REPORT

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Nordic Council of Ministers

Final report from NMR project "Test of a filter pack combined with a PM_{10} inlet"

Project number 04FOX5

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B1686
June 2006

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Report Summary

Project title

Test of a filter pack combined with a PM_{10} inlet

Project sponsor

Nordic Council of Ministers,
Hav- och luftgruppen

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Title and subtitle of the report

Final report from NMR project "Test of a filter pack combined with a PM_{10} inlet"
project number 04FOX5

Summary

The EMEP filter pack for measuring gaseous and particulate reduced and oxidised nitrogen compounds in air has been modified with a PM_{10} inlet to meet the EU air quality directive for particle measurements. The filter pack also collects sulphur compounds as well as base cations and sodium chloride. The EMEP filter pack has been used for 20 years now and it is important that the PM_{10} inlet doesn't affect the results. The cut-off for the filter pack recommended by EMEP is unknown and may be affected by wind. Here it was found that the cut-off for the EMEP filter pack is larger than it is for PM_{10}. This implies that higher calcium concentrations will be obtained with the original EMEP filter pack without a PM_{10} inlet. All comparisons of the two filter packs show excellent agreement for sulphur dioxide and man made sulphate particles. Some losses of total nitrate have been found with the PM_{10} inlet especially of particulate nitrate. Some losses of particulate ammonium also take place but do not affect the total concentration.

Keyword

EMEP, PM_{10}, filter pack, nitric acid, nitrate, ammonia, ammonium, base cations.

Bibliographic data

IVL Report 1686

The report can be ordered via

Homepage: www.ivl.se, e-mail: publicationservice@ivl.se, fax+46 (0)8-598 563 90, or via IVL, P.O. Box 21060, SE-100 31 Stockholm Sweden

This report approved
2006-09-14

Peringe Grennfelt
Scientific Director

Innehållsförteckning

1 Introduction

Measurements of gaseous plus particulate nitrogen compounds can be made using a filter pack as recommended by EMEP. The filter pack consists of a membrane filter, a hydroxide impregnated filter and an oxalic acid impregnated filter in series. The filter pack is of the open face type in order to avoid losses of the reactive gaseous nitrogen compounds. This filter pack collects particulate ammonium, nitrate and sulphate on the first filter, nitric acid and sulphur dioxide on the second and ammonia on the last. Since the equilibria between gaseous and particulate nitrogen compounds can be displaced during filtration, only the total (gas + particulate) concentrations can be reliably measured.

The deposition of base cations counteracts the acidification. The base cation concentrations are therefore often measured on the first filter. Sodium and chloride concentrations are also obtained in these analyses and are therefore also reported.

The filter pack is protected from rain and wind by mounting it inside a tube (plastic bottle without bottom, see Fig. 1). The cut-off for the particle filter depends on wind speed and turbulence. This fact can influence the measured concentration of coarse particles (base cations, sodium chloride and a fraction of the nitrates).

According to an EU directive, the total mass of the PM_{10} fraction has to be monitored in urban areas all over Europe. In the Nordic countries, the background concentration of PM_{10} can contribute much to the measured urban concentration. In order to get the PM_{10} concentration at the EMEP sites at a low cost, it was therefore proposed to combine a PM_{10} samling head, developed by IVL, with the EMEP filter pack. The airflow through the IVL PM_{10} head and the diameter are similar to that used in the EMEP filter pack. The head and its internal parts are all made from polyoximethylene. Further advantages with such a combination are that analysis of the water-soluble ions in this PM_{10} fraction is obtained without extra sampling costs and that a well-defined cut-off for the base cations is obtained. A funding application was therefore sent to NMR. Funding was obtained for 2004 and 2005.

The modification of the PM_{10} head to fit the filter pack and the production of the heads as well as the co-ordination of the project were carried out by IVL in Sweden. The combined filter pack is shown in Fig. 1. It is mounted inside a similar rain shield as the EMEP filter pack. FMI in Finland, NILU in Norway and DMU in Denmark have carried out measurements with the two different filter packs. A modification of the EMEP recommended filter pack sampling method was used in Finland and Denmark. The methods were, however, the normal procedures used for their countries. Sampling was made at Virolahti in Finland, Birkenes in Norway and Lille Valby in Denmark.

Due to some analytical problems, NILU repeated the test later at Kjeller.

1.1 Test of the collection efficiency for coarse particles in the EMEP filter pack

Only at NILU the filters in the EMEP filter pack were weighed in order to see if the data produced since the start in the middle of the 1980's represent PM_{10} (Fig. 2). The particle masses were often higher on the EMEP filter pack than on the combined PM_{10} filter. This suggests that the cut-off

often is higher than 10 μm for the EMEP filter pack. The cut-off is, however, most likely wind dependent.

Of all the particles analysed, the largest were those consisting of calcium compounds. The calcium concentration show slightly higher concentrations for the EMEP filter packs (Fig. 3) also suggesting that the cut-off for the EMEP filter pack is larger than PM_{10}. The slope (EMEP filter pack/PM_{10}) was higher at Kjeller than at Birkenes.

Sodium is also present in coarse particles, but generally in smaller particles than calcium. The sodium concentrations are shown in Fig. 4. The low slope for Lille Valby is caused by the two highest concentrations obtained with the PM_{10} head. The slopes of the regression lines for the two Norwegian stations are lower than they are for calcium. This indicates the sodium particles were smaller than the calcium particles. The slope for the regression line for sodium at Kjeller is higher than unity and shows that the EMEP filter pack collects a larger fraction than PM_{10}. The sodium concentrations were very low at Virolahti and no conclusions can be drawn from these measurements.

1.2 Concentrations of nitrogen and sulphur species obtained with the new combined filter pack versus the old EMEP filter pack

Since there are long data series of nitrate sampled with the EMEP filter pack, it is necessary that the new PM_{10} combined filter pack gives the same result. Nitrate can be present in the same particles as sodium because of the reaction $HNO_3 + NaCl \rightarrow NaNO_3 + HCl$. At Kjeller the correlations between the two samplers are very similar for NO_3^- and Na^+ (note that the axes are reversed in Fig. 4 and 5). At Kjeller, the sum of Cl^- and NO_3^- concentrations also correlated very well with the Na^+ concentration on a molar basis and the $(Cl^- + NO_3^-)/Na^+$ ratio was close to that of sea water (1.17). This is a strong evidence for the sea salt – nitric acid reaction. This was not the case at Lille Valby, which has the highest particulate nitrate concentrations. At Lille Valby particulate nitrate was instead very well correlated with particulate ammonium, which suggests a formation of NH_4NO_3. Virolahti has much lower nitrate concentrations on the particle filter and the combined filter pack shows lower nitrate concentrations than the EMEP filter pack. This can perhaps be explained by the fact that a cellulose filter (which also collects some HNO_3) was used as particle filter in the EMEP filter pack at Virolahti.

Ammonium is only present in fine particles. Comparison between the combined filter pack and EMEPs filter pack is shown in Fig. 6. At Kjeller and Virolahti the results from the two collectors agree better than for particulate nitrate. At Lille Valby the combined filter pack collects less particulate ammonium compared to the EMEP filter pack than it does for nitrate. The results are not so easy to interpret.

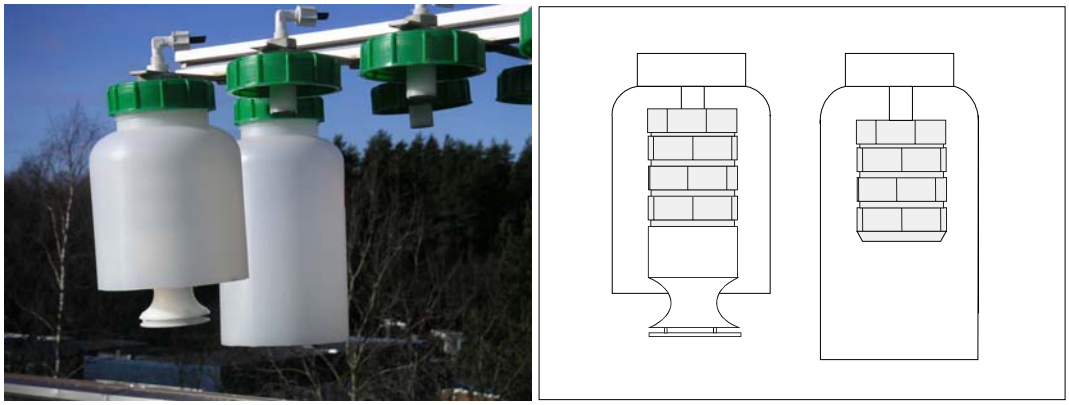
In order to understand the differences, the accuracy with the sampling and analysis must be known. Non marine particulate sulphate, which often consists of fine ammonium sulphate particles, are easy to sample because the sulphate part is not volatile and the particles are small. The comparison is shown in Fig. 7. As can be seen the two samplers agree well. A check of the accuracy in the measurements was also done with sulphur dioxide which is less reactive than the nitrogen compounds. The comparisons are shown in Fig. 8. The correlations are excellent and the slopes are close to unity.

Filter packs can not separate the particle and gas phases correctly. The sum of the two will, however, be correct if there are no losses in the filter holder. It is therefore crucial that the combined PM_{10} filter pack gives the same total (gas + particle) concentration as EMEPs filter pack which has been used for decades. Denuders can separate the two phases correctly. Earlier measurements have shown that the filter pack gives similar total concentrations as the denuder (Ferm et al., 1988).

The correlations for total nitrate are shown in Fig. 9. The correlations are similar as they were for particulate nitrate alone, except for Virolahti. At Virolahti the correlation is much better for total nitrate than it is for particulate. Similar plots for total ammonium are shown in Fig. 10. The plots for the total ammonium concentrations show a better agreement than for particulate ammonium at Lille Valby and Virolahti, but shows a little more scatter (but with a good slope) at Kjeller. This indicates that the filter artefacts that dispalaces the ammonia/ammonium equilibrium are different in the two samplers.

1.3 Data

All data can be found on page 13-20.



a *b*

Fig. 1. a) The combined filter pack (left) and the EMEP filter pack during sampling. b) The interior of the funnels.

