartu NO2	Period 1	Period 2	Period 3	Period 4
B	13	11	8	0
C	11	8	6	0
D	4	3	2	0

Tartu O3	Period 1	Period 2	Period 3	Period 4
B		3	2	0
C		1	1	0
D		1	1	0

Tartu SO2	Period 1	Period 2	Period 3	Period 4
B	13	0	1	0
C	11	0	1	0
D	4	0	1	0

Tartu VOC	Period 1	Period 2	Period 3	Period 4
B	13	8	8	0
C	12	8	6	0
D	4	3	2	0

Special campaigns

Special NO2	Period 1	Period 2	Period 3	Period 4
	4	6	32	27

Special O3	Period 1	Period 2	Period 3	Period 4
	0	20	4	5

Special SO2	Period 1	Period 2	Period 3	Period 4
	4	1	16	9

Special VOC	Period 1	Period 2	Period 3	Period 4 a/b/c
	3	17	18	38/5/2

Appendix 4 Monitoring data

Pärnu

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				NO2	NO2	NO2	NO2	
Pärnu NO2				apr-05	july-aug -05	nov-dec -05	apr-06	
T028	58.4092	24.4933	B	18.6		16.6		17.6
T030	58.4111	24.4944	B	19.5	22.2	18.8		20.2
T032	58.3861	24.4967	B	17.7	28.2	18.2		21.4
T035	58.3992	24.515	B	17.9				17.9
T037	58.3917	24.5122	B	12.7	8.4	13.3		11.5
T041	58.3922	24.5372	B	14.7				14.7
T044	58.3736	24.5403	B	19.5				19.5
T046	58.3592	24.5711	B	14.8		13.1		13.9
T027	58.3894	24.4653	C	8.8	5.1	8.7		7.6
T029	58.4036	24.4961	C	12.4	7.1			9.7
T031	58.3953	24.4844	C	11.4	6.0	12.5		10.0
T034	58.3814	24.4922	C	8.8	9.0	9.4		9.1
T038	58.3908	24.5222	C	12.2	8.9	13.6		11.6
T040	58.3828	24.5128	C	10.4	16.2	12.7		13.1
T042	58.3881	24.5469	C	10.3	13.0	10.3		11.2
T045	58.3678	24.5408	C	7.5	5.6	8.7		7.3
T047	58.3556	24.5694	C	10.5		9.6		10.0
T033	58.3781	24.4894	D	6.3	3.9			5.1
T043	58.3861	24.5364	D	9.8	7.0			8.4
T048	58.3614	24.5719	D	1.1	3.9			2.5

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				O3	O3	O3	O3	
Pärnu O3				apr-05	juli-aug -05	nov-dec -05	apr-06	
T030	58.4111	24.4944	B		44			44
T032	58.3861	24.4967	B		51			51
T037	58.3917	24.5122	B		48			48
T027	58.3894	24.4653	C		48			48
T029	58.4036	24.4961	C		48			48
T031	58.3953	24.4844	C		49			49
T034	58.3814	24.4922	C		47			47
T038	58.3908	24.5222	C		50	33		41
T040	58.3828	24.5128	C		49	34		42
T042	58.3881	24.5469	C		53			53
T045	58.3678	24.5408	C		57			57
T047	58.3556	24.5694	C			33		33
T033	58.3781	24.4894	D		57			57
T043	58.3861	24.5364	D		40			40
T048	58.3614	24.5719	D		37			37

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				SO2	SO2	SO2	SO2	
Pärnu SO2				apr-05	july-aug -05	nov-dec -05	apr-06	
T028	58.4092	24.4933	B	1.6				1.6
T030	58.4111	24.4944	B	2.9				2.9
T032	58.3861	24.4967	B	2.6				2.6
T035	58.3992	24.515	B	3.2				3.2
T037	58.3917	24.5122	B	3.3				3.3
T041	58.3922	24.5372	B	1.6				1.6
T044	58.3736	24.5403	B	2.5				2.5
T046	58.3592	24.5711	B	2.1				2.1
T027	58.3894	24.4653	C	1.8				1.8
T029	58.4036	24.4961	C	2.7				2.7
T031	58.3953	24.4844	C	1.9				1.9
T034	58.3814	24.4922	C	2.2				2.2
T038	58.3908	24.5222	C	2.1		3.0		2.5
T040	58.3828	24.5128	C	2.7		3.4		3.1
T042	58.3881	24.5469	C	1.9				1.9
T045	58.3678	24.5408	C	1.7				1.7
T047	58.3556	24.5694	C	2.2		2.8		2.5
T033	58.3781	24.4894	D	2.2				2.2
T043	58.3861	24.5364	D	1.0				1.0

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
Bensen								
Pärnu VOC				**apr-05**	**july-aug -05**	**nov-dec -05**	**apr-06**	
T028	58.4092	24.4933	B	1.8		1.8		1.8
T030	58.4111	24.4944	B	2.9	0.7	2.9		2.2
T032	58.3861	24.4967	B	1.8	0.6	2.1		1.5
T037	58.3917	24.5122	B	2.0	0.4	1.8		1.4
T035	58.3992	24.515	B	2.3				2.3
T041	58.3922	24.5372	B	1.5				1.5
T044	58.3736	24.5403	B	1.9				1.9
T046	58.3592	24.5711	B	2.1		2.1		2.1
T027	58.3894	24.4653	C	2.9	0.4	2.1		1.8
T031	58.3953	24.4844	C	2.5		2.5		2.5
T034	58.3814	24.4922	C	1.4	0.4	1.4		1.1
T029	58.4036	24.4961	C	2.5	0.5	3.0		2.0
T040	58.3828	24.5128	C	2.1		2.0		2.0
T038	58.3908	24.5222	C	2.5	0.4	2.4		1.7
T045	58.3678	24.5408	C	2.3	0.3	1.3		1.3
T042	58.3881	24.5469	C	1.3		1.5		1.4
T047	58.3556	24.5694	C	3.1		2.4		2.7
T036	58.4028	24.5133	C	2.2				2.2
T033	58.3781	24.4894	D	1.2	0.2			0.7
T043	58.3861	24.5364	D	1.5				1.5
T048	58.3614	24.5719	D	1.6	0.3			0.9

