GLOBAL MONITORING PLAN
FOR PERSISTENT ORGANIC POLLUTANTS

UNDER THE STOCKHOLM CONVENTION ARTICLE 16 ON EFFECTIVENESS EVALUATION

THIRD REGIONAL MONITORING REPORT
ANNEXES

ASIA-PACIFIC REGION

THE SECOND DRAFT
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Contents

Annex A
Information on use and regulations for POPs in this region

A.1 Information on pesticide and agricultural use and regulations

Table A.1–1 Information of Regulation on initial POPs Pesticide in Asia and Pacific Region

Substance	Historically no use	Banned on use	Exemption
Aldrin	China[+2], Indonesia, Palau, Yemen	Cambodia[+1], China, Cyprus, India, Indonesia, Iran, Japan, Jordan, Korea (Republic of), Kyrgyzstan, Lao PDR, Lebanon, Mongolia, Nepal, Pakistan, Philippines, Singapore, Thailand, Tonga, United Arab Emirates, Vietnam, Yemen	
Chlordane	Palau, Yemen	Cambodia[+1], China, Cyprus, India, Indonesia, Iran, Japan, Jordan, Korea (Republic of), Kyrgyzstan, Lao PDR, Lebanon, Mongolia, Nepal, Pakistan, Philippines, Singapore, Thailand, Tonga, United Arab Emirates, Vietnam, Yemen	
DDT		Cambodia[+1], China[+4], Cyprus, Indonesia, Iran, Japan, Jordan, Korea (Republic of), Kyrgyzstan, Lao PDR, Lebanon, Maldives, Mongolia, Myanmar[2], Nepal, Oman, Palau, Philippines, Singapore, Thailand, Tonga, United Arab Emirates, Vietnam, Yemen	India*[1], Marshal Islands*[1]
Dieldrin	China[+2], Palau, Yemen	China, Cambodia[+1], Cyprus, India, Indonesia, Iran, Japan, Jordan, Korea (Republic of), Kyrgyzstan, Lao PDR, Lebanon, Mongolia, Nepal, Pakistan, Philippines, Singapore, Thailand, Tonga, United Arab Emirates, Vietnam, Yemen	
Endrin	China, Cyprus, Indonesia, Palau, Yemen	China, Cambodia[+1], Cyprus, India, Indonesia, Iran, Japan, Jordan, Korea (Republic of), Kyrgyzstan, Lao PDR, Lebanon, Mongolia, Nepal, Pakistan, Philippines, Singapore, Thailand, Tonga, United Arab Emirates, Vietnam, Yemen	
Heptachlor	Cyprus, Indonesia, Palau, Yemen	Cambodia[+1], China, Cyprus, India, Indonesia, Iran, Japan, Jordan, Korea (Republic of), Kyrgyzstan, Lao PDR, Lebanon, Mongolia, Nepal, Pakistan, Philippines, Korea (Republic of), Singapore, Thailand, Tonga, United Arab Emirates, Vietnam, Yemen	
Hexachlorobenzene	Cyprus, India[+3], Indonesia, Palau, Philippines, Korea (Republic of), Sri Lanka, Thailand, Yemen	Cambodia[+1], China, Cyprus, Indonesia, Iran, Japan, Kyrgyzstan, Lao PDR, Lebanon, Mongolia, Pakistan, Tonga, United Arab Emirates, Vietnam, Yemen	
Mirex	Cyprus, India[+3], Indonesia, Japan, Kazakhstan, Palau, Philippines, Korea (Republic of), Sri Lanka, Thailand, Yemen	Cambodia[+1], China, Cyprus, Indonesia, Iran, Japan, Kyrgyzstan, Lao PDR, Lebanon, Mongolia, Nepal, Singapore, Thailand, Tonga, United Arab Emirates, Vietnam, Yemen	
Toxaphene	Cyprus, Japan, Palau, Yemen	Cambodia[+1], China, Cyprus, India, Indonesia, Iran, Japan, Jordan, Korea (Republic of), Lao PDR, Lebanon, Mongolia, Nepal, Philippines, Singapore, Thailand, Tonga, Vietnam	