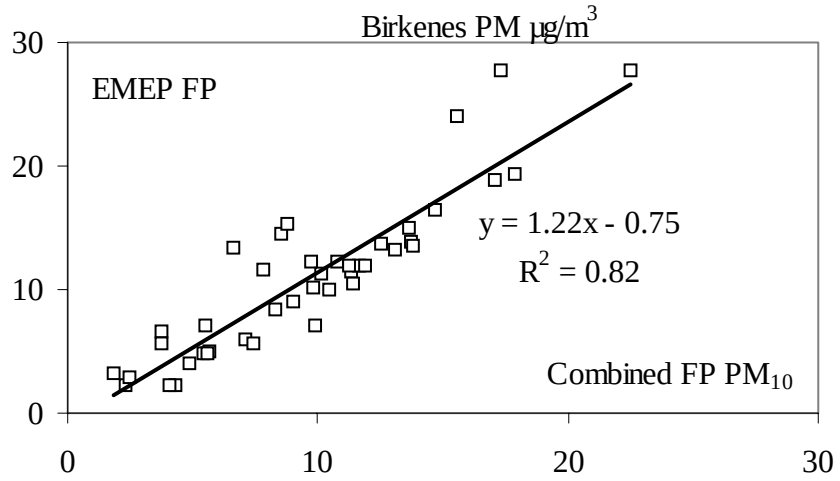


Fig. 2. The particle mass collected on the EMEP filter pack as a function of the PM_{10} fraction collected with the combined filter pack.

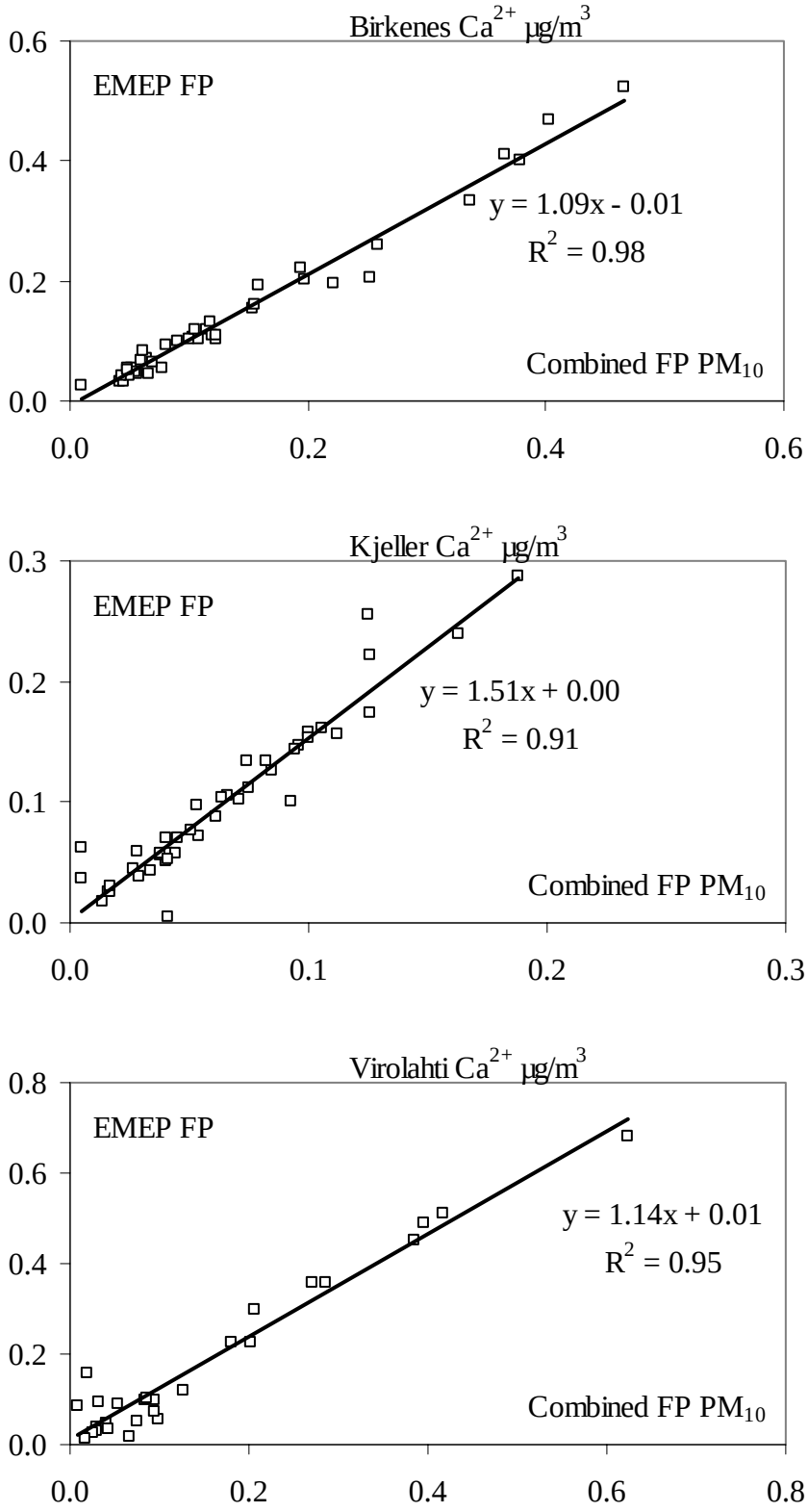


Fig. 3. The calcium concentration collected with the EMEP filter pack as a function of the calcium concentration collected with the combined filter pack.

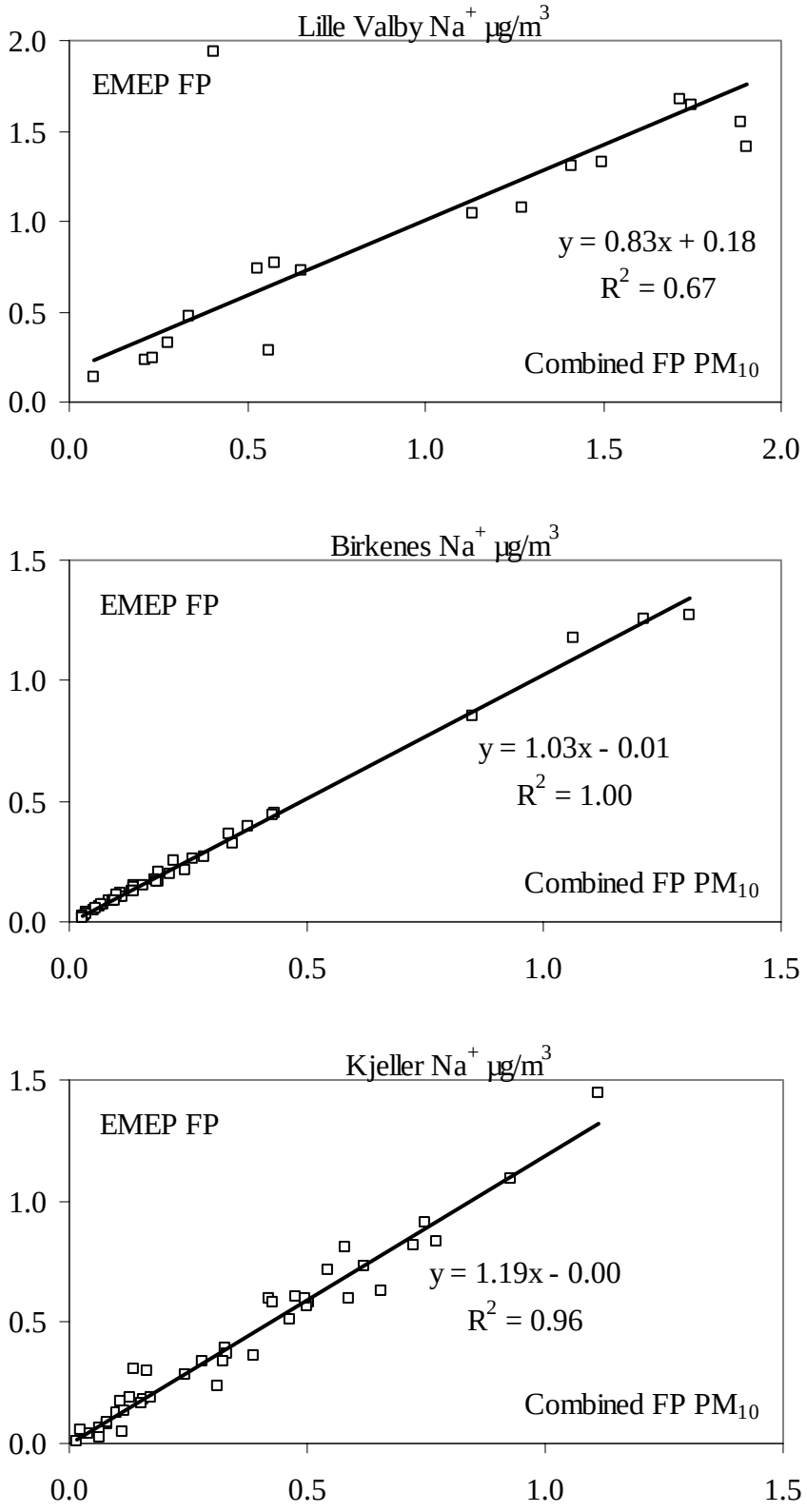


Fig. 4. The sodium concentration collected with the EMEP filter pack as a function of the sodium concentration collected with the combined filter pack.

