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PROGRAMME

Pollutant deposits and air quality at coastal stations in 2002

**OSPAR Commission
for the Protection of the Marine Environment
of the North-East Atlantic**

Report to the Working Group on Inputs to the Marine Environment (INPUT)

Norwegian Institute for Air Research
P.O. Box 100, N-2027 Kjeller, Norway

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Pollutant deposits and air quality at coastal stations in 2002

Kevin Barrett
Centre for Ecological Economics

Contents

Summary

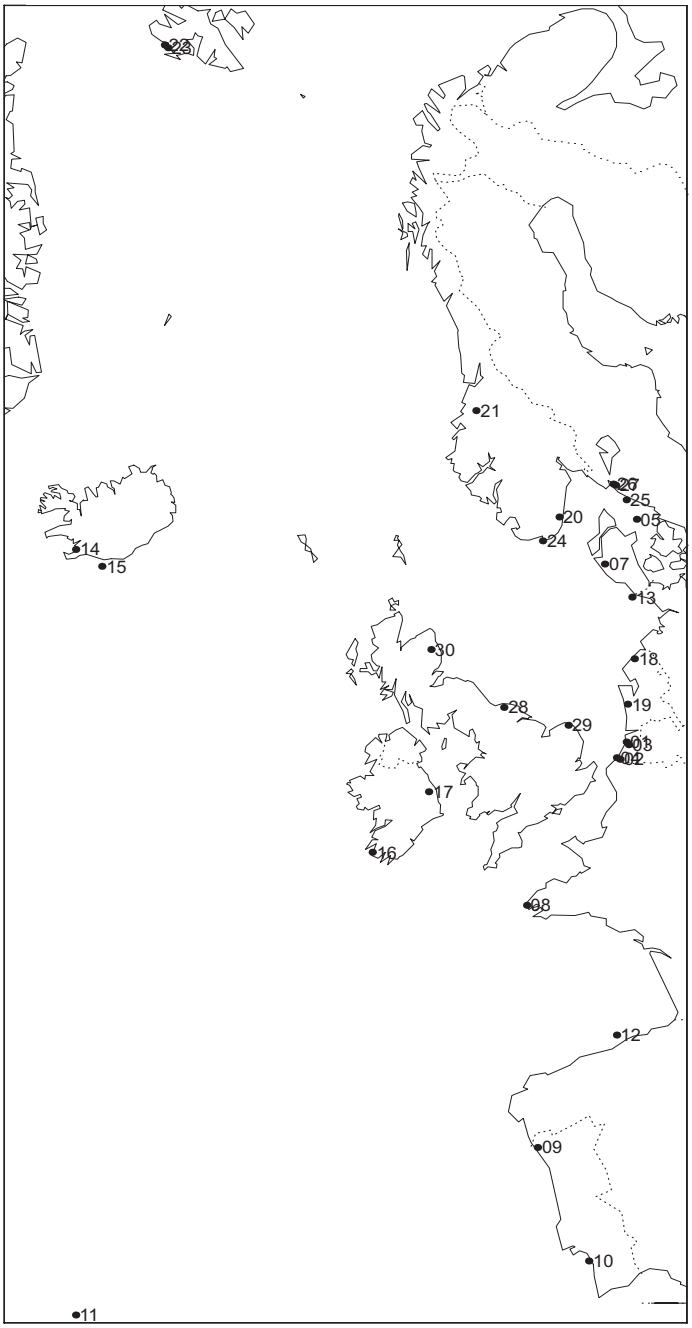
This report is the assimilated record of observed input of atmospheric pollutants to the OSPAR seas, and of the concentrations of pollutants in the ambient air of the OSPAR region. Observations are made following the terms of the CAMP – the Comprehensive Atmospheric Monitoring programme. This programme calls for Mandatory Monitoring of a range heavy metals, organic compounds and nutrients in precipitation and air, and encourages participation in a Voluntary Monitoring of additional compounds.

All countries submitted data from observations made in 2002. Country participation in the Mandatory programme for components in precipitation was reasonable for most metals and for nitrogen. However, despite their Mandatory status γ-HCH (lindane) and mercury were monitored by only half of OSPAR countries. There was reasonably good coverage of the inputs of these substances around the North Sea, whilst the southern areas of the OSPAR region were not monitored at all. The consequence is that no ground-truth data was collected in these regions. Notably less attention was given to pollutants within the Voluntary programme. For example, three quarters of countries did not give attention during 2002 to the monitoring of the atmospheric input of organic substances to their coasts. It may be desirable for countries to positively address the monitoring of these components. In areas lacking ground truth data, estimates of pollutant load and potential impact must otherwise rest purely on assumptions.

A significant advantage of centralised review of the programme is the potential to note spatial and temporal inconsistencies between locations. The reported concentrations of pollutants reported by some countries during 2002 were notably above the levels observed by neighbouring countries at neighbouring sites. This might be sufficient to question the representivity of this data, despite its validation by the data suppliers in the originating country. Parties may wish to consider encouraging national data suppliers to consider observed historical concentrations in neighbouring states when planning, undertaking and validating monitoring in coming years. These annual data reports are one such source of information.

Metal and organic concentrations reported are frequently are below the detection limits of the analytical devices being employed, and in some cases detection limits are unusually high. , Informal discussion has been held with the data originators in various countries concerning differences in practices. Differences in techniques and laboratories may be worth some evaluation.

1: The OSPAR CAMP monitoring programme, 2002



1	BE04	Knokke
2	BE11	Houtem
3	BE13	Moerkerke
4	BE14	Koksijde
5	DK08	Anholt
6	DK20	Pedersker
7	DK31	Ulborg
8	FR90	Porspoder
9	PT03	V. d. Castelo
10	PT04	Monte Velho
11	PT10	A. d. Heroismo
12	ES08	Niembro
13	DE01	Westerland
14	IS90	Irafoss
15	IS91	Storhofdi
16	IE01	Valentia
17	IE02	Turlough Hill
18	NL09	Kollumerwaard
19	NL91	De Zilk
20	NO01	Birkenes
21	NO39	Kaarvatn
22	NO42	Zepellinfjell
23	NO57	Ny Alesund
24	NO99	Lista
25	SE14	Rao
26	SE97	Gaardsjoen
27	SE98	Svartedalen
28	GB14	High Muffles
29	GB90	East Ruston
30	GB91	Banchory

Figure 1.1 Monitoring sites reporting to OSPAR in 2002

The distribution of monitoring sites underwent only minor changes during 2002. Coverage of the southern North Sea, the Skaggerak and the Kattegat is very good. There is also broad coverage of the far west coastline. Areas with lesser coverage are the Norwegian Sea/north-west North Sea, the English Channel, and the Bay of Biscay.

It is important to note that observations of pollutant wet deposition and of observations of air quality have dissimilar geographical distributions. The following table detailing the monitoring station indicates the occurrence of air quality and of precipitation monitoring. The monitoring of the pollutants in precipitation also have dissimilar distributions. This can be observed in the mapped deposition presented in chapter 2.

Table 1.1 Stations reporting precipitation and air quality to OSPAR in 2002.

Country	Station number	Station name	Latitude	Longtitude	Elevation/ Altitude (m)	Distance from sea (km)	precipitation(p) airborne(a) monitoring
Belgium	BE0004r	Knokke	51°21' N	3°20' E	0	1	pa
	BE0011r	Moerkerke	51°01' N	2°35' E	0	9	a
	BE0013r	Houtem	51°15' N	3°21' E	10	12	a
	BE0014r	Koksijde	51°7' N	2°30' E	7	1.5	p
Denmark	DK0008r	Anholt	56°43' N	11°31' E	40	~0.5	pa
	DK0020	Pedersker	51°01' N	14°57' E			p
	DK0031r	Ulborg	56°17' N	8°26' E	40	20	pa
France	FR0090r	Porspoder	48°30' N	4°46' W	30	0.5	p
Germany	DE0001r	Westerland	54°56' N	8°19' E	12	0.09	pa
Iceland	IS0090r	Irafoss	64°08' N	21°54' W	52	1	p
	IS0091r	Storhofdi	63°24' N	20°17' W	118	0.5	pa
Ireland	IE0001r	Valentia Island	51°56' N	10°15' W	9	0	p
	IE0002r	Turlough Hill	53°02' N	6°24' W	420	19	p
Netherlands	NL0009r	Kollumerwaard	53°20' N	6°17' E	1	7.5	pa
	NL0091r	De Zilk	52°18' N	4°31' E	4	2.5	pa
Norway	NO0001r	Birkenes	58°23' N	8°15' E	190	20	p
	NO0039r	Kaarvatn	62°47' N	8°53' E	210	70	p
	NO0042r	Zepellinfjell	78°54' N	11°53' E	474	2	a
	NO0057r	Ny Aalesund	78°55' N	11°55' E	8	0.3	pa
	NO0099r	Lista	58°06' N	6°34' E	13	0.1	p
Portugal	PT0003r	Viana do Castelo	41°42' N	8°48' W	16	4	p
	PT0004r	Monte Velho	38°05' N	8°48' W	43	1.5	p
	PT0010r	Angra do Heroismo	38°40' N	27°13' W	74	1	p
Spain	ES0008r	Niembro	43°27'N	4°51' W	134		p
Sweden	SE0014r	Rao	57°24' N	11°55' E			pa
	SE0097r	Gaardsjoen	58°03' N	12°01' E	113	12	p
	SE0098r	Svartedalen	57°59' N	12°06' E	120	16	p
United	GB0014r	High Muffles	54°20' N	0°48' W	265	22	pa
Kingdom	GB0090r	East Ruston	52°48' N	1°28' E	5	8	pa
	GB0091r	Banchory	57°05' N	2°32' W	130	26.5	pa

Most components on the Mandatory list for precipitation monitoring are reported by all countries. The exceptions are the two toxic substances mercury and lindane. As half of countries are not reporting these mandatory components, ground truth data is somewhat sparse. Distributions are also quite uneven so that the observed inputs to large areas are not being reported to OSPAR. For air concentrations, reported observations are generally less.

In the maps and tables data from the United Kingdom is often not displayed. This is due to data only on precipitation quality being received, i.e. no precipitation quantity data. Thus neither total loading nor annual mean concentrations can be determined, and it has not been possible to present UK data in this report.

Table.1.2: National submissions of precipitation data for 2002 – Mandatory List.