+1: due to the weakness of law enforcement and other constraints, practical application of these legislative instruments has not really happened up to date.
+2: It was used for research purpose.
+3: Never registered (as pesticide).
+4: China decided to further the cease of use of DDT for vector control use and dicofol production and Myanmar imports the alternative insecticides such as malathion and alphacypermethrin instead of DDT.
*1: Vector control
Reference:1) National Implementation Plans (Cambodia, China, India, Indonesia, Iran, Japan, Jordan, Kazakhstan, Korea (DPRK),

Korea (Republic of), Kyrgyzstan, Lao PDR, Lebanon, Mongolia, Marshall Islands, Nauru, Nepal, Oman, Pakistan, Palau, Philippines, Qatar, Singapore, Thailand, Tonga, Tuvalu, Vietnam and Yemen)
http://chm.pops.int/Countries/NationalImplementation/tabid/253/language/en-US/Default.aspx (access in May 2020)
2) Information submitted from countries in the region

Table A.1–2 Information of Regulation on new POPs Pesticide in Asia and Pacific Region

Substance	Historically no use	Banned on use	Exemption
Chlordecone	China, Cyprus, Japan, Jordan, Korea (Republic of), Philippines	China, Cyprus, Iran, Japan, Lebanon, Mongolia, Korea (Republic of), United Arab Emirates, Yemen	
Lindane	Cyprus	China, Cyprus, Iran, Japan, Jordan, Korea (Republic of), Lebanon, Nepal, United Arab Emirates, Vietnam, Yemen	
α-HCH, and β-HCH	Cyprus, Korea (Republic of),	China, Iran, Cyprus, Japan, Jordan, Korea (Republic of), Lebanon, Mongolia, United Arab Emirates, Vietnam, Yemen	
PFOS, its salts and PFOS-F		China, Iran, Japan, Jordan, Maldives, Mongolia, Yemen	Vietnam*[1]
Pentachlorobenzene	China, Japan, Jordan, Korea (Republic of)	China, Cyprus, Iran, Japan, Korea (Republic of), United Arab Emirates, Yemen	
Technical endosulfan and its related isomers		China, Cyprus, Indonesia, Iran, Japan, Korea (Republic of), Lebanon, Nepal, Philippines, United Arab Emirates, Vietnam, Yemen	
Pentachlorophenol (PCP) and its salts and esters		Iran, Japan, Korea (Republic of), United Arab Emirates, Yemen	
Dicofol		China, Iran, United Arab Emirates, Yemen	

*[1]: Insecticides for control of red imported fire ants and termites.
Reference: 1) National Implementation Plan (Japan, Jordan, Korea (Republic of), Lebanon, Tonga, Vietnam and Yemen)
http://chm.pops.int/Implementation/NIPs/NIPSubmissions/tabid/253/Default.aspx (access in May 2020)
2) Stockholm Convention website.
3) Information submitted from countries in the region

A.2 Information on industrial use and regulations

Table A.2–1 Information of regulation on industrial POPs in Asia and Pacific Region

Substance	Historically no use	Banned on technical/industrial use	Exemption
Hexachlorobenzene		China, Japan, Singapore, Vietnam, Yemen	
PCBs		China, Cyprus, Indonesia, Iran, Japan, Korea (Republic of), Lebanon, Oman, Singapore, Thailand, Tonga, Yemen	
TeBDE, PeBDE	Cambodia	China, Iran, Japan, Jordan, Korea (Republic of), Mongolia, Yemen	Japan*[1], Korea (Republic of) *[1]
HxBDE, HpBDE		China, Iran, Japan, Jordan, Korea (Republic of), Mongolia, Yemen	Cambodia, Japan*[1], Korea (Republic of) *[1]
DeBDE		Japan, Yemen	Iran, Korea (Republic of), Vietnam
Hexabromobiphenyls		China, Japan, Korea (Republic of), Yemen	
PFOS, its salts and PFOS-F		Japan, Jordan, Korea (Republic of), Mongolia, Yemen	Cambodia, China, Japan, Vietnam
Pentachlorobenzene		China, Japan, Mongolia, Korea (Republic of), Yemen	
Polychlorinated naphthalenes (PCNs)		Japan, Korea (Republic of), Yemen	