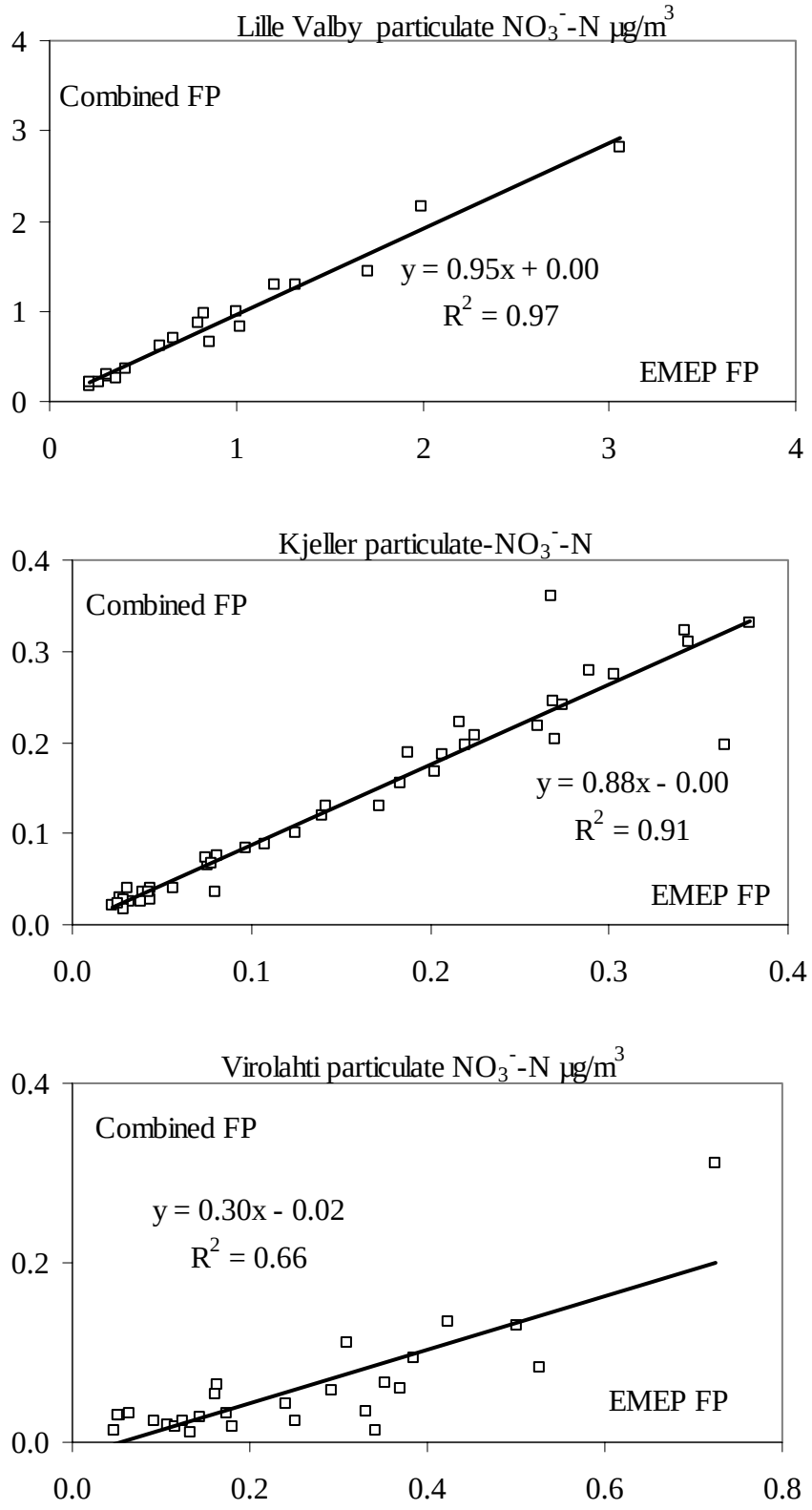


Fig. 5. The particulate nitrate concentration collected with the combined filter pack as a function of the particulate nitrate concentration collected with the EMEP filter pack.

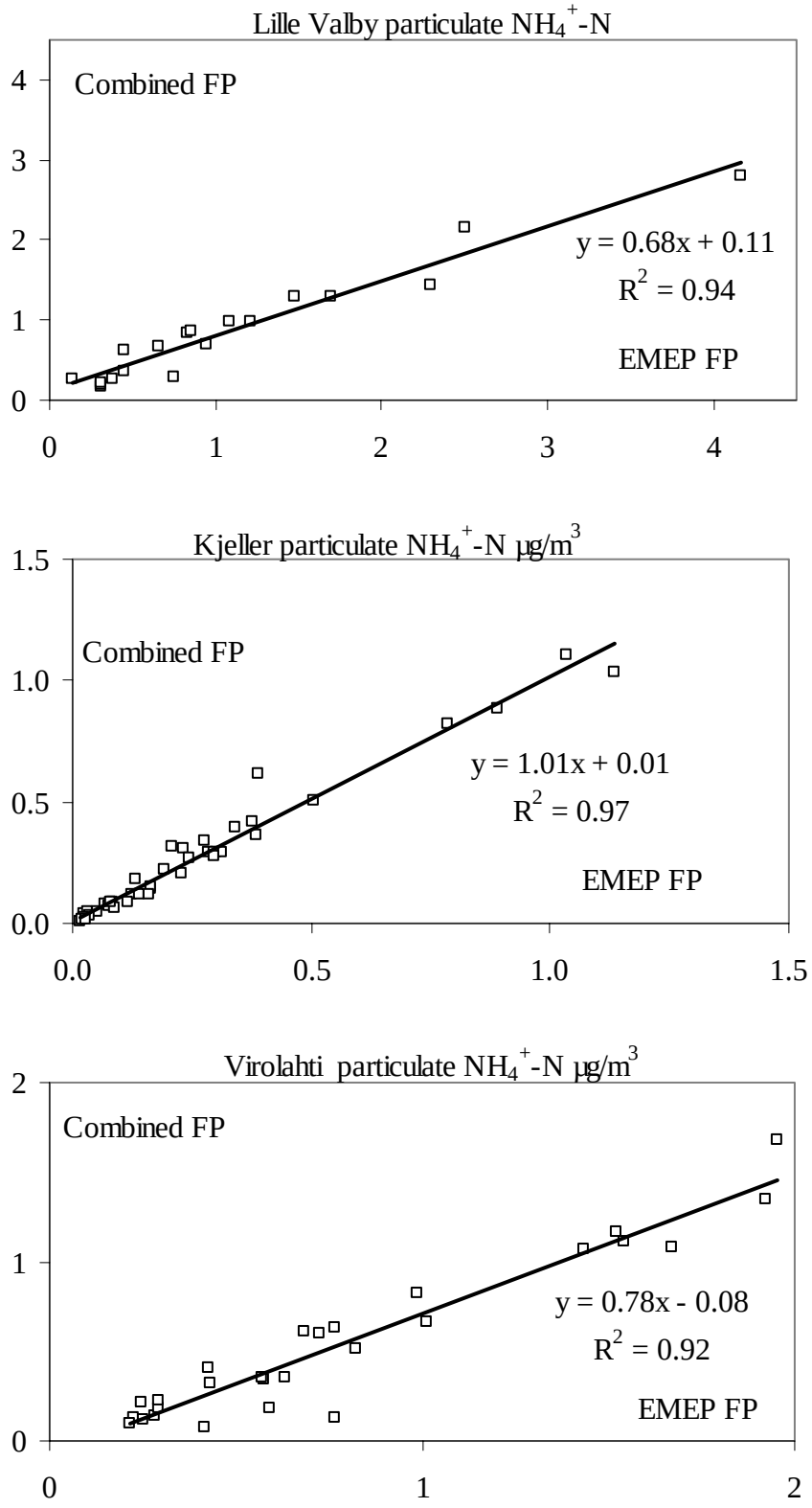


Fig. 6. The particulate ammonium concentration collected with the combined filter pack as a function of the particulate ammonium concentration collected with the EMEP filter pack.

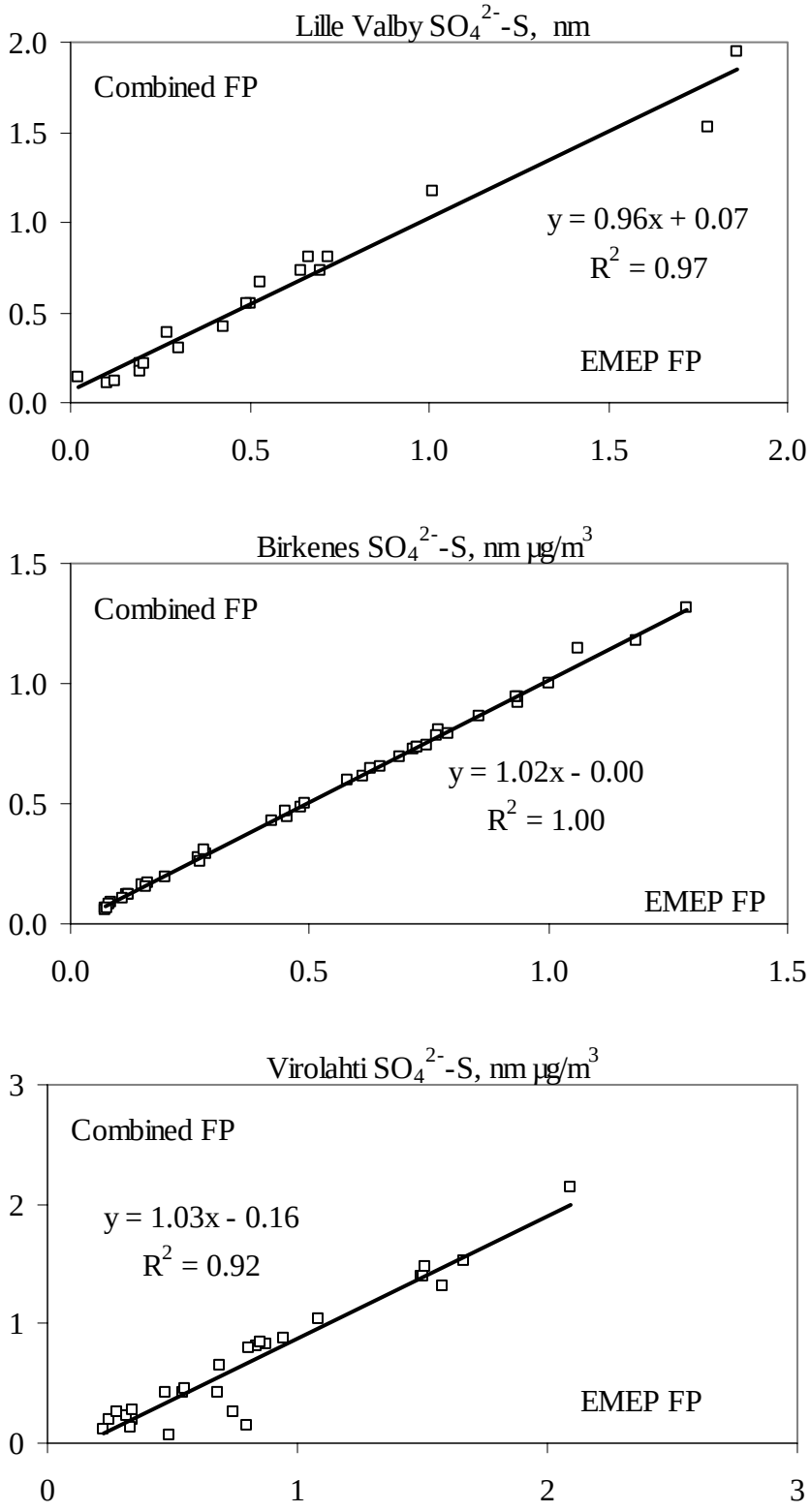


Fig. 7. The particulate non-marine sulphate concentration collected with the combined filter pack as a function of the non-marine sulphate concentration collected with the EMEP filter pack.