	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	γ-HCH	NH_4	NO_3
Belgium	•	•	•	•	•	•	•	•	•	•	•
Denmark	•	•	•	•	•		•	•		•	•
France	•	•	•	•	•		•	•		•	•
Germany	•	•	•	•	•	•	•	•	•	•	•
Iceland	•	•	•	•	•		•	•	•	•	•
Ireland	•	•	•	•	•	•	•	•	•	•	•
Netherlands	•	•	•	•	•	•	•	•	•	•	•
Norway	•	•	•	•	•	•	•	•	•	•	•
Portugal		•		•	•		•	•		•	•
Spain										•	•
Sweden	•	•	•	•	•	•	•	•		•	•
United Kingdom	•	•	•	•	•		•	•		•	•

Grey areas in table were not reported.

Table.1.3: Submissions of air concentration data for 2002 – Mandatory List.

	NO_2	NO_3	NH_x
Belgium	•		
Denmark		•	•
France			
Germany	•	•	•
Iceland		•	
Ireland			
Netherlands	•	•	•
Norway	•	•	•
Portugal			
Spain	•	•	•
Sweden	•	•	•
United Kingdom	•	•	•

Grey areas in table were not reported.

All countries have reported data from 2002 in time for preparation of the draft report to INPUT, representing an improvement over 2001. In tables 1.4 and 1.5 the timetable for

reporting as given in the CAMP Principles, and the actual reporting achieved are set out. More than half of countries achieved reporting within or close to the timetable. The validation round, however, was delayed whilst awaiting the bulk of remaining data. Whilst countries returned the Validation forms rapidly in general, there was little available time for follow-up data management in advance of preparation of draft reporting to INPUT.

Table 1.4: The timetable for data reporting according to the CAMP Principles

30th June	Call for metadata and data issued from NILU (regarding new data and metadata), with instructions and reference to supporting software(e.g. where to find tools on the NILU website).
30th September	Participants submit data and metadata via email or on diskette, in specified formats.
31st October	NILU returns data and metadata via email or on diskette in the form of a 'validation report' to data originators for verification and signing off by the data originators within **two weeks** of reception.

Table 1.5: Actual reporting of 2002 data

country	**last data received**	**Validation reports returned**
Data request issued by NILU – June 26		
Ireland	July 8	November 27
Portugal	August	November 17
Spain	September 26	November 26
Netherlands	September 30	November 25
Norway	September 30	
Deadline for receipt of data – September 30		
Denmark	October 1	December 2
United Kingdom	October 1	
Belgium	October 13	November 17
Iceland	October 27	November 24
Sweden	October 29	
Deadline for NILU to issue Validation Reports – October 31		
France	November 7	December 4
Validation reports issued by NILU - November 11		
Germany	December 2	

2: Observed Pollutant Depositions, 2002

In this chapter the annual average values of the mandatory list substances are provided as an overview of atmospheric conditions around the North East Atlantic in 2002. The reported annual concentrations (precipitation weighted) of pollutants in precipitation are first tabulated, followed by plotting the observed annual depositions for the mandatory components arsenic, cadmium, copper, chromium, lead, nickel, zinc, oxidized nitrogen and reduced nitrogen. Where reported values have not been plotted this is commented below each map. Observations of the wet deposit of mercury and of lindane (Mandatory components) are given in tables.

The CAMP principles have been followed with respect to detection limits. Where flag 780 was given by the data originator (observation below detection limit, value is best estimate), this data value was employed. Where 781 was flagged (observation below detection limit, value is detection limit), a value of half the detection limit was used.

Table 2.1: Reported mean annual precipitation concentrations of mandatory metals (μg/l). These are precipitation weighted values, and precipitation amounts are given as mm.

		arsenic	cadmium	chromium	copper	lead	nickel	zinc	precipitation
Belgium	**BE0004R**	0,26	0,88	1,39	1,69	7,18	2,55	40,24	822,99
Germany	**DE0001R**	0,15	0,04	0,11	1,41	1,17	0,37	12,92	783,60
Denmark	**DK0008R**	0,27	0,05	0,20	0,97	1,57	0,27	7,91	718,02
	DK0020R	0,17	0,06	0,18	0,93	1,41	0,26		578,07
	DK0031R	0,11	0,03	0,15	0,71	0,79	0,24	7,33	1034,41
France	**FR0090R**	0,43	0,03	0,15	0,68	1,02	0,42	2,82	964,00
Ireland	**IE0001R**	0,50	0,05	0,50	0,66	0,69	0,50	43,05	1919,00
	IE0002R	0,50	0,05	0,93	2,10	0,79	0,50	7,81	2277,00
Iceland	**IS0090R**	0,17	0,01	0,49	2,07	0,65	0,90	6,32	1024,85
	IS0091R		0,01	0,75	1,90	0,40	0,96	9,09	1556,42
Netherland	**NL0009R**	0,18	0,04	0,24	1,32	1,07	0,18	4,59	981,21
	NL0091R	0,09	0,05	0,26	1,61	3,06	0,26	6,23	882,06
Norway	**NO0001R**	0,00	0,03			0,99		3,60	1449,97
	NO0039R	0,00	0,18			3,23		19,28	1188,79
	NO0099R	0,29	0,03	0,16	1,30	2,15	0,29	6,83	985,01
Portugal	**PT0003R**		0,43		1,47	0,65	0,91	15,26	1729,60
	PT0004R		0,43		0,65	0,64	1,03	5,75	694,50
	PT0010R		0,43		0,55	0,70	9,08	44,21	1064,80
Sweden	**SE0097R**	0,09	0,03	0,13	0,80	0,96	0,09	4,61	987,83

Table 2.2: Reported concentrations and depositions of mercury in precipitation, in increasing order of deposition quantity (ng/m^2)

		deposition ng/m2	**concentration** ng/l	**precipitation** mm
Germany	**DE0001R**	5374,68	7,19	747,38
Sweden	**SE0014R**	7127,60	12,26	581,60
Netherland	**NL0091R**	7405,24	9,34	793,04
Norway	**NO0099R**	13629,80	12,81	1064,10
Belgium	**BE0004R**	22202,00	26,98	822,99
Ireland	**IE0001R**	95950,00	50,00	1919,00