Hexabromocyclododecane (HBCD)		Japan, Korea (Republic of), Yemen	China*[2], Korea (Republic of) *[2]
Hexachlorobutadiene (HCBD)		Japan, Korea (Republic of), Yemen	
Short-chain chlorinated paraffins (SCCPs)		Japan, Yemen	
PFOA, its salts and PFOA-related compounds		Yemen	

*[1]: For recycling

*[2]: Expanded polystyrene and extruded polystyrene in insulation for buildings

Reference: 1) National Implementation Plan (Cambodia, China, India, Indonesia, Iran, Japan, Jordan, Kazakhstan, Korea (DPRK), Korea (Republic of), Kyrgyzstan, Lao PDR, Lebanon, Mongolia, Marshall Islands, Nauru, Nepal, Oman, Pakistan, Philippines, Qatar, Singapore, Thailand, Tonga, Tuvalu, Vietnam and Yemen)
http://chm.pops.int/Countries/NationalImplementation/tabid/253/language/en-US/Default.aspx (access in May 2020)
2) Stockholm Convention website.
3) Information submitted from countries in the region

Annex B
Emission inventories in each country of this Region

B.1 PCDD/PCDFs and *dl*-PCBs

(1) Cambodia

Table B.1–1 Dioxins emission inventory of Cambodia in 2013

Category	Source Categories	Year Update Inventory 2013					
		Annual Releases (g TEQ/a)					
		Air	Water	Land	Product	Residues	Sub-Total
1	Waste incineration	60.66	0.00	0.00	0.00	0.31	**60.97**
2	Ferrous and non-ferrous metal production	0.30	0.00	0.00	0.00	0.159	**0.46**
3	Power generation and heating	0.747	0.00	0.00	0.00	0.249	**0.99**
4	Production of mineral products	0.132	0.00	0.00	0.021	0.007	**0.16**
5	Transport	0.048	0.00	0.00	0.00	0.00	**0.048**
6	Uncontrolled combustion processes	214.26	0.00	9.04	0.00	0.00	**223.3**
7	Production of chemicals and consumer goods	0	0	0	0	0	**0**
8	Miscellaneous	1.50	0.00	0.00	0.00	0.013	**1.51**
9	Disposal/Landfill		0.028		0.003	2.81	**2.84**
10	Potential Hot-Spots	0	0	0	0	0	**0**
Total		**277.446**	**0.028**	**9.04**	**0.024**	**3.548**	**290.278**

Reference: National Implementation Plan, Cambodia (2015)

(2) China

Table B.1–2 PCDD/PCDFs emission inventory of China in 2004

Categories	Air g TEQ	Water g TEQ	Products g TEQ	Residue g TEQ	Subtotal g TEQ
Waste incineration	610.47	0	0	1147.1	1757.57
Ferrous and non-ferrous metal production	2486.2	13.5	0.0	2167.2	4667.0
Heat and power generation	1304.4	0	0	588.1	1892.54
Production of mineral products	413.61	0	0	0	413.61
Transportation	119.7	0	0	0	119.7
Uncontrolled combustion processes	64	0	0	953	1017
Production and use of chemicals and consumer goods	0.68	23.16	174.39	68.90	267.13
Miscellaneous	44.2	0	0	11.0	55.2
Disposal/landfill	0	4.53	0	43.2	47.7
Total	5042.4	41.2	174.4	4978.7	10236.8

Table B.1–3 Annual PCDD/PCDFs emission inventory in Hong Kong SAR in 2012

Group	Source Categories	Annual Release (g TEQ/a)					All Routes (g TEQ/a)
		Air	Water	Land	Product	Residue	
1	Waste incineration	0.0010	0.0000	0.0000	0.0000	0.2549	**0.2559**
2	Ferrous and non-ferrous metal production	0.0003	0.0000	0.0000	0.0000	13.2052	**13.2055**
3	Heat and power generation	1.9092	0.0000	0.0000	0.0000	0.2465	**2.1557**
4	Production of mineral products	0.0895	0.0000	0.0000	0.0000	0.0495	**0.1390**
5	Transportation	0.9898	0.0000	0.0000	0.0000	0.0000	**0.9898**
6	Open burning processes	1.8746	0.0000	1.8510	0.0000	0.0000	**3.7256**
7	Production of chemicals and consumer goods	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0000**
8	Waste disposal	0.0000	0.4686	0.0000	0.0040	25.3386	**25.8112**
9	Miscellaneous	0.1121	0.0000	0.0000	0.0000	0.0987	**0.2108**
Total (g TEQ/a)		***4.9765***	***0.4686***	***1.8510***	***0.0040***	***39.1934***	**46.4935**