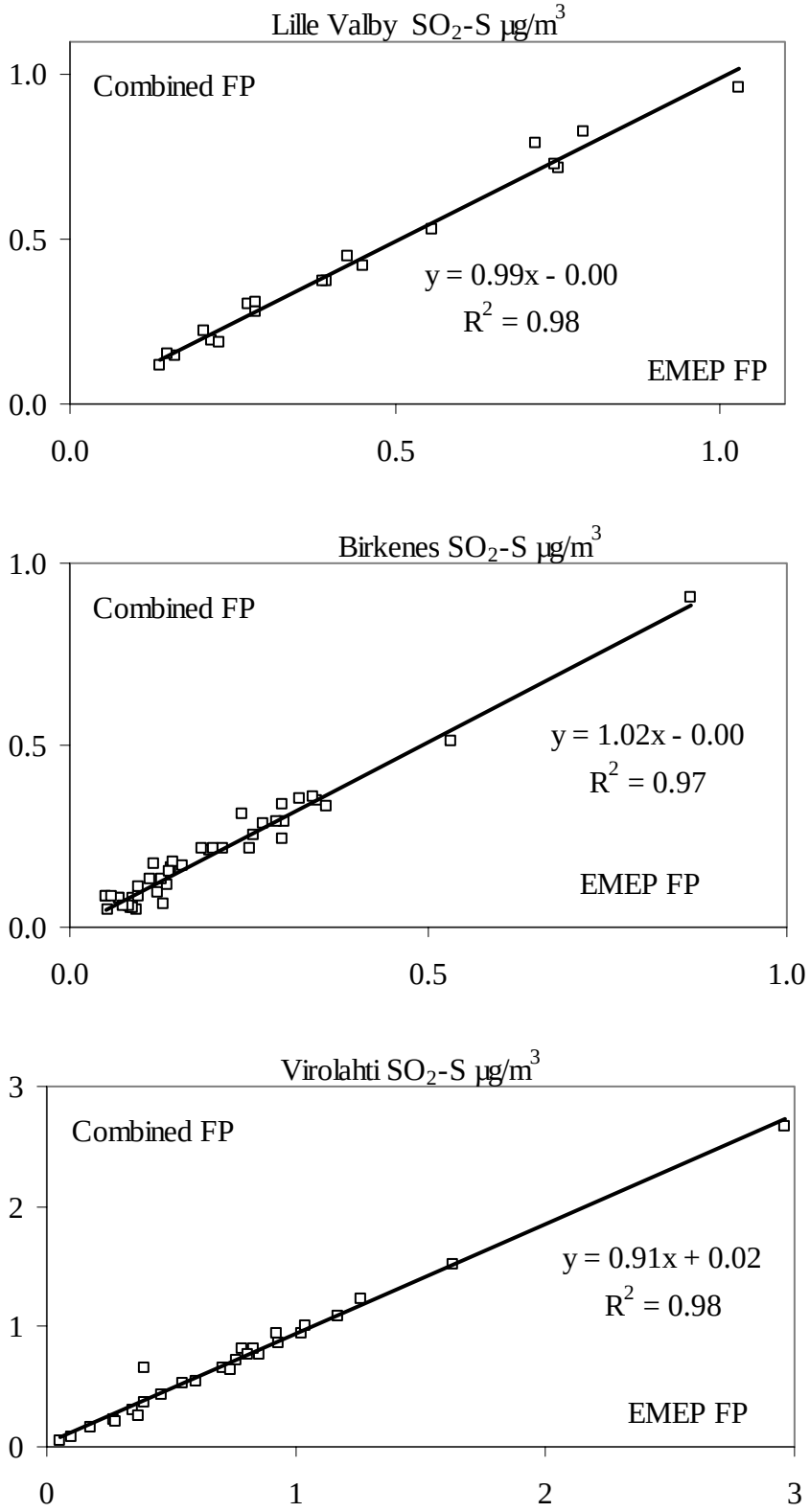


Fig. 8. The sulphur dioxide concentration collected with the combined filter pack as a function of the sulphur dioxide concentration collected with the EMEP filter pack.

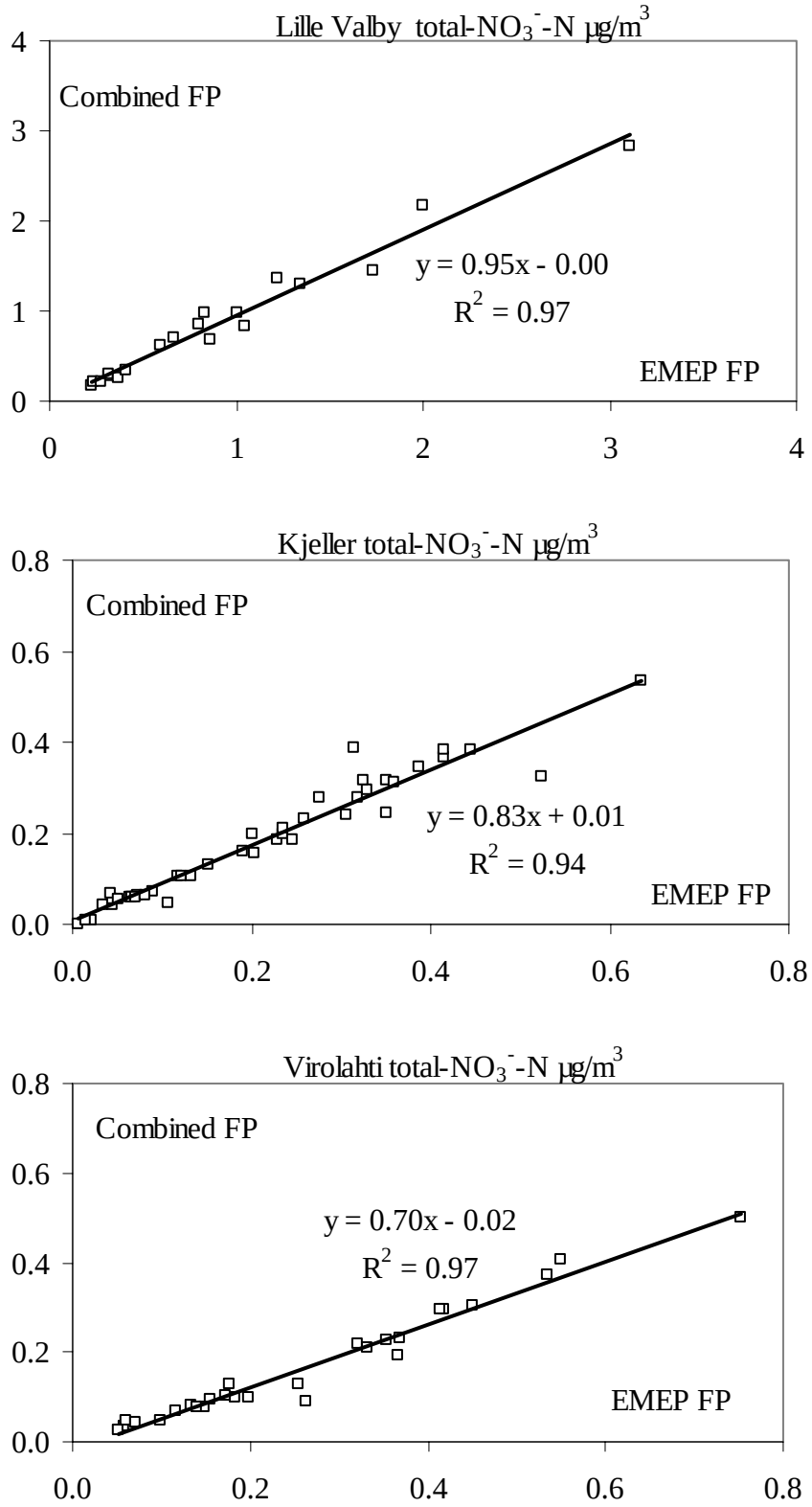


Fig. 9. The total nitrate concentration collected with the combined filter pack as a function of the total nitrate concentration collected with the EMEP filter pack.

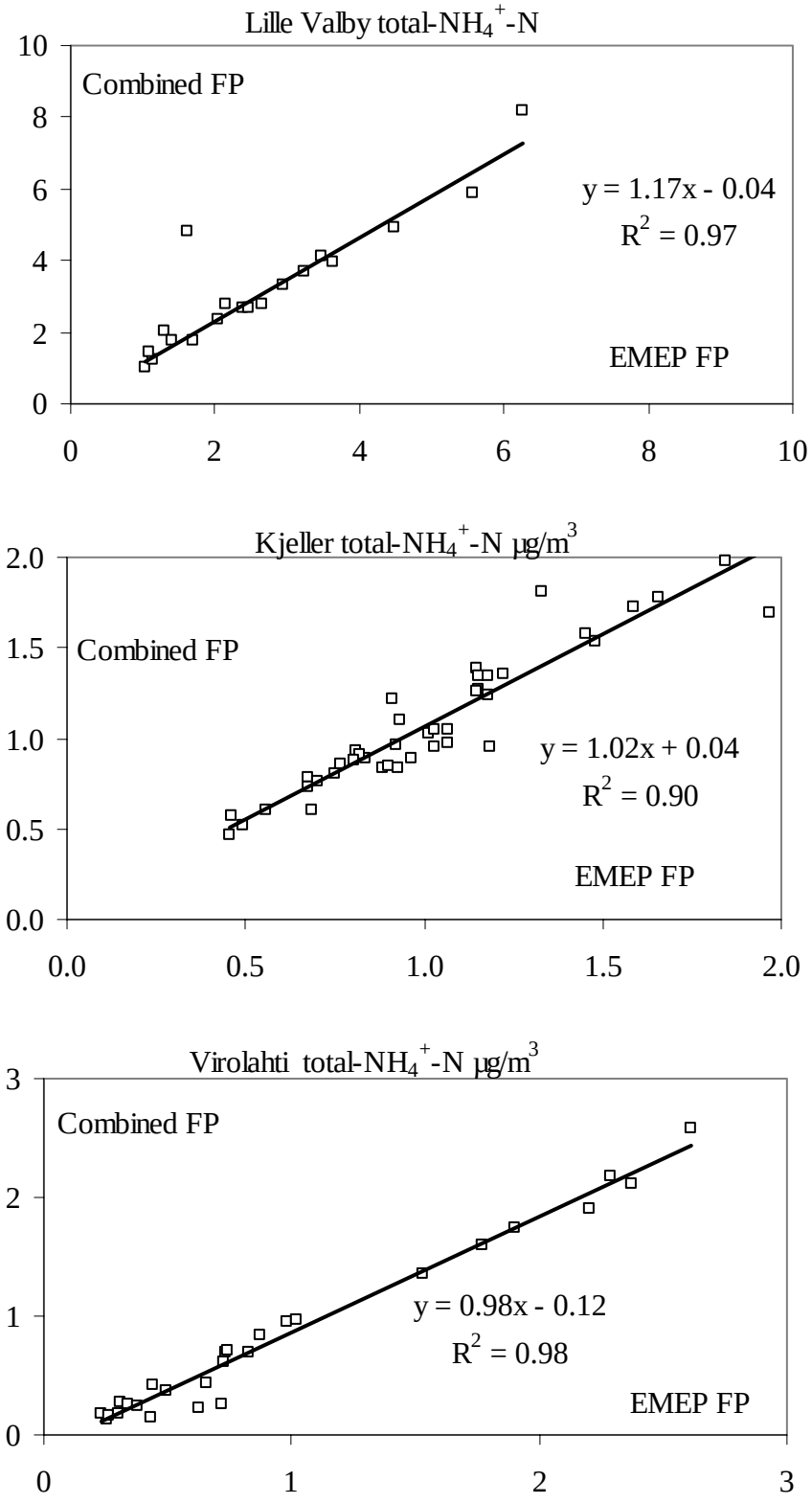


Fig. 10. The total ammonium concentration collected with the combined filter pack as a function of the total ammonium concentration collected with the EMEP filter pack.