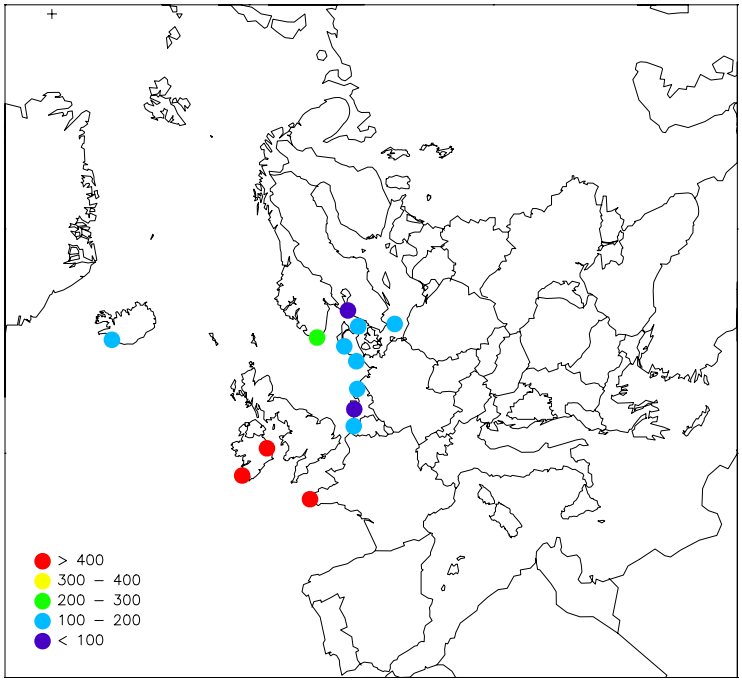


Figure 2.1 Arsenic depositions 2002, µg/m^2

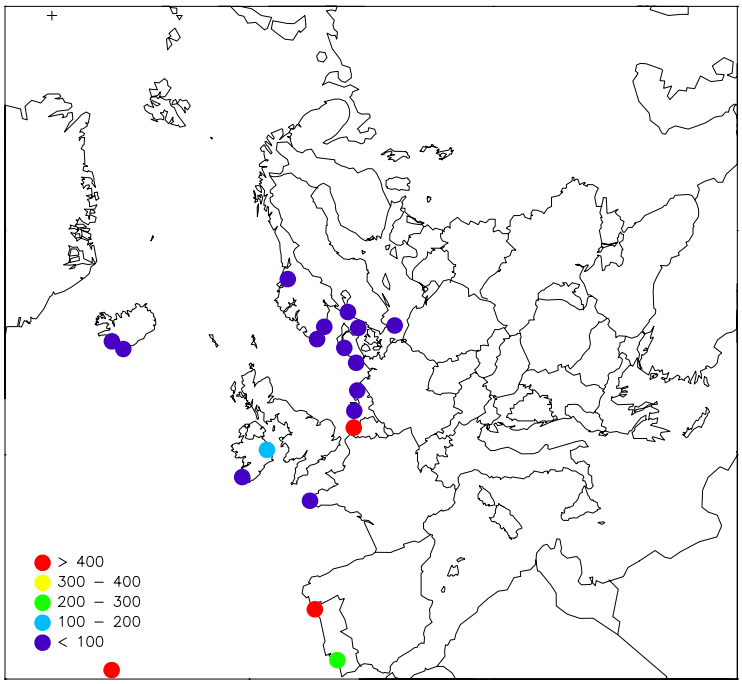


Figure 2.2: cadmium depositions 2002, µg/m^2

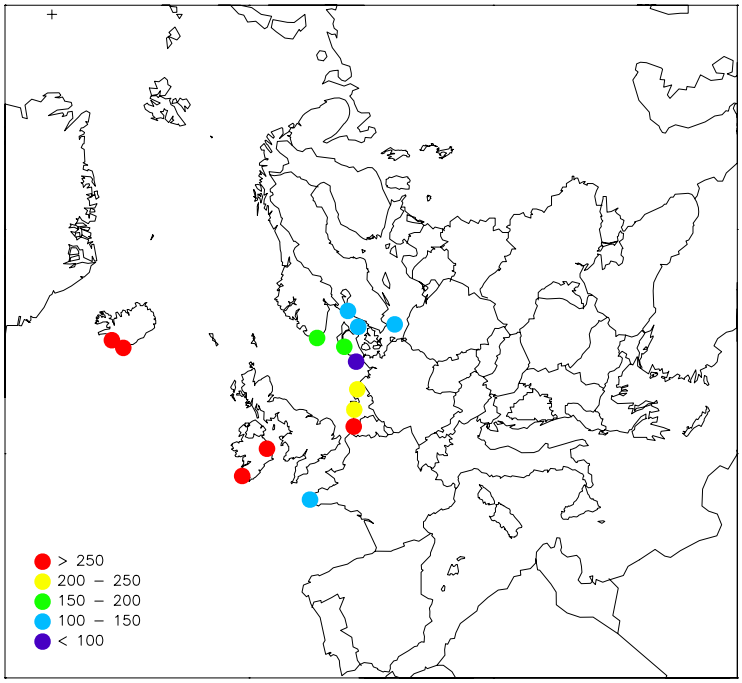


Figure 2.3: chromium depositions 2002, µg/m^2

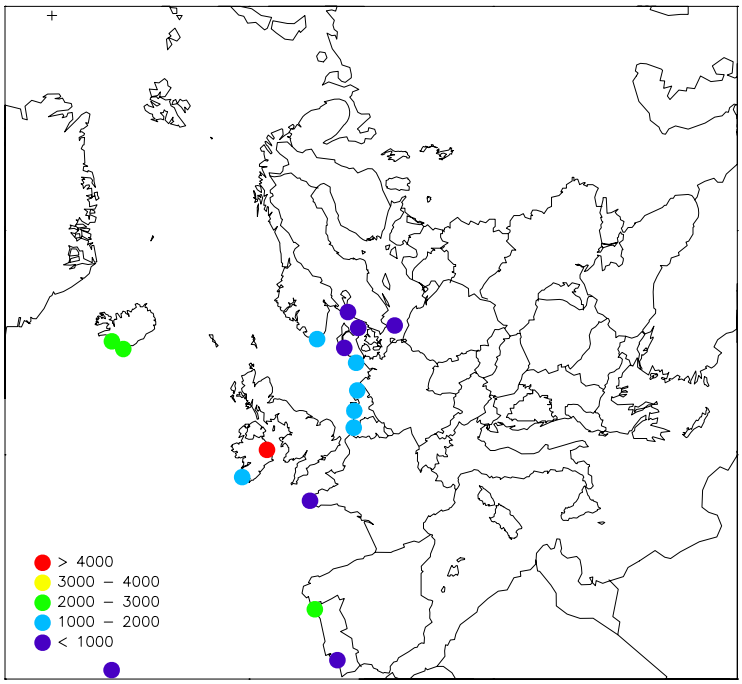


Figure 2.4: Copper depositions 2002, µg/m^2

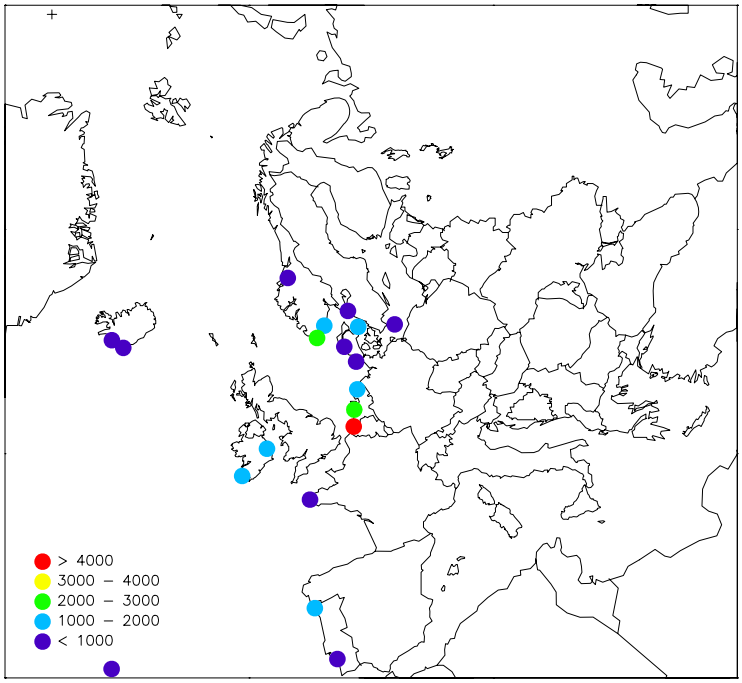


Figure 2.5: lead depositions 2002, µg/m^2

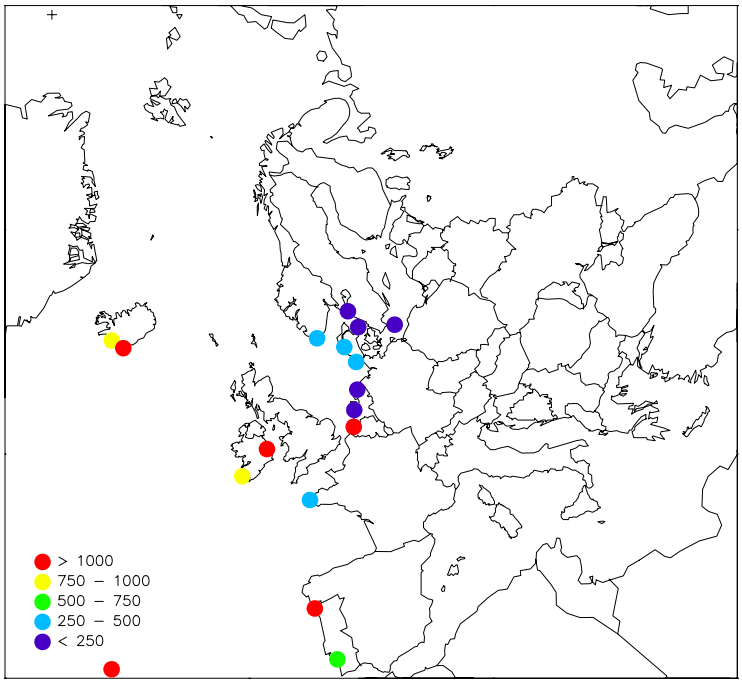


Figure 2.6: nickel depositions 2002, µg/m^2

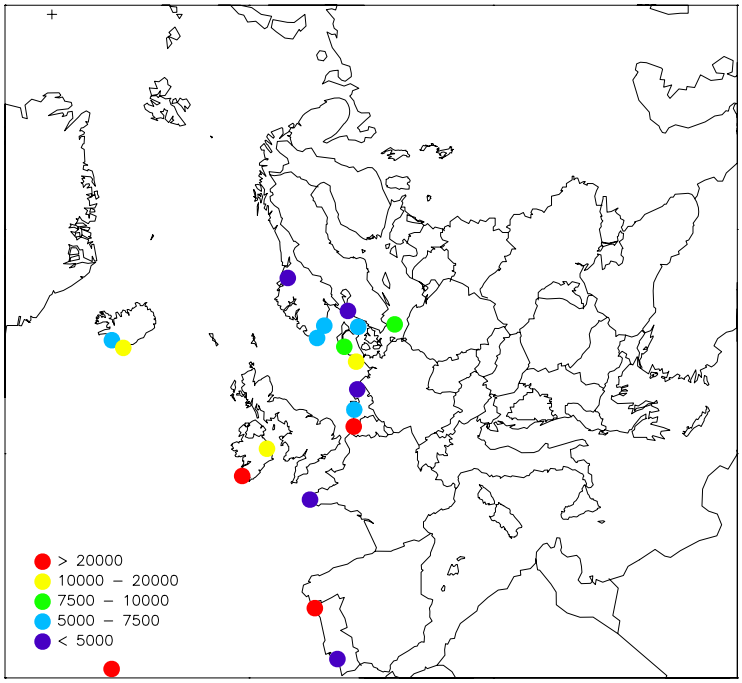


Figure 2.7: zinc depositions 2002, µg/m^2

Table 2.3 Reported annual concentrations and depositions of γ-HCH in precipitation, (prec. wtd) in increasing order of deposition quantity (ng/m^2)

		concentration ng/l	**deposition** ng/m2	**precipitation** mm
iceland	**IS0091R**	0,11	208	1877
germany	**DE0001R**	2,41	1744	725
ireland	**IE0002R**	0,77	1763	2277
norway	**NO0099R**	1,68	1898	1132
belgium	**BE0004R**	7,12	5899	828
netherlands	**NL0091R**	6,71	6162	918

Table 2.4 Reported mean annual concentrations (prec.wtd)of nitrogen in precipitation mg/l

		ammonium mg N/l	**nitrate** mg N/l	**precipitation** mm
Belgium	**BE0014R**	0,56	0,35	805,54
Germany	**DE0001R**	0,52	0,50	736,50
Denmark	**DK0020R**	0,80	0,53	604,51
Spain	**ES0008R**	0,48	0,63	622,60
France	**FR0090R**	0,09	0,28	964,00
Ireland	**IE0001R**	0,08	0,07	1919,00
	IE0002R	0,25	0,21	2277,00
Iceland	**IS0090R**	1,50	2,06	831,00
	IS0091R	0,20	0,18	2242,60
Netherlands	**NL0091R**	0,56	0,58	885,30
Norway	**NO0001R**	0,08	0,06	1574,20
	NO0039R	0,05	0,03	1297,90
	NO0057R	1,12	1,43	563,10
	NO0099R	0,16	0,27	1133,00
Portugal	**PT0003R**	0,04	0,06	1729,60
	PT0004R	0,11	0,29	694,50
	PT0010R	0,29	0,30	1064,80
Sweden	**SE0014R**	0,67	0,72	628,80
	SE0098R	0,40	0,43	1045,00