Source: EPD 2014

Reference: National Implementation Plan, China (2018)

(3) India

Table B.1–4 Annual releases of PCDD/PCDFs in India during 2009-2010(g TEQ/a)

Source	Annual Release of PCDD/Fs (gTEQ/a)						
	Air	Water	Land	Products	Residues	Total	%
Waste incineration	1812.14	-	-	-	3965.83	5777.97	66.75
Ferrous and non-ferrous metal production	539.68	-	-	-	1210.36	1750.04	20.22
Heat and power generation	308.65	-	-	-	195.50	504.15	5.82
Production of mineral products	141.33	-	-	-	-	141.33	1.63
Transportation	9.57	-	-	-	-	9.57	0.11
Uncontrolled combustion processes	15.19	-	30.29	-	-	45.48	0.53
Production and use of chemicals and consumers goods	0.174	20.27	-	243.51	88.51	352.46	4.07
Miscellaneous	0.566	-	-	-	0.16	0.73	0.01
Disposal/Landfill	-	1.22	-	70.16	3.44	74.82	0.86
TOTAL	2827.30	21.49	30.29	313.67	5463.80	8656.55	100.00
Release to Matrix (%)	32.66	0.25	0.35	3.62	63.12		100.00

Note: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Reference: National Implementation Plan, India (2011)

(4) Indonesia

Table B.1–5 Estimated release of PCDD/PCDFs from 10 categories in 2000 (g TEQ/y)

Category	Annual Release of PCDD/Fs (g TEQ/y)
Waste incineration	76.304
Ferrous & non-ferrous metal production	939.596
Power generation & heating	153.047
Mineral production	52.826
Transport	31.223
Uncontrolled combustion processes	1,639.973
Production & use of chemicals & consumer goods	4,442.312
Miscellaneous	16.554
Disposal/Landfill	0.647
Hot Spots	0.000
Total	7,352.482

Note: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Reference: National Implementation Plan, Indonesia (2008)

Table B.1–6 Estimated release of PCDD/PCDFs to 5 vectors in 2000 (g TEQ/y)

Vector	Air	Water	Land	Product	Residue	Total
Annual Release of PCDD/Fs (g TEQ/y)	1768.268	81.231	435.701	3545.22	1521.645	7352.065

Note: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Reference: National Implementation Plan, Indonesia (2008)

(5) Iran

Table B.1–7 Estimated Sector-Wise Released of dioxin-like compounds in Iran (g TEQ/year)

Source Categories	Annual Releases (g TEQ/year)					Total
	Air	Water	Land	Product	Residue	
Waste Incineration	0.0	0.0	0.0	0.0	0.0	0.0
Ferrous and Non-Ferrous Metal Production	79.5	0.0	0.0	0.0	66.5	146.0
Heat and Power Generation	1.5	0.0	0.0	0.0	0.0	1.5
Production of Mineral Products	184.8	0.0	0.0	0.0	0.0	184.8
Transportation	3.5	0.0	0.0	0.0	0.0	3.5
Uncontrolled Combustion Processes	801.7	0.0	31.8	0.0	0.0	833.5
Production of Chemicals and Consumer Goods	0.0	0.1	0.0	232.4	0.1	232.4
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0
Solid waste Disposal/Landfill	0.0	0.0	0.0	166.2	0.0	166.2
Total	1071.0	0.1	31.8	398.6	66.6	
Grand Total						1568

Note1: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Note2: Information on year is not specified in the reference document.
Reference: National Implementation Plan, Iran (2008)