Tartu

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				NO2	NO2	NO2	NO2	
Tartu NO2				apr-05	july-aug -05	nov-dec -05	apr-06	
M062	58.3872	26.6967	B	14.4	12.4	15.6		14.1
M066	58.3778	26.7289	B	36.2	29.4	32.0		32.6
M067	58.3725	26.7189	B	23.2	20.9	25.0		23.0
M068	58.3642	26.6981	B	23.0	18.1	21.1		20.7
M071	58.3786	26.6758	B	8.9				8.9
M072	58.3672	26.6781	B	12.6				12.6
M074	58.3547	26.7081	B	18.4	15.5	18.0		17.3
M076	58.3556	26.7214	B	26.1	24.4	27.5		26.0
M077	58.3439	26.7144	B	18.2	20.0			19.1
M081	58.375	26.7483	B	21.1	16.5	22.2		20.0
M083	58.3736	26.7678	B	11.4	10.2			10.8
M085	58.385	26.7417	B	19.2	16.5			17.8
M087	58.3897	26.7286	B	24.5	24.2	24.1		24.3
M061	58.3814	26.6983	C	10.2				10.2
M064	58.3825	26.7217	C	14.3				14.3
M069	58.3733	26.6942	C	10.5	8.1	15.1		11.3
M070	58.3767	26.6825	C	9.5	7.7	11.7		9.6
M073	58.3589	26.6972	C	10.9	8.5	13.4		10.9
M078	58.3492	26.7206	C	11.4	6.5			9.0
M079	58.3575	26.7267	C	13.0				13.0
M080	58.3669	26.7311	C	14.4	10.5	18.3		14.4
M082	58.3756	26.7544	C	11.8	12.4	15.3		13.1
M084	58.3719	26.7708	C	8.4				8.4
M086	58.3853	26.7294	C	12.1	9.1	17.2		12.8
M089	58.4	26.7183	C		8.4			8.4
M063	58.3856	26.7036	D	10.7				10.7
M065	58.3786	26.7258	D	16.1	12.2	17.5		15.3
M075	58.3586	26.7186	D	13.0	9.4			11.2
M088	58.395	26.7267	D	6.7	6.6	10.7		8.0

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				O3	O3	O3	O3	
Tartu O3				apr-05	july-aug -05	nov-dec -05	apr-06	
M062	58.3872	26.6967	B		43	21		32
M066	58.3778	26.7289	B		37	30		33
M077	58.3439	26.7144	B		38			38
M069	58.3733	26.6942	C			30		30
M082	58.3756	26.7544	C		44			44
M088	58.395	26.7267	D		40	33		36

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				SO2	SO2	SO2	SO2	
Tartu SO2				apr-05	july-aug -05	nov-dec -05	apr-06	
M062	58.3872	26.6967	B	1.6				1.6
M066	58.3778	26.7289	B	2.2		1.5		1.9
M067	58.3725	26.7189	B	1.9				1.9
M068	58.3642	26.6981	B	2.2				2.2
M071	58.3786	26.6758	B	1.3				1.3
M072	58.3672	26.6781	B	1.8				1.8
M074	58.3547	26.7081	B	2.1				2.1
M076	58.3556	26.7214	B	2.2				2.2
M077	58.3439	26.7144	B	2.1				2.1
M081	58.375	26.7483	B	1.7				1.7
M083	58.3736	26.7678	B	1.6				1.6
M085	58.385	26.7417	B	1.6				1.6
M087	58.3897	26.7286	B	1.9				1.9
M061	58.3814	26.6983	C	1.7				1.7
M064	58.3825	26.7217	C	1.4				1.4
M069	58.3733	26.6942	C	1.8		1.5		1.6
M070	58.3767	26.6825	C	1.7				1.7
M073	58.3589	26.6972	C	2.4				2.4
M078	58.3492	26.7206	C	2.2				2.2
M079	58.3575	26.7267	C	2.0				2.0
M080	58.3669	26.7311	C	2.5				2.5
M082	58.3756	26.7544	C	1.8				1.8
M084	58.3719	26.7708	C	1.6				1.6
M086	58.3853	26.7294	C	1.6				1.6
M063	58.3856	26.7036	D	1.6				1.6
M065	58.3786	26.7258	D	1.4				1.4
M075	58.3586	26.7186	D	1.6				1.6
M088	58.395	26.7267	D	1.3		1.3		1.3

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
Bensen								
Tartu VOC				**apr-05**	**july-aug -05**	**nov-dec -05**	**apr-06**	
M071	58.3786	26.6758	B	1.0				1.0
M072	58.3672	26.6781	B	1.2				1.2
M062	58.3872	26.6967	B	1.5	0.5	2.2		1.4
M068	58.3642	26.6981	B	2.8	1.2	5.4		3.1
M074	58.3547	26.7081	B	2.5		3.4		3.0
M077	58.3439	26.7144	B	1.6	1.2			1.4
M067	58.3725	26.7189	B	1.9	0.9	3.6		2.1
M076	58.3556	26.7214	B	3.0	1.7	4.6		3.1
M087	58.3897	26.7286	B	3.2	1.2	4.1		2.8
M066	58.3778	26.7289	B	2.9	1.6	3.3		2.6
M085	58.3850	26.7417	B	2.7				2.7
M081	58.3750	26.7483	B	2.1		2.8		2.5
M083	58.3736	26.7678	B	1.6	0.4			1.0
M070	58.3767	26.6825	C	1.5	0.4	1.8		1.2
M069	58.3733	26.6942	C	1.6	0.7	3.3		1.9
M073	58.3589	26.6972	C	1.5	0.6	3.4		1.8
M061	58.3814	26.6983	C	1.6				1.6
M089	58.4000	26.7183	C	1.6	0.5			1.0
M078	58.3492	26.7206	C	2.1	0.9			1.5
M064	58.3825	26.7217	C	2.8				2.8
M079	58.3575	26.7267	C	2.1				2.1
M086	58.3853	26.7294	C	1.8	0.5	2.6		1.6
M080	58.3669	26.7311	C	2.2	0.9	3.3		2.1
M082	58.3756	26.7544	C	1.5	0.4	2.2		1.4
M084	58.3719	26.7708	C	1.1				1.1
M063	58.3856	26.7036	D	1.4				1.4
M075	58.3586	26.7186	D	3.1	0.5			1.8
M065	58.3786	26.7258	D	1.3	0.4	2.0		1.2
M088	58.3950	26.7267	D	1.4	0.5	1.8		1.2