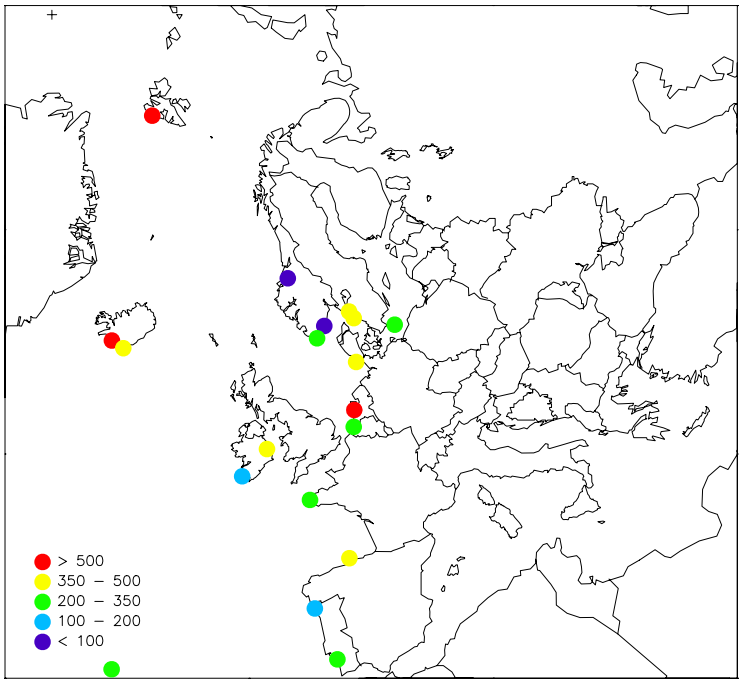


Figure 2.8: Nitrate depositions 2002, mg/m^2

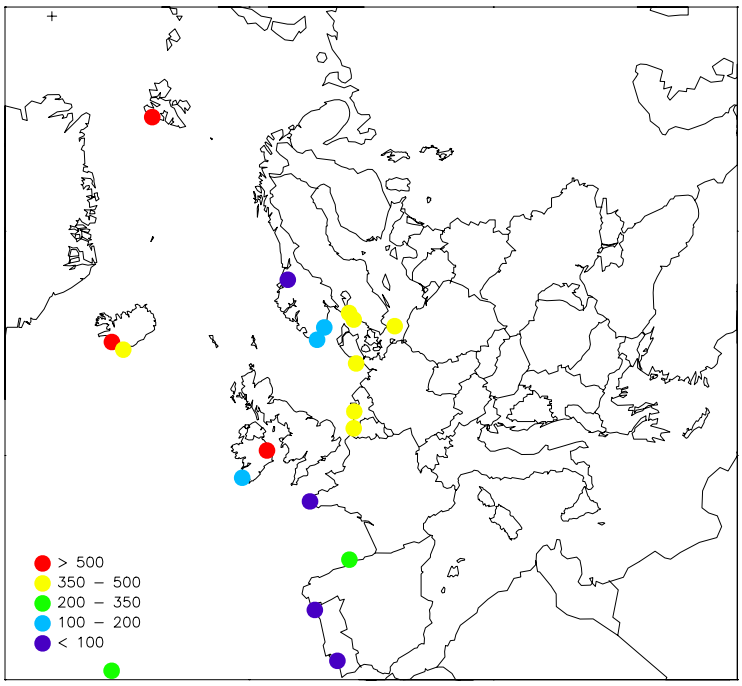


Figure 2.9: Ammonium depositions 2002, mg/m^2

Table 2.5 Reported mean annual air concentrations – metals

		cadmium	copper	lead	zinc	mercury
		mg/m3	ng/m3	ng/m3	ng/m3	ng/m3
belgium	**BE0004R**		27,027	17,065	43,071	
germany	**DE0001R**	0,160	2,543	6,180		
denmark	**DK0008R**	0,100	0,920	3,568	9,432	
	DK0031R	0,088	0,735	2,816	7,822	
united kingdom	**GB0014R**	0,271	1,459	5,395	48,521	
	GB0090R	0,434	2,249	8,003	42,244	
	GB0091R	0,255	0,722	2,002	27,332	
iceland	**IS0091R**	0,051	1,307	0,702	4,693	0,022a
netherlands	**NL0009R**	0,175		7,696	23,983	
norway	**NO0042G**	0,027	0,249	0,664	1,221	1,601
	NO0099R					1,638
sweden	**SE0014R**					1,672

a: only aerosol component

Table 2.6 Reported mean annual air concentrations – reduced nitrogen

		NH3	NH4	NH3+NH4
germany	**DE0001R**			2.179
spain	**ES0008R**			0.749
united kingdom	**GB0014R**	0.609	0.951	
	GB0091R	0.326	0.493	
netherlands	**NL0009R**		1.258	
	NL0091R	1.209	1.425	
norway	**NO0001R**	0.234	0.432	0.667
	NO0039R	0.671	0.154	0.825
	NO0042G	0.261	0.060	0.321
sweden	**SE0014R**			0.989
denmark	**DK0008R**			1.218

Table 2.7 Reported mean annual air concentrations – oxidised nitrogen

		NO2	HNO3	NO3	HNO3+NO
belgium	**BE0011R**	6.512			
	BE0013R	5.317			
germany	**DE0001R**	2.256			1.124
spain	**ES0008R**	1.416			0.341
united kingdom	**GB0014R**		0.231	0.489	
	GB0091R		0.110	0.261	
netherlands	**NL0009R**	3.737		0.698	
	NL0091R	5.970		0.800	
norway	**NO0001R**		0.087	0.238	0.326
	NO0039R	0.255	0.051	0.081	0.133
	NO0042R		0.067	0.080	0.149
sweden	**SE0014R**	1.381			0.701
denmark	**DK0008R**				0.735
iceland	**IS0091R**			0.053	

3. Review of temporal trends

3.1 Annual patterns

The review of temporal trends is a matter which OSPAR intend to consider during 2004. As part of that, considerable attention has been given by NILU as data manager to selected heavy metal and organic components. This has begun to pay dividends in the information obtained, and it is anticipated that further effort during 2004 will achieve a high quality assessment.

The heavy metals cadmium, mercury and lead have been examined so far, as have the organic components lindane and PCBs. In this connection there has been discussion with data originators of countries where benefit may be expected from detailed review of reported depositions. For PCB, there have been various discussion with the data originators in Iceland, Germany, Ireland, United Kingdom and Sweden to elucidate differences in monitoring and analysis practices which may have a bearing on results, to obtain fresh data where possible, and to encourage more detailed cross-comparison of observed depositions. For metals discussions have been held with the data originator in Belgium to review the status of data submitted in the light of neighbouring estimates. As an overall indication of the state of progress, the following figure (fig 3.1) indicates the changes believed to have occurred in depositions of the five components. For metals 1990 is taken as a base year, whilst for the organic data 1996 is used. This is due to monitoring over a shorter period:

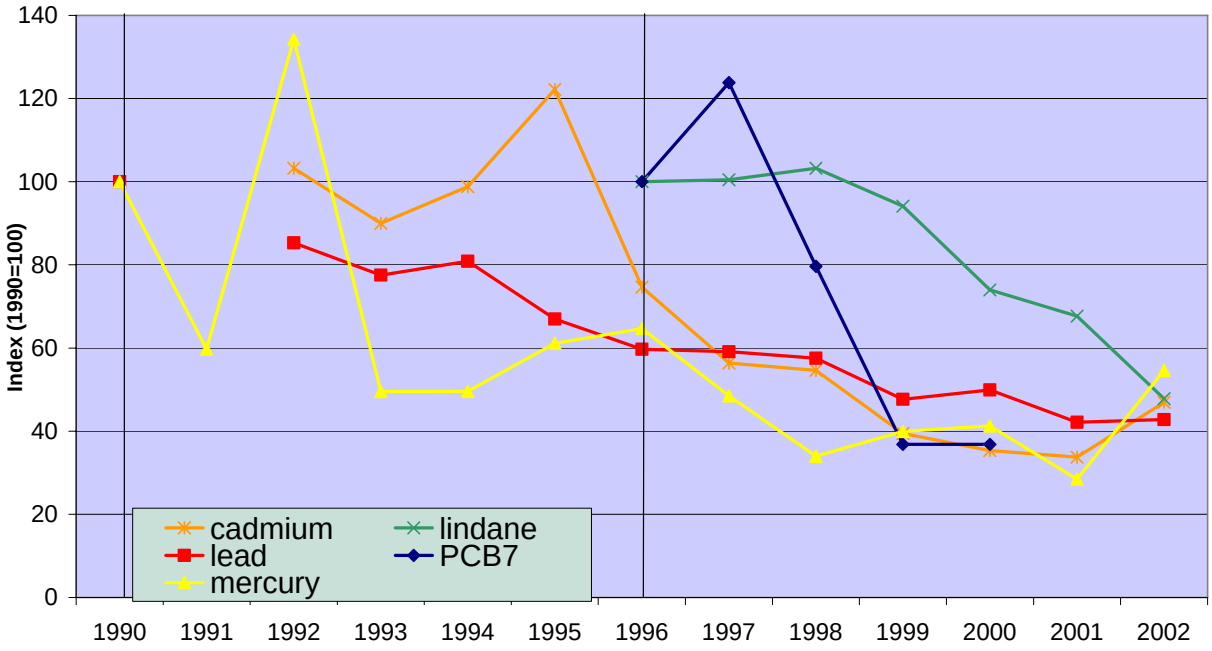


Figure 3.1. Estimated changes in atmospheric deposition to coastal waters, derived from monitoring within CAMP.

The work on metals does indicate that quality is generally very good, This is reflected in the very close comparison seen between observations across the region over several years.

Such close comparison is an aid in identifying those results which are falling beyond expectations, and which can then be examined carefully as part of current data review and adjustment. As an example, the following figure 3.2 indicates observed rates of cadmium deposition observed to the coastal zone since 1990. In general, observations are within a close range, neighbouring countries monitoring to within a close percentage. Against this general picture, the exceptions are readily identified. Very often, the deviation from a norm can be traced to single individual data points of uncertain quality. National data originators generally retain good records of each observation which permits careful re-determination. At the most extreme, removal of such points can be effective in indicating the accurate picture.