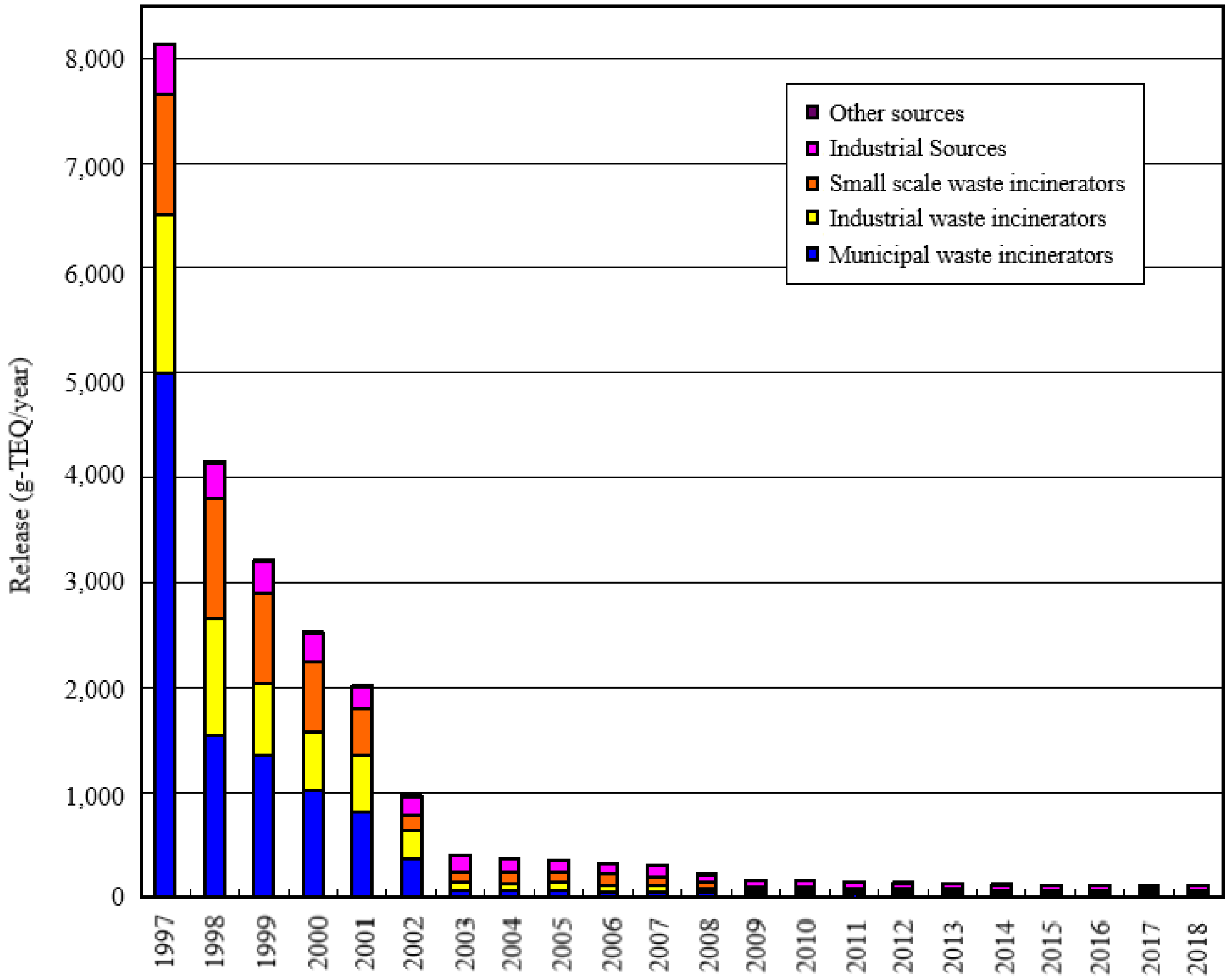
(6) Japan

Table B.1–8 Dioxins (PCDDs, PCDFs and *dl*-PCBs) Emission Inventory in Japan (g-TEQ/year)