Kothla- Järve

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				NO2	NO2	NO2	NO2	
Kothla-Järve NO2				apr-05	july-aug-05	nov-dec-05	apr-06	
M047	59.4008	27.2892	B	12.1	10.8	12.1		11.7
M049	59.4067	27.2825	B	9.3	4.9	7.2	8.6	7.5
M049			B		6.0			6.0
M052	59.3972	27.2797	B	7.5	6.6			7.1
M054	59.3922	27.2539	B	9.3	11.4	9.4		10.0
M099	59.3992	27.2408	B		3.5	5.6		4.6
M100	59.4097	27.2575	B		4.0	6.0		5.0
M102	59.4208	27.2269	B		8.4	6.1		7.3
M046	59.4061	27.2958	C	6.0	4.7			5.3
M048	59.3964	27.2978	C	4.8	4.0	5.9		4.9
M050	59.4017	27.2767	C	6.1	4.7	6.4		5.7
M053	59.3922	27.2656	C	6.1	4.8			5.4
M055	59.3836	27.2564	C	5.9	2.6	5.2		4.6
M056	59.4292	27.2383	C	4.6				4.6
M044	59.4136	27.2881	D	4.5				4.5
M051	59.3983	27.2744	D	6.1	3.9			5.0

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				O3	O3	O3	O3	
Kothla-Järve O3				apr-05	july-aug-05	nov-dec-05	apr-06	
M049	59.4067	27.2825	B		52	41	85	59
M054	59.3922	27.2539	B			38		38
M100	59.4097	27.2575	B		40			40
M102	59.4208	27.2269	B			25		25
M048	59.3964	27.2978	C		49	39		44

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				SO2	SO2	SO2	SO2	
Kothla-Järve SO2				apr-05	july-aug -05	nov-dec -05	apr-06	
M047	59.4008	27.2892	B	8.1			5.5	6.8
M049	59.4067	27.2825	B	10.8	10.5	8.0	10.0	9.8
M052	59.3972	27.2797	B	9.1				9.1
M054	59.3922	27.2539	B	13.9	13.4	12.0	7.5	11.7
M099	59.3992	27.2408	B		15.2	13.5	10.1	12.9
M100	59.4097	27.2575	B			7.8		7.8
M102	59.4208	27.2269	B		9.7	5.7		7.7
M046	59.4061	27.2958	C	7.4				7.4
M048	59.3964	27.2978	C	5.4		5.8		5.6
M050	59.4017	27.2767	C	10.7		6.5		8.6
M053	59.3922	27.2656	C	10.3				10.3
M055	59.3836	27.2564	C	8.0	11.3	14.5	10.1	11.0
M056	59.4292	27.2383	C	5.7				5.7
M044	59.4136	27.2881	D	10.2				10.2
M051	59.3983	27.2744	D	11.3				11.3

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Period 5	Ave-rage
Bensen									
Kothla-Järve VOC				apr-05	july-aug -05	nov-dec -05	apr-06	apr-06	
M047	59.4008	27.2892	B	1.6	0.8	2.5	1.1	1.1	1.4
M049	59.4067	27.2825	B	1.3		2.0			1.6
M052	59.3972	27.2797	B	1.2	0.8				1.0
M054	59.3922	27.2539	B	1.9	1.6	3.7	1.5	1.1	2.0
M099	59.3992	27.2408	B			3.8			3.8
M100	59.4097	27.2575	B		0.8	1.6			1.2
M102	59.4208	27.2269	B		0.6	1.8			1.2
M046	59.4061	27.2958	C	1.2	0.7	1.7			1.2
M048	59.3964	27.2978	C	1.0	0.6	1.7			1.1
M050	59.4017	27.2767	C	1.7	0.8	1.6			1.3
M053	59.3922	27.2656	C	1.6	1.0				1.3
M055	59.3836	27.2564	C	1.7		2.3			2.0
M056	59.4292	27.2383	C	1.1					1.1
M044	59.4136	27.2881	D	1.3					1.3
M051	59.3983	27.2744	D	1.2	0.8				1.0

Jöhvi

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				NO2	NO2	NO2	NO2	
Jöhvi NO2				apr-05	july-aug -05	nov-dec -05	apr-06	
M030	59.3603	27.43	B	12.6	11.3	12.9		12.3
M033	59.3622	27.4025	B	11.2	13.0	13.3		12.5
M036	59.3581	27.4039	B	8.4	8.2			8.3
M037	59.3575	27.4142	B	14.3	10.9	13.8		13.0
M039	59.3533	27.4286	B	8.4	12.7			10.5
M042	59.3531	27.4106	B	12.6	11.0			11.8
M098	59.3692	27.3889	B		14.7	9.5		12.1
M031	59.3633	27.4356	C	9.2				9.2
M032	59.3614	27.4206	C	8.3	7.9	8.6		8.3
M034	59.3653	27.4053	C	7.1				7.1
M038	59.3589	27.4425	C	6.5				6.5
M040	59.3506	27.4156	C	8.3	4.6	9.1		7.3
M043	59.3533	27.4022	C	7.2	5.0			6.1
M035	59.3636	27.3919	D	5.1	3.7			4.4
M041	59.3497	27.4231	D	6.3				6.3