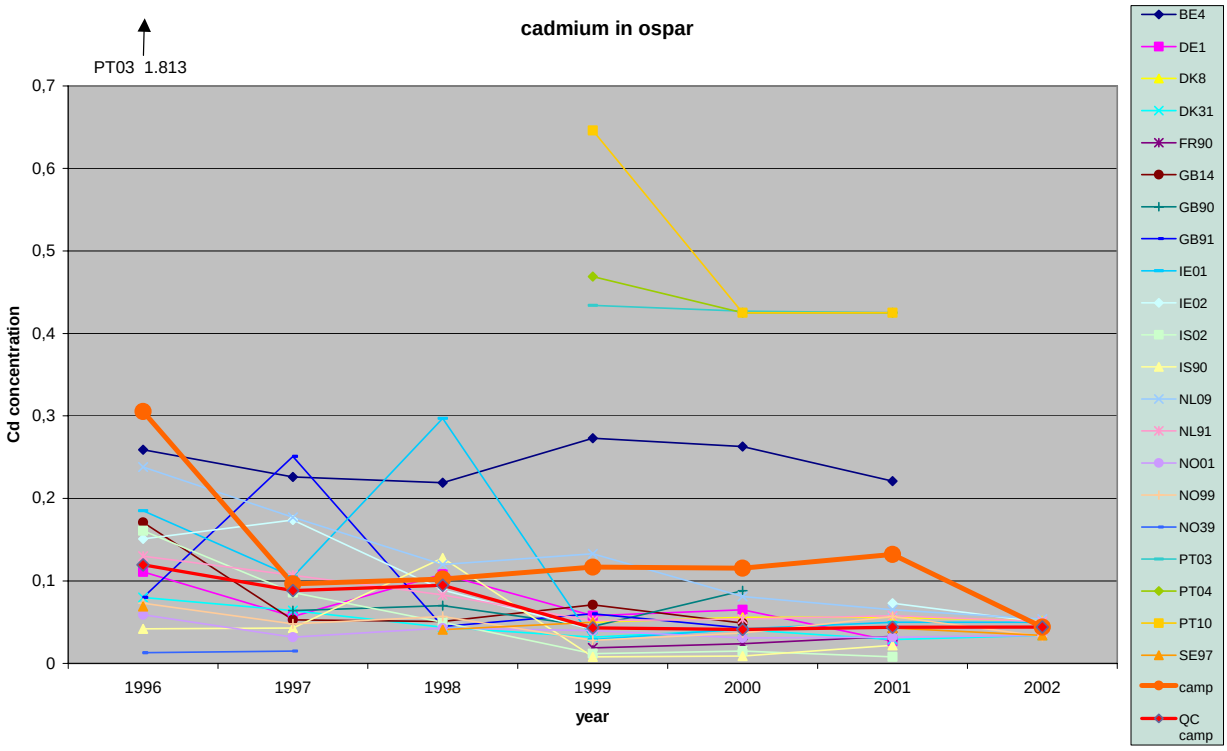


Figure 3.2

Following recent discussions between NILU as data manager and the data originators in countries, Germany has indicated a willingness to undertake an intensive data check in 2004. A part of this will be to evaluate and understand the implications of method changes, and further sharing of experience with Iceland is expected. The Belgian data originator has indicated a willingness to research the patterns found in Belgian data in comparison with those of neighbouring countries. The UK data originator has offered to make available observations of organic contaminants.

Review of nitrogen trends, which OSPAR will deal with 2004, can benefit greatly from the evaluations conducted within the EMEP network of this component. NILU will continue to liaise with the EMEP programme such that a cost effective review of nitrogen trends across the OSPAR region will be available during the review work in 2004.

3.2 Seasonal patterns

The monthly observations allow evaluation of the presence of any seasonal patterns in rates on pollutant supply from the atmosphere to the seas. In figure 3.3 the seasonal depositions during 2002 of each component is displayed. Values are in each case the average across all stations submitting an unbroken series of monthly observations, with each monthly value normalised against annual total to weight each station equally.

It is evident that on a European scale only lindane reveals a seasonal pattern in the rates of deposition to the sea in precipitation. The various metals show little intermonthly variation. Differences from month to month are very likely the result simply of meteorological differences. However, whilst this indicates that excepting lindane, for which a seasonal use pattern can be anticipated, across Europe there is little immediate evidence for a common pattern such an analysis will mask the potential for sub-regional patterns. The very size of the OSPAR region lends itself to the potential for such variability. This analysis is anticipated within the overall review during 2004.

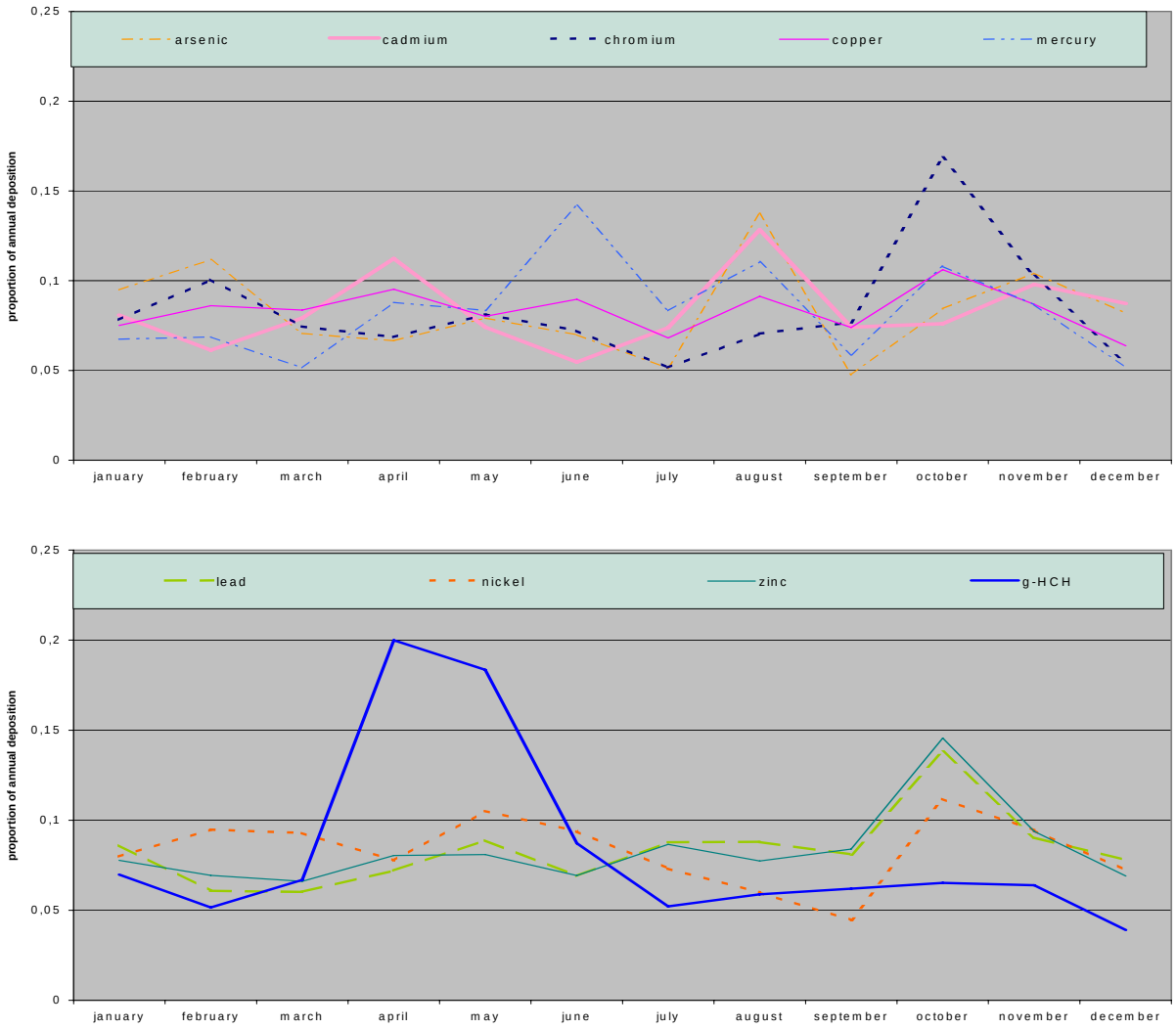


Figure 3.3 Seasonal depositions of priority metals and of lindane during 2002. Expressed as monthly proportion of annual total deposition.

4. Some points

- Reporting by OSPAR countries has remained broadly stable. This means reasonable cover for the North Sea, but weaker cover particularly for northern areas.
- The principal deficiency, however, may be said to be the rather incomplete implementation of the Mandatory monitoring programme. This incompleteness is observable both in that important toxic components are not reported by half of countries, and in that the geographical coverage of monitoring of each component in the programme is incomplete.
- Reporting occurred largely in adherence to the time table.
- There are issues of data quality to be answered. There are notable examples of very high reported concentrations being indicated as valid by national data originators which neighbour much lower concentrations also being indicated as valid. Consideration of such spatial features across national borders may assist national data originators identify potential weaknesses not evident in national datasets.
- Work towards time change evaluation of organic and heavy metal inputs has laid the foundations for the coming review, and has led to attention to data quality review amongst the national data originators. The cross-border comparisons mentioned previously will be considered within this context, as will issues of monitoring and analysis differences.

Appendix 1

Reported monthly depositions of Mandatory Components

APPENDIX 1
Reported monthly depositions of Mandatory Components

Arsenic depositions, μg/m2

country	station	january	february	march	april	may	june	july	august	september	october	november	december	total
Belgium	**BE0004R**	13,082	19,782	13,44	11,42	10,69	15,1	12,84	24,341	13,769	20,631	21,897	20,52	197,52
Germany	**DE0001R**	5,05	11,02	18,40	7,07	8,18	8,89	5,30	22,52	3,71	8,03	13,40	7,97	119,52
Denmark	**DK0008R**	29,44	24,84	8,27	7,33	16,55	15,94	5,11	26,12	10,51	18,48	19,42	8,75	190,76
	DK0020R	52,42	6,10		7,60		8,59	4,18	11,18		12,04			102,09
	DK0031R	12,68	9,33	5,26	5,09	7,80	14,07	8,61	12,91	12,25	14,33	8,44	6,22	116,99
France	**FR0090R**	7,50	92,40	28,00	49,50	47,60	32,00	2,67	0,26	10,40	7,65	49,00	90,85	417,83
Ireland	**IE0001R**	131,65	92,70	33,70	55,50	93,05	67,90	49,05	40,45	60,60	118,55	143,35	73,00	959,50
	IE0002R	134,45	143,15	55,55	91,90	116,50	46,25	25,30	39,10	13,30	150,95	203,25	118,80	1138,50
Iceland	**IS0090R**	7,05	2,07	1,87	9,16	3,07	2,87	10,87	79,81	3,12	3,29	7,37	10,19	140,74
Netherlands	**NL0009R**	11,54	17,501	15,042	14,03	7,567	23,11	16,52	27,844	33,42		15,511	2,73	184,81
	NL0091R	12,12	14,53	1,73	4,52	10,10	4,97	5,18	8,78	3,85	5,87	8,19	2,94	82,76
Norway	**NO0099R**	30,56	23,09	59,66	25,45	16,73	21,53	23,32	19,15	13,29	23,98	13,91	12,32	282,99
Sweden	**SE0097R**	19,20	4,05	21,08	17,92	1,55	2,50	3,05		3,00	2,58	11,40		86,33