2 Disseminations of results

The results from the first phase of this project have earlier been sent to the Nordic Council of Ministers (Ferm et al., 2005). The final results have been presented at the Seventh Meeting of the Task Force on Measurements and Modelling (TFMM) in Helsinki, Finland, 10 - 12 May 2006. PowerPoint slides from the presentation can be downloaded from: http://www.nilu.no/projects/ccc/tfmm/index.html.

3 Conclusions

The results from the new filter pack combined with a PM_{10} inlet agree well with the EMEP filter pack (without inlet and defined cut-off) for sulphur dioxide, sulphate and total ammonium.

Some losses of nitrate were observed in the combined PM_{10} filter pack.

The EMEP filter pack that has been used for two decades now, collects a larger particle mass than PM_{10}. The combined PM_{10} filter therefore gave lower concentrations of calcium in this study. The modellers at the TFMM meeting in Helsinki preferred the old EMEP filter pack, mainly because it collects more of the calcium particles.

4 Acknowledgement

Funding has been obtained from Nordic Council of Ministers, Hav- och luftgruppen.

5 References

Ferm M., Makkonen U., Hanssen J. E. and Ellermann T. (2005) Results from the first phase of the NMR project "Test of a filter pack combined with a PM_{10} inlet" project number 04FOX5. IVL report U1087.

Ferm M., Areskoug H., Hanssen J-E., Hilbert G. and Lättilä H. (1988) Field intercomparison of measurements techniques for total NH_4^+ and total NO_3^- in ambient air. *Atmospheric Environment* **22,** 2275-2281

Virolahti			**2-stage Filterpack, front filter**								**1-stage**	**2-stage back filter**	
Start	Stop	PM_{10}	NH_4^+-N	NO_3^--N	SO_4^{2-}-S	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_3-N	HNO_3-N	SO_2-S
yy-mm-dd	yy-mm-dd	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
04-04-20	04-04-21	30.5	1.92	0.73	1.68	0.16	0.13	0.302	0.451	0.060	2.20	0.03	1.63
04-04-21	04-04-22	10.1	0.63	0.18	0.69	0.08	0.15	0.069	0.039	0.007	0.66	0.01	0.27
04-04-22	04-04-23	5.5	0.28	0.11	0.35	0.07	0.09	0.025	0.028	0.006	0.30	0.01	0.71
04-04-23	04-04-24	5.2	0.25	0.09	0.34	0.07	0.10	0.021	0.024	0.005	0.25	0.01	0.60
04-04-24	04-04-25	10.6	0.58	0.16	0.48	0.08	0.05	0.056	0.057	0.010	0.88	0.01	1.02
04-04-25	04-04-26	11.0	0.68	0.14	0.84	0.06	0.05	0.064	0.099	0.014	0.74	0.01	0.79
04-04-26	04-04-27	8.3	0.43	0.13	0.95	0.04	0.09	0.046	0.088	0.015	0.44	0.02	0.86
04-04-27	04-04-28	9.2	0.43	0.12	0.55	0.06	0.09	0.044	0.047	0.009	0.49	0.02	0.76
04-04-28	04-04-29	11.0	0.59	0.18	0.75	0.05	0.11	0.090	0.095	0.014	0.62	0.02	0.46
04-04-29	04-04-30	14.6	0.77	0.24	0.88	0.06	0.11	0.116	0.100	0.014	0.83	0.01	0.34
04-04-30	04-05-01	11.5	0.73	0.33	0.81	0.08	0.08	0.075	0.102	0.015	0.74	0.02	0.83
04-05-01	04-05-02	11.2	0.77	0.34	0.81	0.08	0.11	0.076	0.084	0.015	0.72	0.03	0.81
04-05-02	04-05-03	13.9	0.99	0.35	1.09	0.09	0.07	0.097	0.359	0.045	0.98	0.02	1.26
04-05-03	04-05-04	24.9	1.54	0.42	1.50	0.20	0.09	0.193	0.680	0.087	1.77	0.03	2.96
04-05-04	04-05-05	23.3	1.43	0.31	1.51	0.15	0.09	0.184	0.489	0.052	1.90	0.02	1.04
04-05-05	04-05-06	26.2	1.52	0.38	1.52	0.11	0.08	0.197	0.359	0.056	2.29	0.03	0.93
04-05-06	04-05-07	31.1	1.96	0.50	2.10	0.14	0.08	0.227	0.512	0.061	2.61	0.04	1.17
04-05-07	04-05-08	24.2	1.67	0.53	1.59	0.11	0.08	0.175	0.298	0.032	2.38	0.02	0.39
04-05-08	04-05-09	19.3	1.01	0.37	0.86	0.10	0.08	0.110	0.226	0.034	1.53	0.04	0.74
04-05-09	04-05-10	18.2	0.82	0.29	0.70	0.09	0.07	0.121	0.226	0.028	1.02	0.03	0.39
04-05-10	04-05-11	16.8	0.57	0.16	0.56	0.07	0.06	0.052	0.117	0.012	0.73	0.01	0.92
04-05-11	04-05-12	37.7	0.22	0.05	0.26	0.09	0.08	0.023	0.074	0.009	0.24	0.00	0.10
04-05-12	04-05-13	15.2	0.25	0.05	0.29	0.05	0.05	0.015	0.053	0.006	0.31	0.01	0.28
04-05-13	04-05-14	16.5	0.29	0.06	0.32	0.05	0.04	0.025	0.032	0.004	0.34	0.01	0.18
04-05-14	04-05-15	10.9	0.42	0.25	0.50	0.13	0.13	0.024	0.157	0.021	0.43	0.01	0.54
04-05-15	04-05-16	5.8	0.30	0.12	0.34	0.06	0.05	0.010	0.017	0.002	0.38	0.02	0.37
04-05-16	04-05-17	5.7	0.22	0.05	0.23	0.04	0.03	0.011	0.013	0.001	0.26	0.00	0.05

Virolahti **Combined PM_{10} with filterpack**

Start	Stop	PM_{10}	NH_4^+-N	NO_3^--N	SO_4^{2-}-S	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_3-N	HNO_3-N	SO_2-S
yy-mm-dd	yy-mm-dd	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
04-04-20	04-04-21	26.7	1.35	0.31	1.54	0.01	0.11	0.269	0.386	0.050	0.56	0.19	1.52
04-04-21	04-04-22	8.8	0.36	0.03	0.43	0.01	0.03	0.048	0.031	0.005	0.08	0.07	0.23
04-04-22	04-04-23	5.4	0.14	0.02	0.20	0.00	0.06	0.019	0.030	0.006	0.04	0.05	0.65
04-04-23	04-04-24	4.3	0.12	0.02	0.14	0.01	0.05	0.014	0.025	0.005	0.02	0.02	0.54
04-04-24	04-04-25	10.2	0.34	0.06	0.42	0.01	0.05	0.062	0.100	0.012	0.50	0.06	0.95
04-04-25	04-04-26	10.5	0.61	0.03	0.81	0.00	0.05	0.067	0.095	0.012	0.08	0.07	0.82
04-04-26	04-04-27	7.7	0.40	0.01	0.88	0.00	0.06	0.035	0.054	0.011	0.01	0.07	0.77
04-04-27	04-04-28	8.8	0.32	0.02	0.44	0.00	0.09	0.037	0.041	0.008	0.05	0.06	0.72
04-04-28	04-04-29	10.2	0.18	0.02	0.26	0.00	0.03	0.036	0.033	0.005	0.04	0.08	0.44
04-04-29	04-04-30	13.2	0.63	0.04	0.83	0.00	0.10	0.123	0.083	0.012	0.06	0.08	0.30
04-04-30	04-05-01	11.2	0.60	0.03	0.80	0.00	0.07	0.080	0.085	0.013	0.11	0.19	0.81
04-05-01	04-05-02	10.8	0.13	0.01	0.15	0.00	0.02	0.013	0.008	0.003	0.14	0.18	0.76
04-05-02	04-05-03	13.4	0.82	0.07	1.05	0.00	0.05	0.097	0.270	0.018	0.13	0.17	1.23
04-05-03	04-05-04	23.6	1.11	0.13	1.40	0.02	0.05	0.191	0.623	0.082	0.49	0.17	2.66
04-05-04	04-05-05	22.8	1.07	0.11	1.40	0.01	0.07	0.180	0.396	0.036	0.67	0.10	1.00
04-05-05	04-05-06	25.9	1.16	0.09	1.48	0.00	0.06	0.188	0.286	0.030	1.02	0.20	0.87
04-05-06	04-05-07	31.5	1.68	0.13	2.14	0.00	0.07	0.229	0.417	0.036	0.89	0.24	1.08
04-05-07	04-05-08	24.3	1.08	0.08	1.31	0.00	0.04	0.138	0.206	0.020	1.03	0.32	0.66
04-05-08	04-05-09	18.9	0.67	0.06	0.84	0.00	0.04	0.105	0.203	0.025	0.69	0.24	0.63
04-05-09	04-05-10	18.6	0.51	0.06	0.66	0.00	0.03	0.103	0.181	0.015	0.45	0.16	0.36
04-05-10	04-05-11	17.8	0.35	0.05	0.45	0.02	0.04	0.055	0.126	0.014	0.27	0.05	0.94
04-05-11	04-05-12	28.5	0.13	0.03	0.20	0.05	0.06	0.018	0.095	0.015	0.05	0.01	0.08
04-05-12	04-05-13	17.6	0.22	0.03	0.27	0.02	0.03	0.015	0.075	0.011	0.06	0.02	0.21
04-05-13	04-05-14	17.6	0.19	0.03	0.23	0.01	0.02	0.018	0.043	0.009	0.08	0.01	0.16
04-05-14	04-05-15	12.4	0.07	0.02	0.07	0.00	0.01	0.002	0.018	0.004	0.07	0.07	0.52
04-05-15	04-05-16	5.4	0.22	0.02	0.28	0.00	0.02	0.011	0.067	0.004	0.03	0.06	0.26
04-05-16	04-05-17	6.7	0.10	0.01	0.12	0.00	0.01	0.009	0.017	0.003	0.07	0.02	0.04