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				O3	O3	O3	O3	
Jöhvi O3				apr-05	july-aug -05	nov-dec -05	apr-06	
M037	59.3575	27.4142	B		38			38
M098	59.3692	27.3889	B		42			42
M032	59.3614	27.4206	C		41			41

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				SO2	SO2	SO2	SO2	
Jöhvi SO2				apr-05	july-aug -05	nov-dec -05	apr-06	
M030	59.3603	27.43	B	2.6		3.9		3.2
M033	59.3622	27.4025	B	2.9		5.1		4.0
M036	59.3581	27.4039	B	2.1				2.1
M037	59.3575	27.4142	B	2.5		4.7		3.6
M039	59.3533	27.4286	B	1.9				1.9
M042	59.3531	27.4106	B	2.3				2.3
M031	59.3633	27.4356	C	2.2				2.2
M032	59.3614	27.4206	C	2.1		4.7		3.4
M034	59.3653	27.4053	C	2.5				2.5
M038	59.3589	27.4425	C	2.6				2.6
M040	59.3506	27.4156	C	2.4		6.1		4.3
M043	59.3533	27.4022	C	2.5				2.5
M035	59.3636	27.3919	D	2.3				2.3
M041	59.3497	27.4231	D	2.2				2.2

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
Bensen								
Jöhvi VOC				apr-05	july-aug -05	nov-dec -05	apr-06	
M030	59.3603	27.43	B	1.4	0.7	1.9		1.3
M033	59.3622	27.4025	B	1.5	0.7	2.4		1.5
M036	59.3581	27.4039	B	1.0	0.4			0.7
M037	59.3575	27.4142	B	1.3	2.8	1.6		1.9
M039	59.3533	27.4286	B	1.0	0.4			0.7
M042	59.3531	27.4106	B	1.4	0.9			1.2
M098	59.3692	27.3889	B		0.4	1.3		0.8
M031	59.3633	27.4356	C	1.5				1.5
M032	59.3614	27.4206	C	1.5		1.5		1.5
M034	59.3653	27.4053	C	1.1				1.1
M038	59.3589	27.4425	C	2.3				2.3
M040	59.3506	27.4156	C	1.0	0.3	2.6		1.3
M043	59.3533	27.4022	C	1.5	0.5			1.0
M035	59.3636	27.3919	D	1.0	0.3			0.6
M041	59.3497	27.4231	D	1.1				1.1

Narva

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				NO2	NO2	NO2	NO2	
Narva NO2				apr-05	july-aug -05	nov-dec -05	apr-06	
M007	59.3772	28.1919	B	16.1	21.0	18.2		18.4
M008	59.3719	28.1972	B	22.8	27.8	22.7		24.4
M011	59.3644	28.1964	B	20.5	16.3	17.5		18.1
M016	59.3636	28.1772	B	10.4				10.4
M017	59.3742	28.155	B	13.7	13.7			13.7
M019	59.3742	28.1819	B	20.1	24.6	19.1		21.3
M020	59.3794	28.1794	B	17.9	18.9	18.5		18.4
M022	59.3878	28.1753	B	10.6	9.9	11.9		10.8
M027	59.3867	28.1981	B	9.2	12.5	11.2		11.0
M028	59.3842	28.1594	B	13.8	10.9	12.8		12.5
M006	59.3806	28.1983	C	8.5				8.5
M010	59.3697	28.2014	C	17.5				17.5
M012	59.3631	28.1931	C	9.0				9.0
M014	59.3689	28.1814	C	10.0	10.8	9.5		10.1
M015	59.3633	28.1825	C	9.3				9.3
M018	59.3744	28.1678	C	9.5		10.2		9.8
M021	59.3825	28.1828	C	9.6				9.6
M023	59.3881	28.1675	C	7.6	6.4	9.4		7.8
M026	59.3889	28.1986	C	7.7				7.7
M029	59.3808	28.1631	C	9.0	9.1	9.4		9.2
M013	59.3631	28.1931	D	14.2	6.7			10.4
M024	59.395	28.1928	D	5.9	5.9			5.9
M025	59.3889	28.1925	D	7.4				7.4

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				O3	O3	O3	O3	
Narva O3				apr-05	juli-aug - 05	nov-dec -05	apr-06	
M007	59.3772	28.1919	B		36			36
M011	59.3644	28.1964	B		45			45
M020	59.3794	28.1794	B		47	31		39
M014	59.3689	28.1814	C		44	40		42
M029	59.3808	28.1631	C		40			40
M024	59.395	28.1928	D		41			41

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				SO2	SO2	SO2	SO2	
Narva SO2				apr-05	july-aug -05	nov-dec -05	apr-06	
M007	59.3772	28.1919	B	3.7				3.7
M008	59.3719	28.1972	B	3.8				3.8
M011	59.3644	28.1964	B	3.6				3.6
M016	59.3636	28.1772	B	3.5				3.5
M017	59.3742	28.155	B	6.9				6.9
M019	59.3742	28.1819	B	4.6				4.6
M020	59.3794	28.1794	B	4.6		2.5		3.6
M022	59.3878	28.1753	B	6.2				6.2
M027	59.3867	28.1981	B	4.2		2.2		3.2
M028	59.3842	28.1594	B	8.4				8.4
M006	59.3806	28.1983	C	4.2				4.2
M010	59.3697	28.2014	C	3.8				3.8
M012	59.3631	28.1931	C	3.2				3.2
M014	59.3689	28.1814	C			2.2		2.2
M015	59.3633	28.1825	C	3.3				3.3
M018	59.3744	28.1678	C	4.2				4.2
M021	59.3825	28.1828	C	4.0				4.0
M023	59.3881	28.1675	C	6.9				6.9
M026	59.3889	28.1986	C	4.3				4.3
M029	59.3808	28.1631	C	7.6				7.6
M013	59.3631	28.1931	D	3.7				3.7
M024	59.395	28.1928	D	5.3				5.3
M025	59.3889	28.1925	D	4.8				4.8