Cadmium depositions, μg/m2

country	station	january	february	march	april	may	june	july	august	september	october	november	december	total
Belgium	**BE0004R**	6,00	8,65	5,60	42,35	17,97	8,18	22,63	33,84	92,65	29,33	107,27	296,69	671,15
Germany	**DE0001R**	1,39	2,17	2,29	2,33	2,37	2,70	1,61	7,02	0,68	1,79	3,85	2,37	30,56
Denmark	**DK0008R**	3,25	0,97	3,15	2,07	3,11	2,78	0,75	9,96	1,31	2,16	5,48	2,19	37,16
	DK0020R	17,22	1,72		2,19		3,16	1,61	4,44		3,44			33,78
	DK0031R	4,00	2,81	1,72	1,13	1,69	3,92	2,91	9,70	1,98	2,62	1,75	0,81	35,04
France	**FR0090R**	2,00	4,80	2,40	5,40	4,20	1,00	1,78	0,52	0,39	1,53	2,80	1,15	27,97
Ireland	**IE0001R**	13,17	9,27	3,37	5,55	9,31	6,79	4,91	4,05	6,06	11,86	14,34	7,30	95,95
	IE0002R	13,45	14,32	5,56	9,19	11,65	4,63	2,53	3,91	1,33	15,10	20,33	11,88	113,85
Iceland	**IS0090R**	0,47	0,18	0,67	2,50	0,34	0,32	2,16	0,78	0,56	0,51	0,35	0,41	9,24
	IS0091R	0,67	0,71	4,34	6,50	1,11	0,69	1,90	1,06	2,52	1,28	0,98	1,25	23,02
Netherlands	**NL0009R**	7,22	5,19	2,42	5,36	3,12	2,37	2,58	7,14	4,66				40,05
	NL0091R	8,75	1,54	1,20	5,24	4,38	1,13	3,50	5,27	2,72	2,74	6,33	2,27	45,06
Norway	**NO0001R**	3,58	1,89	3,25	4,82	3,54	2,74	3,55	6,06	5,36	7,48	2,86	3,96	49,07
	NO0039R	0,43	0,70	2,96	1,28	0,91	0,91	2,21	4,89	5,56	1,51	0,20	0,17	21,73
	NO0099R	3,35	1,90	5,03	2,49	2,70	2,98	2,09	5,04	0,87	1,65	2,42	2,49	33,00
Portugal	**PT0003R**	56,99	36,34	53,85	23,04	47,26	32,30	12,41		35,23	115,69	212,37	99,37	724,84
	PT0004R	21,55	4,38	42,50	31,92	2,98	2,30			18,66	41,01	70,38	59,50	295,16
	PT0010R	49,81	20,53	72,59	12,03	22,78	11,05		9,22	32,26	72,29	39,50	110,16	452,22
Sweden	**SE0097R**	7,00	3,24	6,20	4,48	1,24	4,00	0,61		1,20	3,09	2,85		33,91

Chromium depositions, μg/m2

country	station	january	february	march	april	may	june	july	august	september	october	november	december	total
Belgium	**BE0004R**	43,88	66,35	54,25	43,78	54,97	86,78	21,41	43,67	65,27	220,61	261,09	101,75	1063,80
Germany	**DE0001R**	3,32	8,00	11,93	4,16	6,13	5,29	6,83	16,54	4,23	7,63	7,96	3,95	85,95
Denmark	**DK0008R**	23,72	21,99	6,68	9,40	12,25	14,66	6,98	17,66	7,49	10,06	7,97	3,99	142,87
	DK0020R	59,88	5,51		8,76		11,21	6,17	10,07		5,61			107,20
	DK0031R	12,13	9,18	5,07	5,41	6,23	15,42	12,41	16,41	13,21	48,65	6,05	5,72	155,89
France	**FR0090R**	13,00	19,20	9,60	20,70	21,00	12,50	22,25	3,90	4,94	7,65	7,00	6,90	148,64
Ireland	**IE0001R**	131,65	92,70	33,70	55,50	93,05	67,90	49,05	40,45	60,60	118,55	143,35	73,00	959,50
	IE0002R	134,45	143,15	55,55	91,90	116,50	46,25	25,30	39,10	532,00	603,80	203,25	118,80	2110,05
Iceland	**IS0090R**	30,74	90,95	53,62	44,26	40,93	33,91	43,45	8,75	5,15	23,69	23,38	6,10	404,92
	IS0091R	29,86	56,39	156,04	173,22	173,43	66,13	16,45	22,42	45,72	237,31	99,45	94,55	1170,98
Netherlands	**NL0009R**	34,39	23,56	12,27	17,73	11,57	33,43	23,44	34,65	20,21		25,21	4,44	240,90
	NL0091R	42,02	23,61	6,01	15,65	14,59	17,21	8,42	30,42	13,34	20,33	28,39	10,19	230,18
Norway	**NO0099R**	16,43	15,21	22,15	11,75	9,95	6,66	20,53	12,81	12,81	11,93	6,44	8,37	155,04
Sweden	**SE0097R**	22,41	4,05	3,10	1,40	1,55	2,50	26,84		9,00	22,66	31,35		124,86

Copper depositions, μg/m2

country	station	january	february	march	april	may	june	july	august	september	october	november	december	total
Belgium	**BE0004R**	201,33	249,04	165,9	149,66	150,9	166,83	56,228	100,99	55,547				1296,43
Germany	**DE0001R**	53,09	285,44	100,20	53,42	82,37	77,14	66,68	116,16	25,77	62,97	91,11	83,63	1097,96
Denmark	**DK0008R**	46,66	107,57	15,12	58,41	65,10	62,19	28,81	149,28	36,91	51,53	58,27	18,45	698,29
	DK0020R	204,77	34,59		41,75		76,81	34,19	132,29		33,94			558,33
	DK0031R	73,85	47,52	18,01	26,26	40,59	88,75	106,37	145,62	47,10	90,54	27,07	18,31	730,01
France	**FR0090R**	32,50	64,80	35,20	59,40	63,00	30,00	62,30	39,00	23,40	56,10	112,00	80,50	658,20
Ireland	**IE0001R**	131,65	92,70	33,70	55,50	93,05	67,90	49,05	40,45	363,60	118,55	143,35	73,00	1262,50
	IE0002R	134,45	143,15	222,20	551,40	116,50	46,25	50,60	39,10	79,80	2113,30	813,00	475,20	4784,95
Iceland	**IS0090R**	125,42	100,27	155,25	170,77	181,42	332,72	170,26	127,92	92,10	73,93	113,47	73,18	1716,70
	IS0091R	84,63	102,45	700,75	541,88	212,26	379,30	158,30	101,95	182,34	191,63	153,55	142,93	2951,97
Netherlands	**NL0009R**	126,32	115,07	52,57	124,55	82,33	163,03	113,54	183,10	191,97		155,11	27,30	1334,90
	NL0091R	222,82	82,63	49,43	183,01	164,37	158,88	89,42	174,33	50,27	61,78	93,91	91,34	1422,20
Norway	**NO0099R**	121,57	37,09	269,14	157,67	117,35	93,54	94,85	80,12	138,56	43,66	35,07	96,24	1284,87
Portugal	**PT0003R**	289,69	93,73	80,56	138,30	292,52	134,58	20,93		144,85	508,33	268,16	558,23	2529,88
	PT0004R	68,48	14,21	70,88	41,49	20,02	9,94			14,27	34,83	53,82	120,03	447,96
	PT0010R	38,09	18,73	79,18	26,60	140,97	8,45		7,05	24,67	55,28	185,30	89,83	674,15
Sweden	**SE0097R**	145,64	45,36	62,00	151,20	58,28	112,00	97,60		24,90	29,87	69,35		796,20

Mercury depositions, ng/m2

country	station	january	february	march	april	may	june	july	august	september	october	november	december	total
Belgium	**BE0004R**	273,00	1451,00	1680,00	1427,00	1336,00	2463,00	1650,00	3043,00	2427,00	4313,00	456,00	1829,00	22348,00
Germany	**DE0001R**	230,74	323,41	310,97	218,95	607,52	722,15	560,19	888,08	304,88	425,85	623,42	156,05	5372,21
Ireland	**IE0001R**	13165,00	9270,00	3370,00	5550,00	9305,00	6790,00	4905,00	4045,00	6060,00	11855,00	14335,00	7300,00	95950,00
Netherlands	**NL0091R**	530,09	536,00	380,60	353,82	534,20	1318,80	479,10	1032,03	334,20	749,90	684,70	459,41	7392,84
Norway	**NO0099R**	5201,29	448,06	450,84	2801,74		3178,74	602,36			597,31	349,46		13629,80
Sweden	**SE0014R**	521,60	348,58	270,00	1635,33	535,30	1542,98	872,16	496,80	140,25	307,74	390,50	66,36	7127,60