Birkenes			**EMEP Filterpack**											
Start	Stop	PM_{10}	PM	NH_4^+-N	NO_3^--N	SO_4^{2-}-S	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_3-N	HNO_3-N	SO_2-S
yy-mm-dd	yy-mm-dd	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
04-04-21	04-04-22	7.8	11.4	0.94	0.43	0.73	-0.02	0.15	0.038	0.092	0.024	0.34	0.22	0.30
04-04-22	04-04-23		13.2	1.15	0.58	0.74	-0.02	0.12	0.040	0.071	0.015	0.17	0.16	0.25
04-04-23	04-04-24	5.1	7.1	0.58	0.10	0.62	-0.02	0.04	0.055	0.033	-0.009	0.16	0.14	0.09
04-04-24	04-04-25	11.1	4.9	0.19	0.05	0.28	-0.02	0.10	0.031	0.049	0.017	0.21	0.06	0.35
04-04-25	04-04-26	3.3	5.9	0.36	0.02	0.46	-0.02	0.05	0.024	0.047	0.012	0.09	0.08	0.12
04-04-26	04-04-27	1.8	4.8	0.41	-0.01	0.49	-0.02	0.02	0.026	0.025	-0.009	-0.05	0.11	0.05
04-04-27	04-04-28	8.5	11.9	0.92	0.12	0.94	-0.02	0.06	0.063	0.068	0.015	0.07	0.23	0.14
04-04-28	04-04-29	13.2	15.0	0.62	0.13	0.87	-0.02	0.10	0.102	0.334	0.051	0.35	0.19	0.34
04-04-29	04-04-30	8.3	12.3	0.51	0.09	0.75	0.08	0.26	0.063	0.221	0.051	0.15	0.07	0.30
04-04-30	04-05-01	9.8	11.6	0.46	0.06	0.59	-0.02	0.08	0.050	0.192	0.021	0.23	0.07	0.29
04-05-01	04-05-02	14.0	12.0	0.48	0.04	0.63	-0.01	0.03	0.082	0.259	0.023	0.16	0.08	0.21
04-05-02	04-05-03	17.9	13.7	0.74	0.05	0.94	-0.02	0.07	0.086	0.205	0.024	0.32	0.17	0.87
04-05-03	04-05-04	13.9	13.9	0.73	0.13	1.10	-0.02	0.45	0.065	0.154	0.078	0.19	0.19	0.53
04-05-04	04-05-05	9.0	13.6	1.25	0.50	0.95	0.02	0.21	0.042	0.054	0.036	0.13	0.09	0.13
04-05-05	04-05-06	7.5	10.5	0.54	0.10	0.79	-0.02	0.25	0.048	0.197	0.051	0.14	0.09	0.14
04-05-06	04-05-07	11.9	19.4	0.78	0.08	1.20	-0.02	0.14	0.082	0.400	0.047	0.22	0.14	0.15
04-05-07	04-05-08	14.2	27.7	0.87	0.13	1.30	-0.02	0.13	0.168	0.522	0.074	0.43	0.14	0.36
04-05-08	04-05-09	11.5	18.9	0.68	0.07	1.01	-0.02	0.09	0.116	0.467	0.057	0.40	0.09	0.20
04-05-09	04-05-10	8.4	16.4	0.60	0.06	0.77	-0.02	0.02	0.094	0.411	0.040	0.29	0.12	0.11
04-05-10	04-05-11	5.0	11.3	0.54	0.02	0.69	-0.02	0.02	0.063	0.202	0.016	0.19	0.05	0.14
04-05-11	04-05-12	5.0	10.1	0.27	0.14	0.48	0.06	0.37	0.046	0.162	0.068	0.19	0.05	0.12
04-05-12	04-05-13	4.8	5.7	0.27	0.16	0.30	-0.02	0.18	0.039	0.106	0.042	0.16	0.05	0.07
04-05-13	04-05-14	6.1	9.1	0.34	0.24	0.46	0.05	0.44	0.058	0.118	0.092	0.14	0.08	0.13
04-05-14	04-05-15	5.9	10.0	0.18	0.34	0.30	1.08	1.17	0.081	0.110	0.206	0.19	0.04	0.05
04-05-15	04-05-16	1.9	2.2	0.13	0.17	0.09	-0.02	0.08	0.022	0.046	0.038	0.18	0.03	0.07
04-05-16	04-05-17	1.9	2.2	0.14	0.12	0.13	-0.02	0.13	0.014	0.045	0.040	0.15	0.01	0.05
04-05-17	04-05-18	7.2	8.3	0.45	0.26	0.53	0.07	0.40	0.040	0.130	0.084	0.25	0.10	0.10
04-05-18	04-05-19	7.8	12.0	0.18	0.33	0.26	1.36	1.25	0.048	0.104	0.209	0.15	0.01	0.06
04-05-19	04-05-20	2.7	7.2	0.11	0.21	0.10	0.15	0.27	0.018	0.083	0.065	0.23	0.04	0.09
04-05-20	04-05-21	2.0	4.8	0.18	0.23	0.14	0.21	0.32	0.014	0.055	0.071	0.19	0.04	0.09
04-05-21	04-05-22	2.9	6.6	0.17	0.19	0.14	0.05	0.20	-0.009	0.047	0.051	0.26	0.05	0.09
04-05-22	04-05-23	-0.4	2.3	0.07	0.09	0.09	-0.02	0.11	-0.009	0.032	0.030	0.27	0.07	0.08
04-05-23	04-05-24		2.9	0.11	0.08	0.11	-0.02	0.07	0.020	0.043	0.020	0.21	0.03	0.10
04-05-24	04-05-25	0.6	5.6	0.05	0.08	0.09	0.06	0.15	0.014	0.043	0.042	0.21	0.03	0.08
04-05-25	04-05-26	-0.4	3.3	0.10	0.10	0.08	-0.02	0.05	0.015	0.055	0.018	0.18	0.01	0.30
04-05-26	04-05-27	5.5	4.1	0.57	0.52	0.17	-0.02	0.11	0.031	0.050	0.020	0.24	0.04	0.16
04-05-27	04-05-28	6.2	14.5	0.08	0.11	0.17	0.09	0.21	0.066	0.063	0.049	0.33	0.06	0.32
04-05-28	04-05-29	16.1	27.8	0.26	0.39	0.85	0.38	1.27	0.107	0.110	0.193	0.34	0.05	0.19
04-05-29	04-05-30	15.7	24.0	0.50	0.39	0.86	0.11	0.85	0.105	0.103	0.143	0.26	0.11	0.27
04-05-30	04-05-31	5.4	15.3	0.15	0.10	0.29	0.02	0.17	0.075	0.102	0.045	0.28	0.04	0.20
04-05-31	04-06-01	9.5	12.3	0.55	0.13	0.66	-0.02	0.17	0.048	0.099	0.035	0.47	0.16	0.24
04-06-01	04-06-02		13.3	0.24	0.16	0.29	-0.02	0.08	0.036	0.119	0.026	0.37	0.06	0.26