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
Bensen								
Narva VOC				**apr-05**	**july-aug -05**	**nov-dec -05**	**apr-06**	
M007	59.3772	28.1919	B	1.7	1.5	2.4		1.9
M008	59.3719	28.1972	B	1.7	1.1	2.2		1.6
M011	59.3644	28.1964	B	1.4	1.2	2.1		1.6
M016	59.3636	28.1772	B	1.2				1.2
M017	59.3742	28.155	B	1.5	1.0			1.2
M019	59.3742	28.1819	B	2.5	1.8	3.4		2.6
M020	59.3794	28.1794	B	1.7	1.2	2.7		1.9
M022	59.3878	28.1753	B	2.9	0.9	2.2		2.0
M027	59.3867	28.1981	B	1.4	1.0	2.5		1.6
M028	59.3842	28.1594	B	1.5	1.0	1.9		1.5
M045	59.4086	27.2931	B	1.5				1.5
M006	59.3806	28.1983	C	1.1				1.1
M010	59.3697	28.2014	C	1.4				1.4
M012	59.3631	28.1931	C	1.3				1.3
M014	59.3689	28.1814	C	1.1	0.5	1.7		1.1
M015	59.3633	28.1825	C	1.1				1.1
M018	59.3744	28.1678	C	1.1	0.5	1.5		1.0
M021	59.3825	28.1828	C	1.1				1.1
M023	59.3881	28.1675	C	1.2	0.4	1.5		1.0
M026	59.3889	28.1986	C	1.7				1.7
M029	59.3808	28.1631	C	1.1		1.6		1.4
M013	59.3631	28.1931	D	0.9	0.5			0.7
M024	59.3950	28.1928	D	1.5				1.5
M025	59.3889	28.1925	D	1.3				1.3
M009	59.3731	28.2011	D	1.1				1.1

Background

Name	Lat.	Long.		Period 1	Period 2	Period 3	Period 4	Average
				NO2	NO2	NO2	NO2	
Background NO2				apr-05	july-aug -05	nov-dec -05	apr-06	
M001	59.2094	25.7064	E	1.9	1.3	2.9	1.9	2.0
M002	59.2233	26.1858	E	1.8	0.9	3.1		1.9
M003	59.5153	25.9281	E	1.9	1.2	3.2	2.9	2.3
M004	59.4961	26.6264	E	2.6	1.5	3.4	2.9	2.6
M005	59.2917	26.8789	E	1.9	1.0	2.8	1.6	1.8
M005			E		0.8			0.8
M057	59.2544	27.4069	E	2.6	1.4	3.8	2.5	2.6
M058	58.87	26.8322	E	1.5	0.8	3.4	1.4	1.8
M059	58.8992	26.3147	E	2.1	1.3	3.2		2.2
M060	58.5883	26.8133	E	1.6	0.8	3.7	1.7	1.9
M090	58.6328	26.2386	E	1.5	0.8	3.7	1.4	1.9
M091	58.5892	25.7533	E	1.6	0.9	3.2		1.9
M092	58.9078	25.6808	E	1.8	1.1	4.4	2.1	2.4
M093	58.9206	25.0325	E	1.5	0.8	2.9	1.4	1.7
M094	59.2517	25.0578	E	2.2	1.2	3.8	1.9	2.3
T001	59.2708	24.3839	E	3.7	1.5	4.3		3.2
T002	59.2147	23.9278	E	2.6	0.9	1.9		1.8
T003	58.9219	23.7872	E	2.1	1.2	0.8		1.4
T004	58.6311	23.8003	E	1.7	0.8	2.5		1.7
T005	58.3747	23.805	E	1.8	0.9	2.1		1.6
T006	58.0669	24.5664	E	2.3	1.0	2.7		2.0
T007	58.0772	25.0531	E	1.2	1.9			1.6
T008	58.0564	25.5883	E	1.4	2.4			1.9
T009	57.7383	26.1781	E	1.5	0.9	3.3		1.9
T010	57.6581	26.8369	E	1.3	0.7	2.3		1.4
T011	57.6675	27.2767	E	1.2	0.8	2.7		1.6
T012	57.9672	27.2983	E	1.5	0.9	2.7		1.7
T013	58.2814	27.4225	E	1.6	0.9	3.3		1.9
T014	58.2839	26.8292	E	2.3	3.8	3.1		3.1
T015	57.9986	26.8208	E	1.5	1.1	3.4		2.0
T016	57.975	26.2508	E	2.0	1.3	2.9		2.1
T017	58.3325	26.2244	E	1.7	1.8	3.8		2.4
T018	58.3244	25.6514	E	1.8	2.0	3.4		2.4
T019	58.3653	25.0597	E	1.3	0.8	2.1		1.4
T020	58.5689	25.0314	E	1.5	1.9	2.6		2.0
T021	58.6436	24.3794	E	1.8	2.5	2.5		2.3
T022	58.9553	24.3294	E	2.0	0.7			1.3
T023	58.6114	23.205	E	1.7	1.1	2.2		1.7
T024	58.3156	22.05	E	1.9	0.8	2.2		1.7
T025	58.3189	22.4606	E	2.0	1.2	3.0		2.1

Name	Lat.	Long.		Period 1	Period 2	Period 3	Period 4	Average
				NO2	NO2	NO2	NO2	
Background NO2				apr-05	july-aug -05	nov-dec -05	apr-06	
T301 Hiiumaa	58.8408	22.6633	E			2.4		2.4
T302 Uustalu	59.1086	24.4631	E			4.5	3.6	4.0