Source categories			Releases (g-TEQ per annum)	
			Estimated amount for 1997 (Reference year)	Estimated amount for 2018
Subject to reduction target			7,676-8,129	115
		Water	13	1
	1. Waste disposal category		7,205-7,658	56
		Water	5	0
		Municipal waste incinerators	5,000	20
		Industrial waste incinerators	1,505	18
		Small scale waste incinerators (Subject to laws and regulations)	-	9.6
		Small scale waste incinerators (Not subject to laws and regulations)	700-1,153	8.5
	2. Industrial category		470	59
		Water	6.3	0.6
		Electric furnaces for steelmaking	229	28.7
		Iron and steel industry sintering facilities	135	11.5
		Zinc recuperation (collection) facilities	47.4	1.7
		Aluminum alloys production facilities	31.0	9.7
		Other facilities	27.3	6.9
	3. Other sources		1.2	0.1
		Water	1.2	0.1
		Final sewage treatment facilities	1.1	0.1
		Final dumping site	0.1	0.0
Subject to reduction target			3.6-6.2	2.4-4.4
		Crematoria	2.1-4.6	1.4-3.4
		Cigarettes smoke	0.1-0.2	0.1
		Vehicles exhaust	1.4	0.9
Total			7,680-8,135	117-119
		Water	13	1

Note 1: Emissions between 1997 to 2007 are presented using WHO-TEF (1998) as a toxicity equivalency coefficient, and emissions between 1997 and 2013 are presented using WHO-TEF (2006) to the possible extent.
Note 2: “Water” in the table means the amount released into water as a part of releases.
Note 3: "0" in the table is the consequence of rounding up at decimals and standardized at g-TEQ.

Reference: Ministry of the Environment Japan (2020) Dioxins Emissions Inventory



Reference: Ministry of the Environment Japan (2020) Dioxins Emissions Inventory

Figure B.1–1 Trends of the emission of dioxins in Japan (1997-2018)

(7) Kazakhstan

Table B.1–9 Release of dioxins and furans in selected sectors of economy in 2002 (g-TE/year)

Sector	Annual releases, g-TE/year				
	Air	Water	Soil	Fly ash	Sludge
Production of power and heat energy	315,981	0,000	0,000	0,000	0,0
Production of ferrous and nonferrous metals	3,324	0,000	0,000	0,000	9,1
Production of goods of mineral raw materials	17,819	0,000	0,000	0,000	2,1
Uncontrolled processes of incineration	2,829	0,000	0,051	0,000	2,7
Production and use of chemicals and consumer goods	0,000	0,000	0,000	2,845	0,0
Other	0,002	0,000	0,000	0,000	0,0
Total	340,0	0,0	0,1	2,8	13,9

Note1: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Note2: Calculation according to the technique of UNEP Chemicals "Methodological Guidance on identifying and quantitative assessment of the release of dioxins and furans", 2001.
Reference: National Implementation Plan, Kazakhstan (2014)

(8) Kiribati

Table B.1–10 Release of dioxins in 2018 (g-TE/year)

		Annual Releases (g TEQ/a)				
Group no.	Source Groups Name	Air	Water	Land	Product	Residue
1	Waste Incineration	2.547468	0.000	0.000	0.000	0.013
2	Ferrous and Non-Ferrous Metal Production	0.024100	0.000	0.000	0.000	0.000
3	Heat and Power Generation	0.062548	0.000	0.000	0.000	0.000001
4	Production of Mineral Products	0.003387	0.000	0.000	0.000	0.000
5	Transportation	0.008862	0.000	0.000	0.000	0.000
6	Open Burning Processes	1.803216	0.000	0.091	0.000	0.000
7	Production of Chemicals and Consumer Goods	0.000000	0.000	0.000	0.000	0.000
8	Miscellaneous	0.000250	0.000	0.000	0.000	0.000
9	Disposal	0.000000	0.000	0.000	0.003	0.000
10	Identification of Potential Hot-Spots				0.000	0.000
	Total per Release Vector (g TEQ/a)	4.450	0.000	0.091	0.003	0.013
	Grand Total (g TEQ/a)	4.56				

Reference: National Implementation Plan, Kiribati (2019)

(9) Korea (DPRK)

Table B.1–11 Unintentional releases of PCDDs and PCDFs in 2006 (g-TEQ)