Birkenes **Combined PM_{10} with filterpack**

Start	Stop	PM_{10}	NH_4^+-N	NO_3^--N	SO_4^{2-}-S	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_3-N	HNO_3-N	SO_2-S
yy-mm-dd	yy-mm-dd	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
04-04-21	04-04-22	11.4	0.88	0.42	0.74	0.01	0.14	0.0	0.1	0.0	0.35	0.22	0.24
04-04-22	04-04-23	13.1	1.13	0.58	0.74	0.01	0.11	0.0	0.1	0.0	0.20	0.15	0.22
04-04-23	04-04-24	9.9	0.58	0.08	0.61	0.00	0.04	0.0	0.0	0.0	0.20	0.13	0.08
04-04-24	04-04-25	5.7	0.21	0.11	0.28	0.00	0.10	0.0	0.1	0.0	0.16	0.05	0.35
04-04-25	04-04-26	7.1	0.31	0.01	0.45	-0.01	0.05	0.0	0.1	0.0	0.09	0.07	0.09
04-04-26	04-04-27	5.5	0.40	0.03	0.49	0.00	0.03	0.0	0.0	0.0	0.04	0.11	0.05
04-04-27	04-04-28	11.7			0.92	0.01	0.06	0.1	0.1	0.0			0.12
04-04-28	04-04-29	13.7	0.67	0.08	0.87	0.00	0.11	0.1	0.3	0.1	0.41	0.19	0.36
04-04-29	04-04-30	9.7	0.61	0.20	0.75	0.01	0.26	0.1	0.2	0.1	0.26	0.12	0.29
04-04-30	04-05-01	7.8	0.79	0.38	0.60	0.01	0.09	0.1	0.2	0.0	0.24	0.11	0.29
04-05-01	04-05-02	11.9	0.50	0.03	0.65	0.00	0.04	0.1	0.3	0.0	0.26	0.09	0.21
04-05-02	04-05-03	12.5	0.75	0.05	0.95	0.00	0.07	0.1	0.3	0.0	0.36	0.18	0.90
04-05-03	04-05-04	13.7	0.75	0.18	1.18	0.01	0.43	0.1	0.2	0.1	0.12	0.21	0.51
04-05-04	04-05-05	13.8	1.13	0.50	0.96	0.01	0.19	0.0	0.1	0.0	0.09	0.08	0.13
04-05-05	04-05-06	11.4	0.46	0.07	0.82	0.00	0.22	0.0	0.2	0.0	0.21	0.08	0.16
04-05-06	04-05-07	17.9	0.72	0.09	1.19	0.01	0.13	0.1	0.4	0.0	0.33	0.15	0.18
04-05-07	04-05-08	22.5	0.91	0.12	1.32	0.01	0.13	0.2	0.5	0.1	0.41	0.16	0.33
04-05-08	04-05-09	17.1	0.61	0.06	1.01	0.01	0.08	0.1	0.4	0.0	0.18	0.10	0.21
04-05-09	04-05-10	14.7	0.53	0.04	0.78	0.01	0.03	0.1	0.4	0.0	0.38	0.13	0.13
04-05-10	04-05-11	10.1	0.49	0.01	0.69	0.00	0.03	0.1	0.2	0.0	0.10	0.08	0.15
04-05-11	04-05-12	9.8	0.19	0.12	0.50	0.07	0.34	0.1	0.2	0.1	0.29	0.06	0.17
04-05-12	04-05-13	7.4	0.17	0.08	0.31	0.01	0.18	0.0	0.1	0.0	0.15	0.05	0.08
04-05-13	04-05-14	9.0	0.25	0.18	0.47	0.12	0.43	0.0	0.1	0.1	0.12	0.07	0.07
04-05-14	04-05-15	10.5	0.07	0.12	0.28	1.30	1.06	0.1	0.1	0.2	0.13	0.03	0.09
04-05-15	04-05-16	4.3	0.05	0.07	0.10	0.04	0.09	0.0	0.1	0.0	0.15	0.03	0.08
04-05-16	04-05-17	4.1	0.08	0.04	0.13	0.07	0.14	0.0	0.1	0.0	0.05	0.02	0.08
04-05-17	04-05-18	8.3	0.34	0.15	0.53	0.11	0.38	0.0	0.1	0.1	0.12	0.10	0.09
04-05-18	04-05-19	11.3	0.10	0.18	0.26	1.51	1.21	0.1	0.1	0.3	0.13	0.03	0.08
04-05-19	04-05-20	5.5	0.28	0.33	0.09	0.21	0.28	0.0	0.1	0.1	0.24	0.03	0.05
04-05-20	04-05-21	5.6	0.09	0.09	0.15	0.35	0.34	0.0	0.1	0.1	0.19	0.03	0.05
04-05-21	04-05-22	3.8	0.15	0.20	0.14	0.02	0.21	0.0	0.1	0.1	0.10	0.07	0.05
04-05-22	04-05-23	2.3	0.07	0.07	0.09	0.02	0.11	0.0	0.0	0.0	0.22	0.02	0.06
04-05-23	04-05-24	2.5	0.14	0.10	0.11	0.01	0.07	0.0	0.1	0.0	0.36	0.08	0.11
04-05-24	04-05-25	3.7	0.07	0.07	0.07	0.07	0.16	0.0	0.0	0.0	0.28	0.03	0.06
04-05-25	04-05-26	1.8	0.11	0.10	0.07	0.01	0.06	0.0	0.0	0.0	0.25	0.05	0.34
04-05-26	04-05-27	4.9	0.23	0.20	0.18	0.01	0.10	0.0	0.0	0.0	0.20	0.07	0.17
04-05-27	04-05-28	8.5	0.31	0.38	0.17	0.03	0.24	0.0	0.1	0.0	0.34	0.12	0.35
04-05-28	04-05-29	17.3	0.55	0.59	0.85	0.31	1.31	0.1	0.1	0.2	0.27	0.12	0.21
04-05-29	04-05-30	15.6	0.58	0.46	0.86	0.07	0.85	0.1	0.1	0.2	0.22	0.16	0.28
04-05-30	04-05-31	8.8	0.19	0.15	0.28	0.02	0.19	0.0	0.1	0.0	0.19	0.06	0.22
04-05-31	04-06-01	10.8	0.56	0.15	0.67	0.01	0.18	0.0	0.1	0.0	0.34	0.14	0.31
04-06-01	04-06-02	6.6	0.51	0.38	0.31	0.01	0.10	0.0	0.1	0.0	0.45	0.16	0.25

Kjeller **EMEP Filterpack**

Start	Stop	NH_4^+-N	NO_3^--N	SO_4^{2-}-S	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_3-N	HNO_3-N	SO_2-S
yy-mm-dd	yy-mm-dd	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
05-07-22	05-07-25	0.08	0.03	0.11	0.22	0.18	0.049	0.017	0.023	0.81	0.02	0.06
05-07-25	05-07-26	0.13	0.14	0.33	0.60	0.60	0.056	0.044	0.069	0.54	0.01	0.06
05-07-26	05-07-27	0.30	0.27	0.43	0.23	0.58	0.060	0.051	0.058	0.77	0.08	0.28
05-07-27	05-07-28	0.28	0.27	0.57	0.98	1.09	0.073	0.102	0.130	0.76	0.08	0.27
05-07-28	05-07-29	0.23	0.19	0.44	0.57	0.72	0.054	0.056	0.085	0.92	0.01	0.09
05-07-29	05-08-01	0.31	0.11	0.36	0.07	0.13	0.067	0.026	0.017	0.70	0.08	0.05
05-08-01	05-08-02	0.17	0.04	0.20	0.01	0.08	0.099	0.059	0.012	1.02	0.09	0.21
05-08-02	05-08-03	0.29	0.22	0.55	1.71	1.45	0.106	0.088	0.158	0.47	0.04	0.10
05-08-03	05-08-04	0.39	0.22	0.87	0.18	0.58	0.049	0.062	0.055	0.52	0.06	0.51
05-08-04	05-08-05	0.13	0.06	0.37	0.10	0.19	0.054	0.005	0.017	0.80	0.03	0.18
05-08-05	05-08-08	0.05	0.04	0.16	0.14	0.17	0.037	0.026	0.020	0.41	0.03	0.08
05-08-08	05-08-09	0.08	0.08	0.21	0.01	0.04	0.053	0.031	0.005	1.24	0.03	0.11
05-08-09	05-08-10	0.19	0.03	0.33	0.01	0.02	0.086	0.072	0.005	0.99	0.01	0.27
05-08-10	05-08-11	0.16	0.02	0.31	0.01	0.01	0.063	0.058	0.005	0.65	0.01	0.09
05-08-11	05-08-12	0.07	0.03	0.13	0.01	0.05	0.058	0.036	0.005	0.96	0.01	0.30
05-08-12	05-08-15	0.08	0.03	0.12	0.01	0.04	0.044	0.039	0.007	0.76	0.04	0.11
05-08-15	05-08-16	0.16	0.14	0.40	0.18	0.36	0.051	0.126	0.042	0.76	0.09	0.33
05-08-16	05-08-17	0.02	0.04	0.23	0.12	0.30		0.058	0.015	1.13	-0.02	0.11
05-08-17	05-08-18	0.30	0.18	0.70	0.31	0.57	0.041	0.161	0.057	0.67	0.05	0.13
05-08-18	05-08-19	0.89	0.17	1.32	0.09	0.39	0.039	0.134	0.037	0.29	0.07	0.11
05-08-19	05-08-22	0.38	0.08	0.72	-0.01	0.17	0.113	0.147	0.029	1.47	0.25	0.16
05-08-22	05-08-23	1.03	0.37	1.33	0.07	0.23	0.177	0.239	0.041	0.90	0.16	0.57
05-08-23	05-08-24	1.14	0.30	1.46	0.04	0.30	0.109	0.097	0.025	0.83	0.11	0.31
05-08-24	05-08-25	0.21	0.27	0.38	0.37	0.63	0.061	0.101	0.060	1.24	0.05	0.42
05-08-25	05-08-26	0.34	0.29	0.57	0.39	0.60	0.072	0.043	0.057	0.48	0.04	0.12
05-08-26	05-08-29	0.08	0.08	0.19	0.40	0.37	0.054	0.076	0.044	0.48	0.04	0.11
05-08-29	05-08-30	0.09	0.10	0.30	1.03	0.81	0.081	0.288	0.088	0.37	-0.02	0.12
05-08-30	05-08-31	0.03	0.08	0.14	0.48	0.33	0.045	0.157	0.040	0.77	-0.02	0.10
05-08-31	05-09-01	0.12	0.35	0.31	0.54	0.82	0.139	0.222	0.115	1.11	0.04	0.15
05-09-01	05-09-02	0.14	0.34	0.31	0.12	0.59	0.101	0.174	0.081	1.52	0.07	0.23
05-09-02	05-09-05	0.51	0.26	0.71	0.04	0.29	0.097	0.134	0.052	0.98	0.19	0.32
05-09-05	05-09-06	0.79	0.38	1.02	0.18	0.51	0.099	0.158	0.076	0.80	0.26	0.22
05-09-08	05-09-09	0.23	0.27	0.49	0.74	0.91	0.064	0.255	0.123	0.67	0.09	0.26
05-09-09	05-09-12	0.04	0.08	0.09	0.15	0.19	0.064	0.070	0.027	1.11	0.04	0.15
05-09-12	05-09-13	0.02	0.03	0.07	0.03	0.06	0.033	0.105	0.011	1.14	-0.02	0.12
05-09-13	05-09-14	0.38	0.20	0.67	0.27	0.60	0.073	0.111	0.066	0.68	0.10	0.18
05-09-14	05-09-15	0.02	0.04	0.09	0.12	0.13	0.021	0.057	0.013	0.47	0.03	0.12
05-09-15	05-09-16	0.02	0.04	0.04	0.09	0.06	0.029	0.071	0.011	0.91	-0.02	0.11
05-09-16	05-09-19	0.03	0.03	0.06	0.08	0.09	0.018	0.053	0.012	0.66	0.06	0.18
05-09-19	05-09-20	0.30	0.13	0.50	0.17	0.34	0.033	0.104	0.038	0.38	0.08	0.41
05-09-20	05-09-21	0.24	0.23	0.56	0.38	0.73	0.051	0.144	0.085	0.46	0.09	0.26
05-09-21	05-09-22	0.08	0.21	0.25	0.86	0.84	0.051	0.153	0.094	0.69	0.03	0.30