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				O3	O3	O3	O3	
Background O3				apr-05	july-aug 05	nov-dec 05	april-may 06	
M001	59.2094	25.7064	E		32	34		33
M002	59.2233	26.1858	E		36	36		36
M003	59.5153	25.9281	E		42	40	91	58
M004	59.4961	26.6264	E		53	42		47
M005	59.2917	26.8789	E		36	37		37
M057	59.2544	27.4069	E		46	39		42
M058	58.87	26.8322	E		37	34		36
M059	58.8992	26.3147	E		41	29		35
M060	58.5883	26.8133	E		32	32	91	52
M090	58.6328	26.2386	E		34	31		33
M091	58.5892	25.7533	E		32	38		35
M092	58.9078	25.6808	E		40	33		36
M093	58.9206	25.0325	E		29	32		30
M094	59.2517	25.0578	E		25	40		33
T001	59.2708	24.3839	E		47	34		41
T002	59.2147	23.9278	E		24	41		32
T003	58.9219	23.7872	E		47	36		41
T004	58.6311	23.8003	E		34	45		39
T005	58.3747	23.805	E		47	36		41
T006	58.0669	24.5664	E		33	34		33
T007	58.0772	25.0531	E		32			32
T008	58.0564	25.5883	E		35	39		37
T009	57.7383	26.1781	E		45	37		41
T010	57.6581	26.8369	E		35	34		34
T011	57.6675	27.2767	E		37	35		36
T012	57.9672	27.2983	E		38			38
T013	58.2814	27.4225	E		38	38		38
T014	58.2839	26.8292	E		45	42		44
T015	57.9986	26.8208	E		42	35		39
T016	57.975	26.2508	E		39			39
T017	58.3325	26.2244	E		45	38		42
T018	58.3244	25.6514	E		43	37		40
T019	58.3653	25.0597	E		38	30		34
T020	58.5689	25.0314	E		30	28		29
T021	58.6436	24.3794	E		40	34		37
T022	58.9553	24.3294	E		35			35
T023	58.6114	23.205	E		41	36		39
T024	58.3156	22.05	E		37	36	88	53
T025	58.3189	22.4606	E		36	40		38
T301 Hiiumaa	58.8408	22.6633	E			35		35

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				SO2	SO2	SO2	SO2	
Background SO2				april-05	july-aug 05	nov-dec 05	apr-06	
M001	59.2094	25.7064	E	0.8				0.8
M002	59.2233	26.1858	E	1.0				1.0
M003	59.5153	25.9281	E	1.3		1.0	1.9	1.4
M004	59.4961	26.6264	E	1.4				1.4
M005	59.2917	26.8789	E	3.3	0.8	1.3		1.8
M057	59.2544	27.4069	E	3.2	1.9			2.5
M058	58.87	26.8322	E	1.3				1.3
M059	58.8992	26.3147	E	1.3				1.3
M060	58.5883	26.8133	E	1.0			1.4	1.2
M090	58.6328	26.2386	E	1.1				1.1
M091	58.5892	25.7533	E	0.9				0.9
M092	58.9078	25.6808	E	1.1				1.1
M093	58.9206	25.0325	E	0.9				0.9
M094	59.2517	25.0578	E	0.8				0.8
T001	59.2708	24.3839	E	1.1				1.1
T002	59.2147	23.9278	E	1.2				1.2
T003	58.9219	23.7872	E	1.1				1.1
T004	58.6311	23.8003	E	1.1				1.1
T005	58.3747	23.805	E	0.8				0.8
T006	58.0669	24.5664	E	1.3				1.3
T007	58.0772	25.0531	E	0.9				0.9
T008	58.0564	25.5883	E	1.0				1.0
T009	57.7383	26.1781	E	1.1				1.1
T010	57.6581	26.8369	E	0.9				0.9
T011	57.6675	27.2767	E	0.9				0.9
T012	57.9672	27.2983	E	0.9				0.9
T013	58.2814	27.4225	E	1.3				1.3
T014	58.2839	26.8292	E	1.1				1.1
T015	57.9986	26.8208	E	1.0				1.0
T016	57.975	26.2508	E	1.0				1.0
T017	58.3325	26.2244	E	1.2				1.2
T018	58.3244	25.6514	E	1.6	0.7	0.9		1.1
T019	58.3653	25.0597	E	0.9				0.9
T020	58.5689	25.0314	E	0.9				0.9
T021	58.6436	24.3794	E	0.8				0.8
T022	58.9553	24.3294	E	0.7				0.7
T023	58.6114	23.205	E	0.5				0.5
T024	58.3156	22.05	E	0.6		0.6	1.0	0.7
T025	58.3189	22.4606	E	0.5				0.5
T302	59.1086	24.4631	E			0.7		0.7