Nickel deposition, μg/m2

country	station	january	february	march	april	may	june	july	august	september	october	november	december	total
Belgium	**BE0004R**	35,81	101,18	85,87	103,4	132,28	197,9	84,7	53,05	152,598	203,41	365,387	436,909	1952,48
Germany	**DE0001R**	6,22	36,18	18,63	17,62	16,40	29,96	15,93	58,30	18,33	26,67	40,10	9,47	293,83
Denmark	**DK0008R**	23,55	17,21	8,59	10,35	20,21	22,26	9,54	21,04	18,60	15,60	18,76	6,68	192,39
	DK0020R	84,99	12,50		15,63		10,75	10,64	9,60		14,12			158,22
	DK0031R	35,00	27,83	14,15	9,71	15,43	33,69	27,99	13,39	16,39	42,17	13,22	4,30	253,24
France	**FR0090R**	35,00	45,60	34,40	68,40	44,80	27,50	17,80	10,40	7,80	20,40	53,20	39,10	404,40
Ireland	**IE0001R**	131,65	92,70	33,70	55,50	93,05	67,90	49,05	40,45	60,60	118,55	143,35	73,00	959,50
	IE0002R	134,45	143,15	55,55	91,90	116,50	46,25	25,30	39,10	13,30	150,95	203,25	118,80	1138,50
Iceland	**IS0090R**	36,71	112,12	93,65	89,71	82,87	146,70	92,38	21,24	8,22	15,72	28,77	11,29	739,39
	IS0091R	28,94	53,15	358,49	95,82	267,79	147,06	34,88	15,52	21,00	341,04	23,46	114,36	1501,51
Netherlands	**NL0009R**	18,96	18,58	9,68	13,98	9,13	26,36	18,48	27,32	15,93		19,87	3,50	181,78
	NL0091R	33,13	38,14	4,74	12,34	24,12	13,57	21,06	23,99	10,52	16,03	22,39	8,04	228,05
Norway	**NO0099R**	23,88	11,21	32,71	33,45	25,48	11,78	69,54	21,20	15,23	13,62	9,11	22,95	290,15
Portugal	**PT0003R**	267,74	66,26	95,82	42,01	117,25	58,90	22,63		64,25	219,03	397,80	181,20	1532,88
	PT0004R	114,54	7,98	77,50	58,20	5,43	4,19			39,03	83,83	194,21	126,66	711,56
	PT0010R	806,06	37,43	####	175,74	472,22	69,29		56,20	58,82	1079,59	3254,50	2351,95	9451,09
Sweden	**SE0097R**	14,22	6,48	9,92	3,36	0,93	10,00	1,83		7,80	1,55	29,45		85,54

Lead deposition, µg/m2

country	station	january	february	march	april	may	june	july	august	september	october	november	december	total
Belgium	**BE0004R**	160,26	274,32	392,09	566,36	519,54	722,47	662,78	895,00	305,46	288,81	269,82	446,31	5503,21
Germany	**DE0001R**	53,94	55,36	49,96	68,12	77,32	71,31	53,28	218,35	37,71	56,28	125,59	48,66	915,87
Denmark	**DK0008R**	94,19	56,34	29,29	38,51	98,20	99,94	37,54	219,18	60,49	82,13	154,22	155,81	1125,83
	DK0020R	446,76	61,89		58,25		89,37	47,25	65,30		82,64			851,46
	DK0031R	101,54	83,65	26,10	37,24	52,21	101,33	70,03	79,41	62,87	109,56	61,71	31,82	817,47
France	**FR0090R**	73,50	63,60	59,20	59,40	112,00	43,00	97,90	65,00	32,50	96,90	126,00	149,50	978,50
Ireland	**IE0001R**	131,65	92,70	33,70	55,50	93,05	67,90	49,05	40,45	60,60	474,20	143,35	73,00	1315,15
	IE0002R	134,45	143,15	222,20	91,90	116,50	46,25	25,30	39,10	53,20	603,80	203,25	118,80	1797,90
Iceland	**IS0090R**	72,70	22,01	31,39	63,27	38,29	38,52	85,83	20,64	28,20	89,51	20,01	25,00	535,37
	IS0091R	28,73	16,93	32,24	91,79	88,55	38,25	24,71	19,82	96,76	100,73	38,08	43,70	620,28
Netherlands	**NL0009R**	91,17	106,22	65,22	77,41	61,79	152,32	122,27	229,96	111,92		59,14	10,41	1087,82
	NL0091R	408,64	217,92	49,43	266,69	251,33	162,85	183,38	284,31	118,50	205,67	487,03	70,95	2706,71
Norway	**NO0001R**	100,28	76,98	78,21	87,04	156,87	83,95	103,04	117,83	80,98	276,88	139,51	127,75	1429,31
	NO0039R	29,27	35,06	22,92	32,20	22,58	25,99	36,81	11,44	139,26	12,85	4,14	10,58	383,08
	NO0099R	175,70	84,18	139,73	138,23	151,08	171,08	726,86	163,01	131,91	95,07	67,44	68,64	2112,92
Portugal	**PT0003R**	86,49	55,15	81,72	34,96	71,72	49,02	18,83		53,47	175,57	322,31	150,80	1100,05
	PT0004R	32,70	6,64	64,50	48,44	4,52	3,48			28,32	62,24	106,81	90,30	447,95
	PT0010R	75,59	31,15	110,17	18,25	92,19	16,77		42,75	48,96	109,71	77,06	167,18	789,79
Sweden	**SE0097R**	161,94	197,64	105,40	192,08	47,12	58,00	37,82		21,00	47,38	80,75		949,13

Zinc depositions, µg/m2

country	station	january	february	march	april	may	june	july	august	september	october	november	december	total
Belgium	**BE0004R**	214,81	265,72	1348,26	1624,98	1417,82	935,00	221,44	2146,25	1180,44	15474,46	5747,59	286,03	30862,80
Germany	**DE0001R**	260,26	933,53	811,18	447,75	431,44	556,41	583,22	1032,14	385,86	1252,28	2610,74	823,19	10128,00
Denmark	**DK0008R**	415,35	396,26	276,93	316,70	846,69	555,44	426,51	854,63	289,66	440,81	607,91	256,23	5683,10
	DK0020R	2716,40	940,28		303,69		2764,08	380,14	584,71		751,64			8440,95
	DK0031R	1126,76	872,15	283,27	337,41	748,03	783,08	1115,66	876,92	552,25	502,86	303,94	79,58	7581,90
France	**FR0090R**	102,00	138,00	168,00	495,00	249,20	125,00	160,20	104,00	130,00	612,00	238,00	195,50	2716,90
Ireland	**IE0001R**	9215,50	11124,00	4044,00	4662,00	3908,10	3123,40	2452,50	2184,30	6666,00	18730,90	8027,60	8468,00	82606,30
	IE0002R	2689,00	858,90	999,90	1654,20	932,00	370,00	303,60	391,00	3351,60	2717,10	1626,00	1900,80	17794,10
Iceland	**IS0090R**	147,66	208,47	272,15	522,14	490,77	1028,47	1095,75	283,86	192,61	516,22	243,08	207,35	5208,53
	IS0091R	569,24	341,43	1096,76	1950,99	715,24	1013,29	1385,11	1000,44	692,73	1887,21	863,73	2636,44	14152,61
Netherlands	**NL0009R**	535,70	508,77	280,26	413,85	325,58	744,25	536,98	858,88	450,78				4655,06
	NL0091R	711,04	177,06	129,36	421,40	976,14	390,58	502,20	608,40	246,24	351,90	567,84	305,76	5387,92
Norway	**NO0001R**	569,47	597,51	664,25	254,92	389,74	266,35	353,48	223,04	103,94	665,22	480,32	656,85	5225,10
	NO0039R	51,91	52,44	80,28	162,02	128,18	112,71	362,17	282,97	843,66	125,68	38,23	50,17	2290,40
	NO0099R	830,13	996,77	1114,66	540,50	455,82	459,30	705,64	524,18	366,50	270,44	203,54	264,18	6731,66
Portugal	**PT0003R**	2661,44	1961,97	1371,53	1594,56	3701,18	1914,08	453,62		1736,30	2962,42	5092,39	2166,71	25616,21
	PT0004R	185,65	20,60	244,93	993,75	91,00	135,00			733,51	384,12	699,76	533,18	4021,49
	PT0010R	2354,10	703,80	3955,80	537,70	2197,60	1009,81		1150,10	476,30	9131,20	14420,40	9898,30	45835,10
Sweden	**SE0097R**	784,36	578,34	804,76	1060,08	254,82	380,00	136,64		74,10	178,19	324,90		4576,19

Precipitation amounts, mm – collected with samples of As, Cd, Cr, Cu, Ni, Pb, and Zn

country	station	january	february	march	april	may	june	july	august	september	october	november	december
Belgium	**BE0004R**	95,39	72,70	36,61	47,74	38,05	61,92	45,60	97,70	50,46	65,89	106,37	48,51
	BE0004R	142,20	114,00	58,90	83,80	62,80	83,70		74,90		125,40	146,00	
Germany	**DE0001R**	53,30	76,30	49,00	35,80	49,30	82,20	79,90	86,00	29,60	98,70	117,10	26,30
Denmark	**DK0008R**	87,87	64,69	24,39	12,54	42,55	75,20	62,36	93,95	50,28	102,66	83,00	18,55
	DK0020R	221,99	59,22		20,81		90,37	47,48	35,82		90,52		
	DK0031R	137,78	148,05	46,53	28,30	60,50	135,29	126,64	47,30	48,21	137,81	79,63	38,39
France	**FR0090R**	50,00	120,00	80,00	90,00	140,00	50,00	89,00	26,00	13,00	51,00	140,00	115,00
Ireland	**IE0001R**	263,30	185,40	67,40	111,00	186,10	135,80	98,10	80,90	121,20	237,10	286,70	146,00
	IE0002R	268,90	286,30	111,10	183,80	233,00	92,50	50,60	78,20	26,60	301,90	406,50	237,60
Iceland	**IS0090R**	93,30	23,30	67,10	83,70	38,00	26,80	75,50	97,90	103,00	70,60	70,10	81,70
	IS0091R	83,56	34,55	102,12	221,75	110,29	54,50	64,59	210,00	187,16	202,01	119,93	165,96
Netherlands	**NL0009R**	166,30	87,50	14,30	84,80	27,20	134,30	76,00	127,30	73,60	68,30	126,60	28,10
	NL0091R	161,60	90,80	23,10	60,20	56,10	66,20	32,40	117,00	51,30	78,20	109,20	39,20
Norway	**NO0001R**	150,38	169,05	54,46	93,22	96,63	104,30	123,38	87,33	91,91	267,55	122,77	89,01
	NO0039R	57,99	118,85	161,37	42,67	49,94	118,66	77,58	76,75	331,14	81,24	10,29	62,29
	NO0099R	142,52	112,10	139,68	84,65	62,99	66,56	76,66	76,88	37,33	102,90	60,06	22,68
Portugal	**PT0003R**	134,10	85,50	126,70	54,20	111,20	76,00	29,20	24,10	82,90	272,20	499,70	233,80
	PT0004R	50,70	10,30	100,00	75,10	7,00	5,40	0,00	0,00	43,90	96,50	165,60	140,00
	PT0010R	117,20	48,30	170,80	28,30	53,60	26,00	1,30	21,70	75,90	170,10	92,40	259,20
Sweden	**SE0097R**	138,00	162,00	124,00	56,00	62,00	100,00	122,00		30,00	103,00	95,00	