Kjeller **Combined PM_{10} with filterpack**

Start	Stop	NH_4^+-N	NO_3^--N	SO_4^{2-}-S	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_3-N	HNO_3-N	SO_2-S
yy-mm-dd	yy-mm-dd	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
05-07-22	05-07-25	0.08	0.03	0.13	0.17	0.16	0.039	0.014	0.019	0.76	0.01	0.05
05-07-25	05-07-26	0.18	0.12	0.31	0.46	0.42	0.039	0.027	0.049	0.61	0.01	0.13
05-07-26	05-07-27	0.29	0.20	0.42	0.18	0.43	0.046	0.040	0.049	0.76	0.04	0.33
05-07-27	05-07-28	0.34	0.24	0.55	0.78	0.93	0.068	0.071	0.112	0.61	0.07	0.29
05-07-28	05-07-29	0.31	0.19	0.42	0.48	0.54	0.054	0.038	0.067	1.07	0.01	0.14
05-07-29	05-08-01	0.29	0.09	0.35	0.04	0.10	0.057	0.016	0.013	0.73	0.07	0.08
05-08-01	05-08-02	0.14	0.04	0.19	0.01	0.08	0.057	0.028	-0.008	1.20	0.07	0.09
05-08-02	05-08-03	0.29	0.20	0.50	1.19	1.11	0.066	0.061	0.124	0.51	0.04	0.11
05-08-03	05-08-04	0.62	0.22	0.93	0.15	0.50	0.061	0.005	0.060	0.60	0.06	0.19
05-08-04	05-08-05	0.12	0.04	0.28	0.08	0.13	0.030	0.041	0.013	0.71	0.03	0.17
05-08-05	05-08-08	0.05	0.04	0.14	0.11	0.15	0.030	0.017	0.017	0.42	0.02	0.08
05-08-08	05-08-09	0.09	0.04	0.19	0.01	0.03	0.049	0.017	0.005	1.73	0.01	0.10
05-08-09	05-08-10	0.22	0.03	0.43	0.01	0.06	0.072	0.054	0.005	0.74	0.03	0.26
05-08-10	05-08-11	0.15	0.02	0.29	0.01	0.02	0.058	0.041	0.005	0.78	0.02	0.10
05-08-11	05-08-12	0.08	0.04	0.27	0.01	0.11	0.075	0.005	0.005	0.96	0.03	0.11
05-08-12	05-08-15	0.08	0.03	0.14	0.01	0.04	0.042	0.029	0.006	0.80	0.03	0.11
05-08-15	05-08-16	0.12	0.13	0.46	0.13	0.39	0.036	0.085	0.034	0.84	0.06	0.28
05-08-16	05-08-17	0.04	0.03	0.18	0.12	0.16		0.038	0.016	1.23	-0.02	0.12
05-08-17	05-08-18	0.30	0.15	0.62	0.22	0.50	0.030	0.106	0.051	0.60	0.05	0.11
05-08-18	05-08-19	0.89	0.13	1.29	0.04	0.33	0.034	0.074	0.028	0.35	0.05	0.10
05-08-19	05-08-22	0.42	0.06	0.65	-0.01	0.11	0.091	0.096	0.022	1.56	0.23	0.18
05-08-22	05-08-23	1.11	0.20	2.00	-0.02	0.31	0.152	0.163	0.032	0.97	0.13	0.61
05-08-23	05-08-24	1.03	0.27	1.36	0.04	0.13	0.086	0.053	0.018	0.66	0.09	0.27
05-08-24	05-08-25	0.31	0.36	0.55	0.39	0.65	0.070	0.093	0.074	1.27	0.03	0.28
05-08-25	05-08-26	0.40	0.28	0.54	0.31	0.50	0.075	0.034	0.045	0.52	0.04	0.10
05-08-26	05-08-29	0.08	0.08	0.20	0.37	0.33	0.041	0.051	0.040	0.53	0.03	0.09
05-08-29	05-08-30	0.07	0.08	0.20	0.88	0.58	0.049	0.188	0.074	0.50	-0.02	0.11
05-08-30	05-08-31	0.05	0.07	0.13	0.44	0.32	0.035	0.112	0.041	0.83	-0.02	0.08
05-08-31	05-09-01	0.09	0.31	0.30	0.33	0.73	0.086	0.126	0.092	1.27	0.04	0.24
05-09-01	05-09-02	0.12	0.32	0.30	0.05	0.59	0.090	0.126	0.074	1.66	0.06	0.20
05-09-02	05-09-05	0.51	0.22	0.68	0.03	0.25	0.083	0.082	0.039	1.03	0.17	0.33
05-09-05	05-09-06	0.82	0.33	1.03	0.09	0.46	0.088	0.100	0.060	0.90	0.20	0.21
05-09-08	05-09-09	0.20	0.24	0.43	0.59	0.75	0.047	0.125	0.088	0.65	0.07	0.26
05-09-09	05-09-12	0.03	0.07	0.09	0.12	0.17	0.050	0.045	0.022	1.23	0.04	0.18
05-09-12	05-09-13	0.01	0.02	0.05	-0.02	0.02	0.022	0.066	-0.008	1.34	-0.02	0.15
05-09-13	05-09-14	0.36	0.17	0.64	0.18	0.48	0.045	0.075	0.051	0.61	0.07	0.23
05-09-14	05-09-15	0.02	0.04	0.08	0.10	0.11	0.013	0.044	0.011	0.50	0.02	0.10
05-09-15	05-09-16	0.01	0.03	0.04	0.08	0.07	0.025	0.040	0.008	1.09	-0.02	0.20
05-09-16	05-09-19	0.02	0.02	0.07	0.06	0.08	0.018	0.041	-0.003	0.59	0.04	0.17
05-09-19	05-09-20	0.28	0.10	0.48	0.11	0.28	0.027	0.064	0.030	0.45	0.05	0.49
05-09-20	05-09-21	0.27	0.21	0.52	0.35	0.62	0.046	0.094	0.071	0.50	0.07	0.28
05-09-21	05-09-22	0.09	0.19	0.26	0.76	0.77	0.047	0.100	0.079	0.77	0.03	0.35

Lille Valby		SM200	**Filterpack**										
Start	Stop	PM_{10}	NH_4^+-N	NO_3^--N	SO_4^{2-}-S	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_3-N	HNO_3-N	SO_2-S
yy-mm-dd	yy-mm-dd	beta	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
04-10-04	04-10-05	26.76	1.47	1.21	0.80	1.10	1.04				1.47	0.02	0.72
04-10-05	04-10-06	26.53	1.70	1.32	0.87	2.03	2.52				1.93	0.02	0.39
04-10-06	04-10-07	36.26	2.50	2.00	1.12	1.65	1.31				0.98	0.01	0.56
04-10-07	04-10-08	21.30	1.08	0.83	0.62	1.44	1.08				0.97	0.00	0.27
04-10-08	04-10-09	18.80	0.38	0.30	0.33	2.75	1.64				0.66	0.01	0.16
04-10-09	04-10-10	10.62	0.31	0.22	0.18	1.06	1.93				1.00	0.01	0.22
04-10-10	04-10-11	13.53	0.31	0.22	0.12	0.30	0.14				1.30	0.02	0.14
04-10-11	04-10-12	15.35	0.31	0.26	0.21	0.69	0.23				0.85	0.01	0.29
04-10-12	04-10-13	12.80	0.75	0.31	0.52	0.80	0.29				2.48	0.01	1.03
04-09-06	04-09-07		4.17	3.06	1.88	0.05	0.25			0.049	2.09	0.05	0.75
04-09-07	04-09-08		0.45	0.60	0.33	0.61	0.72			0.087	0.94	0.00	0.39
04-09-08	04-09-09		0.14	0.36	0.19	0.94	0.77			0.095	0.94	0.00	0.23
04-09-09	04-09-10		0.66	0.86	0.24	0.35	0.48			0.063	1.50	0.01	0.45
04-09-10	04-09-11		0.83	1.03	0.46	0.22	0.33			0.054	3.67	0.02	0.75
04-09-11	04-09-12		2.30	1.71	1.84	0.57	0.73			0.105	3.27	0.02	0.79
04-09-12	04-09-13		0.95	0.66	0.77	1.96	1.54			0.176	1.44	0.01	0.21
04-09-13	04-09-14		0.85	0.80	0.61	1.66	1.41			0.159	1.62	0.00	0.43
04-09-14	04-09-15		1.21	1.00	0.81	1.41	1.32			0.152	1.43	0.00	0.29
04-09-15	04-09-16		0.45	0.41	0.44	2.53	1.68			0.198	1.25	0.00	0.15

Lille Valby **Combined PM_{10} with filterpack**

Start	Stop	PM_{10}	NH_4^+-N	NO_3^--N	SO_4^{2-}-S	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_3-N	HNO_3-N	SO_2-S
yy-mm-dd	yy-mm-dd	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
04-10-04	04-10-05	28.11	1.55	1.30	0.90	0.99	1.13				1.78	0.06	0.79
04-10-05	04-10-06	29.30	1.73	1.28	0.90	1.23	1.14				2.22	0.02	0.37
04-10-06	04-10-07	38.07	2.69	2.15	1.29	1.81	1.41				1.44	0.01	0.53
04-10-07	04-10-08	23.49	1.23	0.98	0.77	1.58	1.27				1.12	0.01	0.30
04-10-08	04-10-09	13.37	0.28	0.27	0.36	2.83	1.75				0.73	0.00	0.15
04-10-09	04-10-10	12.40	0.21	0.17	0.18	0.75	0.41				1.82	0.01	0.19
04-10-10	04-10-11	12.92	0.25	0.20	0.12	0.22	0.07				4.58	0.00	0.12
04-10-11	04-10-12	15.96	0.24	0.21	0.19	0.51	0.21				1.01	0.00	0.28
04-10-12	04-10-13	13.02	0.65	0.29	0.59	0.91	0.56				3.05	0.01	0.96
04-09-06	04-09-07		4.29	2.81	1.97	0.29	0.23			0.049	3.90	0.01	0.72
04-09-07	04-09-08		0.73	0.62	0.45	0.73	0.65			0.085	1.01	-0.01	0.37
04-09-08	04-09-09		0.20	0.26	0.16	0.74	0.58			0.073	1.25	-0.01	0.18
04-09-09	04-09-10		0.55	0.66	0.24	0.41	0.34			0.049	2.20	0.02	0.42
04-09-10	04-09-11		0.83	0.83	0.45	0.30	0.28			0.045	4.09	0.00	0.73
04-09-11	04-09-12		1.99	1.43	1.57	0.63	0.53			0.081	3.88	0.00	0.83
04-09-12	04-09-13		1.11	0.70	0.89	2.65	1.89			0.209	1.57	-0.01	0.22
04-09-13	04-09-14		0.86	0.86	0.71	2.24	1.91			0.198	1.83	-0.01	0.45
04-09-14	04-09-15		1.19	0.99	0.86	1.83	1.50			0.165	1.61	-0.01	0.31
04-09-15	04-09-16		0.41	0.35	0.44	2.63	1.72			0.189	1.33	-0.01	0.15