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Ave-rage
Background VOC Bensen				**1-8april 05**	**22-27 july 05**	**nov-dec 05**	**15 april -22april -06**	**22 april -1 may 06**	**1 may-7 may - 06**	
M001	59.2094	25.7064	E	0.6	0.1	1.4				0.7
M002	59.2233	26.1858	E	0.7	0.1	1.1				0.6
M003	59.5153	25.9281	E	0.6	0.1	1.0	0.6	0.6		0.6
M004	59.4961	26.6264	E	0.7	0.2	1.3				0.7
M005	59.2917	26.8789	E	0.8	0.1	1.0				0.6
M057	59.2544	27.4069	E	0.8	0.1	1.7				0.9
M058	58.8700	26.8322	E	0.8	0.1	1.4				0.8
M059	58.8992	26.3147	E	0.7	0.1	1.6				0.8
M060	58.5883	26.8133	E	0.6	0.1	1.7	0.4	0.7		0.7
M090	58.6328	26.2386	E	1.2	0.1	1.1				0.8
M091	58.5892	25.7533	E	2.2	0.2	1.1				1.1
M092	58.9078	25.6808	E	1.8		1.2				1.5
M093	58.9206	25.0325	E	0.8		1.1				0.9
M094	59.2517	25.0578	E	0.8	0.1	0.8				0.6
T001	59.2708	24.3839	E	1.2		1.0				1.1
T002	59.2147	23.9278	E	0.7		0.7				0.7
T003	58.9219	23.7872	E			0.7				0.7
T004	58.6311	23.8003	E	0.7		1.0				0.8
T005	58.3747	23.805	E	0.9	0.1	1.0				0.7
T006	58.0669	24.5664	E	0.6		1.0				0.8
T007	58.0772	25.0531	E	1.8		1.1				1.5
T008	58.0564	25.5883	E	0.5		1.1				0.8
T009	57.7383	26.1781	E	0.8	0.4	1.2				0.8
T010	57.6581	26.8369	E	0.9	0.3	1.1				0.8
T011	57.6675	27.2767	E	1.0	0.2	1.1				0.8
T012	57.9672	27.2983	E	0.5		1.0				0.8
T013	58.2814	27.4225	E	0.7		1.1				0.9
T014	58.2839	26.8292	E	0.7		1.1				0.9
T015	57.9986	26.8208	E	0.9		1.2				1.0
T016	57.9750	26.2508	E	1.3		1.4				1.4
T017	58.3325	26.2244	E	0.6	0.1	1.3				0.7
T018	58.3244	25.6514	E	0.7	0.2	1.2				0.7
T019	58.3653	25.0597	E	0.7	0.1	1.0				0.6
T020	58.5689	25.0314	E	0.8	0.1	1.1				0.7
T021	58.6436	24.3794	E	1.1		1.0				1.0
T022	58.9553	24.3294	E	0.8	0.1					0.4
T023	58.6114	23.205	E	1.5		0.9				1.2
T024	58.3156	22.05	E	0.3		0.9				0.6
T025	58.3189	22.4606	E	0.5		1.1				0.8

Special

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				NO2	NO2	NO2	NO2	
Special NO2 µg/m3				apr-05	july-aug –05	nov-dec –05	apr-06	
M095	59.4275	24.719	B1	26.5				26.5
M096	59.4139	24.649	C1	11.4				11.4
M097	59.4133	24.651	C1	11.6				11.6
M301	59.4164	24.703	C1			18.2	21.1	19.7
M302	59.4328	24.743	B1			32.1	39.8	35.9
M303	59.4425	24.764	C1			30.9		30.9
M304	59.4308	24.76	B1		19.3	29.0	33.3	27.2
M305	59.4242	24.786	B1			31.6	41.8	36.7
M306	59.4286	24.726	B1			33.7	40.4	37.1
M406	59.4269	24.779					61.7	61.7
M407	59.4422	24.795					36.2	36.2
M412	59.2661	25.965					13.5	13.5
M413	58.7403	26.37					8.6	8.6
M414	58.9189	25.013					9.8	9.8
T303	59.4133	24.651	V1		10.0			10.0
T304 ÖISMÄE	59.4308	24.76	C1		6.2	15.6	14.7	12.1
T304 Öismäe 12						12.5		12.5
T304 Öismäe 13							14.2	14.2
T305 Jahu	59.4792	24.856	C			13.9	11.4	12.7
T307 BLRT	59.46	24.664	C		7.5	14.2		10.8
T308 Lagedi	59.4339	24.918	C			20.6		20.6
T309 Haabersti	59.4239	24.647	B			22.9	27.8	25.4
T310 Marjamaa	59.4256	24.685	C			15.8		15.8
T311 Järve	59.3925	24.722	B			33.6	27.7	30.7
T312 Kilingi-Nömme	58.1486	24.956					6.0	6.0
T312 Nömme	59.3878	24.684	B			27.5	25.3	26.4
Test	59.4247	24.686					0.1	0.1
Vertikaal 1							43.2	43.2
Vertikaal 2							42.2	42.2
Vertikaal 3							41.2	41.2
Vertikaal 4							39.0	39.0
Viljandi	58.3636	25.617					6.5	6.5
Estonia, Muuga 1	59.4944	24.931			7.3			7.3

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				NO2	NO2	NO2	NO2	
Special NO2 µg/m3				apr-05	july-aug –05	nov-dec –05	apr-06	
Estonia, Muuga 2	59.4931	24.957			6.1			6.1
Estonia, Road L1					5.6			5.6
Estonia, Road L2					4.3			4.3
Estonia, Road L3					3.6			3.6
Estonia, Road L4					3.5			3.5
Estonia, Road L5					3.2			3.2
Estonia, Road R1					4.9			4.9
Estonia, Road R2					4.3			4.3
Estonia, Road R3					3.8			3.8
Estonia, Road R4					3.4			3.4
Estonia, Road R5					3.3			3.3
IVL idnr 564261							9.7	9.7
Karksi Nuia	58.1019	25.553					3.2	3.2
Kopli	59.4472	22.663				21.3		21.3
Kuressaare	58.2594	22.496					8.9	8.9
Pölva	58.0522	27.057					11.1	11.1
Scantrans 1	59.4542	24.713	C1		12.3			12.3
Scantrans 1	59.4542	24.713	C1		12.5			12.5
Scantrans 2	59.4539	24.71	B1		13.7			13.7
T026	58.3897	24.3039	B	14.3	12.2	15.4		13.9
M101	59.4089	27.2197	E		2.0			2.0