Source	Total	Air	Water	Soil	Product	Residue
Metal production	91.822	36.291	0.050	-	-	55.481
Power generation	170.195	14.194	-	-	-	156.001
Building material production	2.230	2.230	-	-	-	-
Transport	0.413	0.413	-	-	-	-
Open burning	1.238	0.922	-	0.316	-	-
Pulp, papermaking, other chemical industry	54.723	0.013	-	-	23.040	31.670
Waste disposal	30.040	-	2.340	-	12.800	14.900
Others	0.510	0.330	-	-	0.130	0.050
Total	351.171	54.393	2.390	0.316	35.970	258.102

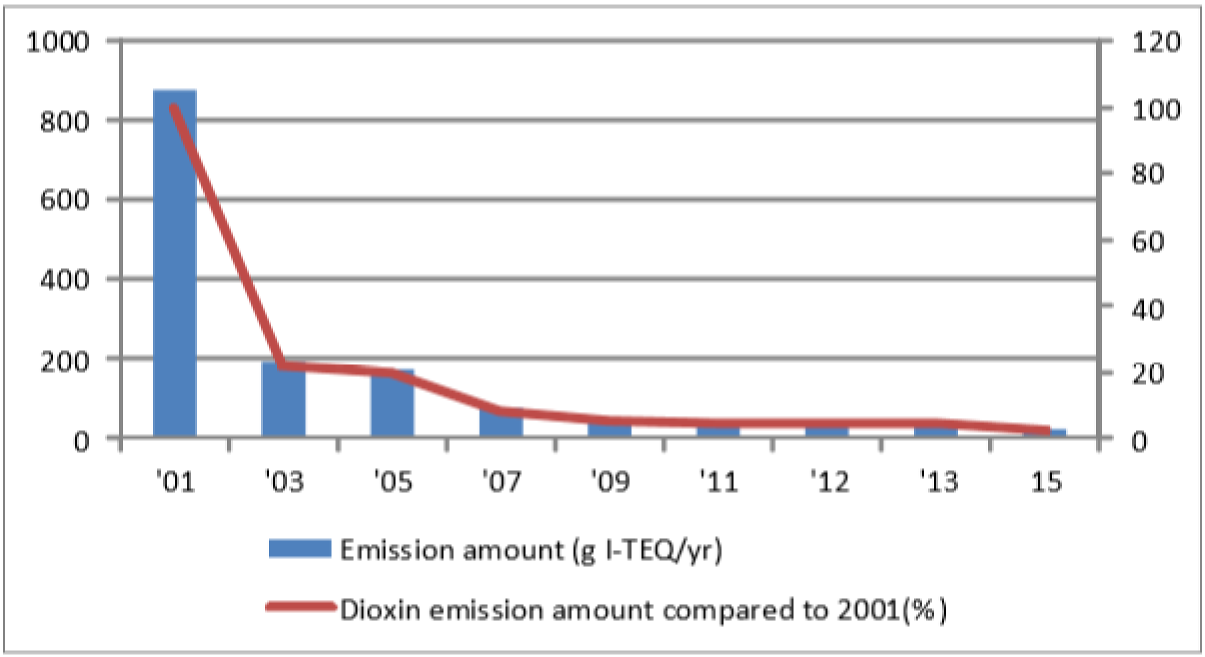
Note: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Reference: National Implementation Plan, Korea (DPRK) (2008)

(10) Republic of Korea

Table B.1–12 Dioxins Emissions from 2001 to 2015 (unit: g I-TEQ/yr)