Mercury precipitation data, mm

country	station	january	february	march	april	may	june	july	august	september	october	november	december
Belgium	**BE0004R**	95,39	72,7	36,61	47,74	38,05	61,92	45,6	97,7	50,46	65,89	106,37	48,51
Germany	**DE0001R**	48,03	66,96	50,26	31,805	49,79	79,77	79,91	86,02	29,04	90,822	106,4815	28,49
Ireland	**IE0001R**	263,3	185,4	67,4	111	186,1	135,8	98,1	80,9	121,2	237,1	286,7	146
Netherlands	**NL0091R**	53,6	89,1	40,3	43,1	30,3	83,6	28,2	104,5	55,9	81,1	91,9	91,44
Norway	**NO0099R**	409,7	104,2	57,8	138,7		170,9	40,7			121,9	20,2	
Sweden	**SE0014R**	81,5	60,1	12	36,1	50,5	86,2	94,8	21,6	8,5	66,9	55	8,4

Ammonium depositions, mg N/m2

country	station	january	february	march	april	may	june	july	august	september	october	november	december
Belgium	**BE0014R**	23,27	30,03	70,76	11,91	47,60	42,91	41,57	53,84	25,30	30,47	32,05	42,21
Germany	**DE0001R**	16,58	14,83	34,31	7,87	42,30	29,95	28,91	97,76	20,35	35,20	39,40	13,20
Denmark	**DE0001R**	17,26	13,03	34,23	8,19	42,33	29,83	28,81	97,08	20,27	35,17	38,97	14,26
	DK0020R	18,37	17,93	29,09	63,04	63,52	58,72	34,55	118,24	15,96	31,81	24,91	4,24
Spain	**ES0008R**	7,79	7,81	10,30	32,54	31,28	75,94	32,72	31,90	14,37	20,97	17,52	16,43
France	**FR0090R**	1,50	4,80	8,00	4,50	28,00	2,50	8,90	1,30	0,39	2,55	14,00	11,50
Ireland	**IE0001R**	20,79	12,29	23,07	8,90	12,18	10,73	10,63	7,58	15,92	21,93	7,34	4,25
	IE0002R	15,80	9,27	17,52	11,10	14,89	16,30	40,22	7,28	13,33	23,71	8,60	5,84
Iceland	**IS0090R**	21,51	14,32	34,44	66,17	69,90	42,55	24,29	28,93	11,44	87,55	69,11	90,29
	IS0091R	0,60	0,09	0,38	24,74	0,79	0,79	33,00	218,98	72,35	29,40	583,70	245,87
Netherlands	**NL0091R**	45,69	28,42	15,64	41,37	61,82	32,14	35,62	73,04	16,16	27,58		25,19
	NO0001R	16,09	18,55	23,74	82,59	86,88	17,14	52,48	66,52	22,57	42,36	40,26	31,63
Norway	**NO0039R**	4,56	5,71	7,22	14,98	10,81	17,45	14,85	1,94	44,66	5,73	2,79	5,04
	NO0057R	0,54		0,04	2,26	1,02	1,02	44,21	2,32	1,62	1,24	4,61	1,84
	NO0099R	59,94	4,85	21,90	171,87	123,34	67,29	39,70	39,97	11,06	28,93	38,80	20,40
Portugal	**PT0003R**	13,39	3,35	6,67	25,14	17,54	5,43	2,16		13,20	49,15	22,17	25,82
	PT0004R	4,82	0,16	1,72	7,50	19,81	1,03			5,04	27,94	3,55	4,67
	PT0010R	6,07	1,98	5,56	1,98	14,47	0,59		2,17	1,81	4,10	5,43	39,69
Sweden	**SE0014R**	38,59	10,42	21,47	27,10	41,40	35,43	58,44	14,77	10,74	9,47	38,59	1,02
	SE0098R	151,79	36,83	42,12	39,60	58,10	31,61	24,99		17,67	12,24		3,48

Nitrate depositions, mg N/m2

country	station	january	february	march	april	may	june	july	august	september	october	november	december
Belgium	**BE0014R**	13,36	21,48	30,41	7,55	35,00	27,66	27,75	24,74	15,36	22,51	20,39	37,65
Germany	**DE0001R**	26,88	36,71	26,79	13,04	30,55	40,77	32,21	49,82	13,46	28,16	54,18	18,18
Denmark	**DE0001R**	28,15	32,43	24,80	13,82	30,96	41,04	32,05	50,17	13,41	28,44	54,34	19,91
	DK0020R	29,21	24,95	28,83	29,66	37,17	38,82	19,60	19,20	14,51	39,34	33,15	5,92
Spain	**ES0008R**	13,86	15,78	17,90	32,25	46,21	81,43	43,69	37,77	25,60	22,03	17,88	37,60
France	**FR0090R**	7,70	13,56	25,28	24,39	126,56	9,60	12,28	11,47	7,79	9,44	7,28	18,40
Ireland	**IE0001R**	21,41	8,49	12,50	5,86	13,69	8,43	7,04	5,04	12,84	22,78	7,49	3,58
	IE0001R	15,80	7,42	9,44	7,77	18,61	9,51	7,85	8,09	12,12	23,71	8,60	4,38
	IE0002R	26,89	8,59	25,55	53,30	25,63	22,20	7,59	16,42	6,38	99,63	48,78	133,06
Iceland	**IS0091R**	13,46	56,25	3,39	25,12	24,38	26,10	7,92	21,65	46,36	444,76	994,97	5,91
Netherlands	**NL0091R**	56,13	36,41	11,00	22,87	44,05	28,67	34,03	76,22	13,89	32,48		15,44
	NO0001R	35,20	34,28	24,58	68,51	74,21	29,73	40,96	31,56	26,68	53,33	51,07	49,32
Norway	**NO0039R**	3,66	4,95	7,49	9,41	8,67	17,08	6,84	1,12	17,92	4,88	3,24	3,36
	NO0057R	0,75		0,71	6,45	0,36	2,40	10,35	3,38	1,29	1,09	6,61	10,51
	NO0099R	101,67	32,71	33,41	169,05	116,20	133,41	51,72	43,59	25,11	38,90	41,81	22,52
Portugal	**PT0003R**	23,48	7,99	11,83	5,43	15,32	11,88	1,73		5,88	30,38	110,19	71,37
	PT0004R	9,60	0,82	9,77	12,61	12,81	0,05			5,25	24,62	16,54	16,58
	PT0010R	12,17	5,01	24,00	9,34	30,55	7,80		10,63	11,32	14,48	25,56	67,96
Sweden	**SE0014R**	61,82	24,67	18,57	21,10	36,81	36,20	20,35	7,71	10,50	20,27	61,65	3,35
	SE0098R	182,71	39,37	41,04	33,60	38,18	34,88	27,93		20,77	27,54		8,41

Precipitation amounts, mm – collected with samples of ammonium and nitrate

country	station	january	february	march	april	may	june	july	august	september	october	november	december
Belgium	**BE0014R**	47,20	81,72	57,97	23,50	53,70	73,10	81,50	65,50	56,00	56,57	81,83	126,95
Germany	**DE0001R**	44,80	70,60	47,00	24,60	47,00	83,20	82,60	94,00	31,30	88,00	98,50	24,90
Denmark	**DE0001R**	46,80	55,30	37,40	25,60	47,00	83,20	82,60	94,00	31,30	89,00	98,50	26,90
	DK0020R	43,28	59,22	36,37	20,81	47,08	90,37	47,48	35,82	46,82	90,52	48,45	6,65
Spain	**ES0008R**	22,00	36,00	18,60	35,60	89,20	93,20	34,00	68,60	27,20	51,80	48,40	98,00
France	**FR0090R**	50,00	120,00	80,00	90,00	140,00	50,00	89,00	26,00	13,00	51,00	140,00	115,00
Ireland	**IE0001R**	293,70	193,10	83,20	87,40	151,30	109,60	81,70	68,80	129,70	217,90	242,00	124,90
	IE0001R	263,30	185,40	67,40	111,00	186,10	135,80	98,10	80,90	121,20	237,10	286,70	146,00
	IE0002R	268,90	286,30	111,10	183,80	233,00	92,50	50,60	78,20	26,60	301,90	406,50	237,60
Iceland	**IS0091R**	120,30	18,80	75,40	251,90	157,90	158,30	206,80	274,40	287,80	258,90	249,00	183,10
Netherlands	**NL0091R**	160,00	88,80	23,70	59,10	55,20	65,60	31,80	117,80	50,50	76,60	107,00	36,50
	NO0001R	135,50	150,40	47,60	144,80	131,70	116,30	157,60	94,50	94,20	249,90	132,30	119,40
Norway	**NO0039R**	64,50	147,80	165,10	28,50	51,50	144,90	98,70	106,40	343,30	79,20	9,40	58,60
	NO0057R	64,70	5,40	8,20	57,20	0,50	7,30	58,50	97,20	23,10	93,20	97,40	50,40
	NO0099R	128,60	104,20	57,80	204,30	137,20	144,70	66,90	80,90	36,40	97,00	57,70	17,30
Portugal	**PT0003R**	134,10	85,50	126,70	54,20	111,20	76,00	29,20	24,10	82,90	272,20	499,70	233,80
	PT0004R	50,70	10,30	100,00	75,10	7,00	5,40	0,00	0,00	43,90	96,50	165,60	140,00
	PT0010R	117,20	48,30	170,80	28,30	53,60	26,00	1,30	21,70	75,90	170,10	92,40	259,20
Sweden	**SE0014R**	88,20	65,10	28,00	19,50	65,50	89,70	87,60	14,40	10,90	67,30	78,80	13,80
	SE0098R	323,00	127,00	54,00	40,00	83,00	109,00	147,00	0,00	31,00	102,00	0,00	29,00

Norwegian Institute for Air Research (NILU)
P.O. Box 100, N-2027 Kjeller, Norway

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ABSTRACT
This report is the assimilated record of observed input of atmospheric pollutants to the OSPAR seas, and of the concentrations of pollutants in the ambient air of the OSPAR region. Observations are made following the terms of the CAMP – the Comprehensive Atmospheric Monitoring programme. This programme calls for Mandatory Monitoring of a range heavy metals, organic compounds and nutrients in precipitation and air, and encourages participation in a Voluntary Monitoring of additional compounds.

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