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				O3	O3	O3	O3	
Special O3				apr-05	july-aug –05	nov-dec –05	apr-06	
M304	59.4308	24.76	B1		36	40	67	47
M402	59.3442	24.066					92	92
T303	59.4133	24.651	V1		53			53
T304 ÖISMÄE	59.4308	24.76	C1		45	36	83	55
T305 Jahu	59.4792	24.856	C			35	87	61
T307 BLRT	59.46	24.664	C		45			45
Estonia, Muuga 1	59.4944	24.931			42			42
Estonia, Muuga 2	59.4931	24.957			41			41
Estonia, Road L1					42			42
Estonia, Road L2					42			42
Estonia, Road L3					42			42
Estonia, Road L4					45			45
Estonia, Road L5					43			43
Estonia, Road R1					43			43
Estonia, Road R2					43			43
Estonia, Road R3					45			45
Estonia, Road R4					44			44
Estonia, Road R5					45			45
Kopli	59.4472	22.663				33		33
Maardu 7	59.4936	24.931					76	76
Scantrans 1	59.4542	24.713	C1		42			42
Scantrans 1	59.4542	24.713	C1		46			46
Scantrans 2	59.4539	24.71	B1		43			43
T026	58.3897	24.3039	B		47			47

Name	Lat.	Long.	Site	Period 1	Period 2	Period 3	Period 4	Average
				SO2	SO2	SO2	SO2	
Special SO2				apr-05	july-aug –05	nov-dec –05	apr-06	
M095	59.4275	24.719	B1	2.3				2.3
M096	59.4139	24.649	C1	1.9				1.9
M097	59.4133	24.651	C1	1.9				1.9
M301	59.4164	24.703	C1			1.5	3.2	2.4
M302	59.4328	24.743	B1			1.1		1.1
M303	59.4425	24.764	C1			15.9	6.8	11.3
M304	59.4308	24.76	B1			1.9	3.4	2.7
M305	59.4242	24.786	B1			1.8		1.8
M306	59.4286	24.726	B1			1.5		1.5
M404	59.4422	24.781					6.3	6.3
M405	59.4458	24.755					5.3	5.3
T304 ÖISMÄE	59.4308	24.76	C1			1.1	2.6	1.9
T304 Öismäe 12						1.1		1.1
T305 Jahu	59.4792	24.856	C			1.4	3.6	2.5
T307 BLRT	59.46	24.664	C			4.7		4.7
T308 Lagedi	59.4339	24.918	C			1.0		1.0
T309 Haabersti	59.4239	24.647	B			1.5		1.5
T310 Marjamaa	59.4256	24.685	C			1.4		1.4
T311 Järve	59.3925	24.722	B			1.4		1.4
T312 Nömme	59.3878	24.684	B			1.8		1.8
Kopli	59.4472	22.663				3.2		3.2
Maardu 2							2.8	2.8
Maardu 7							6.6	6.6
T026	58.3897	24.3039	B	2.1				2.1
M101	59.4089	27.2197	E		6.1			6.1

Name	Lat.	Long.	Site	Period 1	Period 2 a	Period 2 b	Period 3	Period 4	Period 5	Period 6	Ave-rage
Bensen											
Special VOC				**apr-05**	**july-aug -05**	**aug-sept-05**	**nov-dec -05**	**15 apr-22 apr -06**	**22apr -1may -06**	**1 maj-7 may -06**	
M095	59.4275	24.719	B1	2.2							2.2
M096	59.4139	24.649	C1	0.8	0.3						0.6
M097	59.4133	24.651	C1	1.1							1.1
M301	59.4164	24.703	C1				2.8				2.8
M302	59.4328	24.743	B1				1.8	1.1	1.4		1.4
M303	59.4425	24.764	C1				1.4	0.8	1.1		1.1
M304	59.4308	24.76	B1		0.6		1.5	1.0	1.1	1.5	1.1
M304 Liivalaia	59.4308	24.76	B1		0.8						0.8
M305	59.4242	24.786	B1				2.5	1.4	1.4	1.6	1.7
M306	59.4286	24.726	B1				2.7	1.8	1.8		2.1
M401 Tallin								0.8	0.8		0.8
M402 Tallin								2.5	4.7		3.6
M403 Tallin								0.6	1.5		1.0
M404 Tallin								0.6	0.9		0.7
M405 Tallin								0.6	0.9		0.8
M407 Tallin								1.0	1.4		1.2
T301	58.8408	22.663	E				0.8				0.8
T302	59.1086	24.463	E				0.8				0.8
T303	59.4133	24.651	V1				1.1				1.1
T304	59.4308	24.76	C1		0.5		1.1	0.4	0.9		0.7
T305	59.4792	24.856	C1				1.1	0.7	1.6		1.1
T306							3.5				3.5
T307	59.46	24.664	C1		0.6		1.0	0.6	1.1		0.8
T308	59.4339	24.918	C1				1.2	0.6	0.8		0.8
T309	59.4239	24.647	B1				1.6				1.6
T310	59.4256	24.685	C1				1.5				1.5
T311	59.3925	24.722	B1				1.7				1.7
T312	59.3878	24.684	B1				1.8				1.8
TP					2.2						2.2
Kopli	59.4472	22.663			0.4						0.4
Muuga 1 d						0.7					0.7
Muuga 2 d					0.7	1.4					1.1
PA					3.1						3.1
Scantrans 1	59.4542	24.713	C1		0.3	0.6		0.7	1.4		0.7
Scantrans 2	59.4539	24.71	B1		0.4	0.8		0.9	1.3		0.8
Scantrans 3	59.4553	24.689	C1		0.5	0.6					0.5
Tallin	59.4553	25.003						0.9	0.9		0.9

Maardu 1											
Tallin Maardu 2	59.4792	25.012						0.7	0.9		0.8
Tallin Maardu 3	59.4692	24.98						0.7	1.0		0.8
Tallin Maardu 4	59.4803	24.969						0.8	1.4		1.1
Tallin Maardu 5	59.4864	24.953						1.2	2.8		2.0
Tallin Maardu 6	59.4664	24.948						0.4	2.0		1.2
Tallin Maardu 7	59.4936	24.931						0.6	7.4		4.0
Tallin Maardu 8	59.4986	24.917						0.4	5.0		2.7