Category	Emission Source	2001	2003	2005	2007	2009	2011	2013	2015
Incinerator	Municipal wastes	155.1	37.5	39.5	5.2	4.5	2.6	1.9	2.0
	General industrial wastes	649.3	138.2	111.2	63.2	40.3	37.9	35.1	19.0
	Hazardous industrial wastes	73.4	11.8	11.9	2.7	2.1	1.5	1.9	1.6
	Medical wastes	2.4	5.7	10.9	4.6	1.0	0.8	1.3	1.6
	Subtotal	880.2 (87.7%)	193.2 (62.1%)	173.5 (64.5%)	75.7 (46.0%)	47.9 (37.9%)	42.8 (35.4%)	40.2 (36.1%)	24.2 (25.9%)
Industrial facility	Steel industry	90.3	81.7	60.5	45.5	41.7	44.5	40.6	43.1
	Non-ferrous metal industry	15.6	16.8	18.1	22.7	15.9	12.2	7.5	8.5
	Nonmetal industry	6.8	7.4	2.4	8.4	5.8	6.7	5.4	4.9
	Chemical industry	1.1	1.2	1.2	0.5	0.9	0.7	1.9	1.1
	Energy industry	8.5	8.4	10.4	9.2	12.8	12.2	13.4	9.9
	Crematorium	1.5	2.5	2.8	2.5	1.5	1.9	2.5	1.8
	Subtotal	123.8 (12.3%)	118.0 (37.9%)	95.4 (35.5%)	88.8 (54.0%)	78.6 (62.1%)	78.1 (64.6%)	71.3 (63.9%)	69.3 (74.1%)
Total		1004.0	311.2	268.9	164.5	126.5	120.9	111.5	93.5

Reference: National Implementation Plan, Korea (Republic of) (2019)



Reference: National Implementation Plan, Korea (Republic of) (2019)

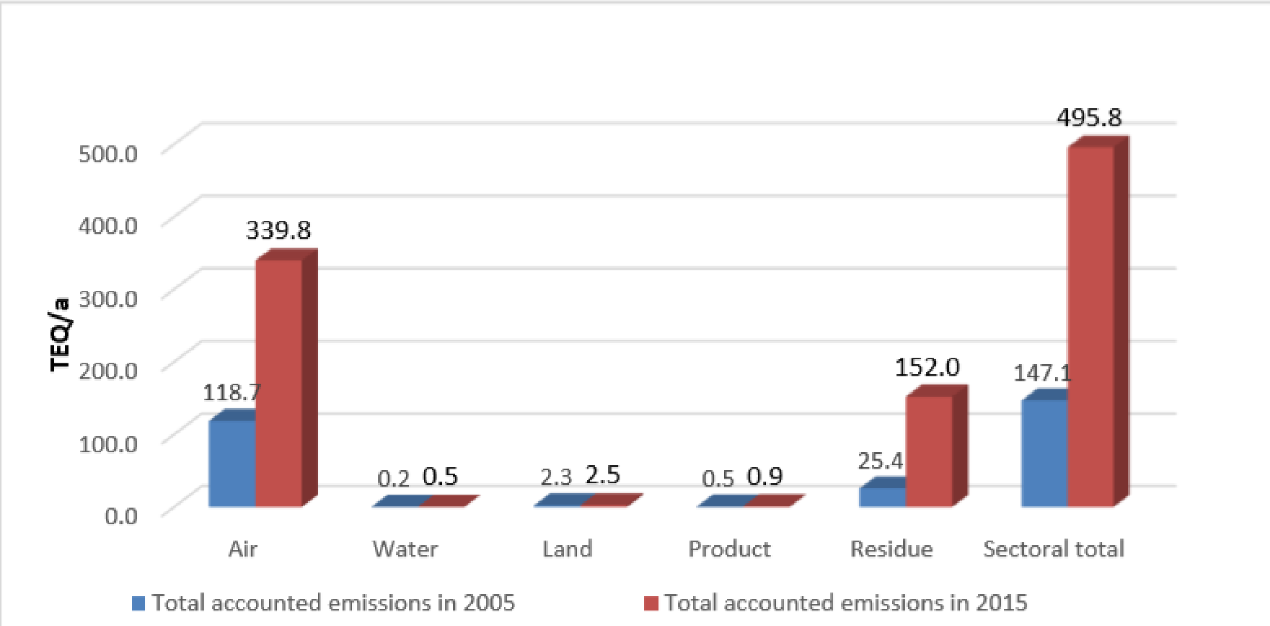
Figure B.1–2 Dioxins emission trend in incinerators

(11) Lao People's Democratic Republic

Table B.1–13 National inventory of Dioxins and Furans in 2015(g TEQ/a)

Source Category	Annual Releases (g TEQ/a) of Dioxins and Furans					
	Air	Water	Land	Product	Residue	Total
Waste Incineration	51.5	0.0	0.0	0.0	2.7	54.3
Ferrous and Non-Ferrous Metal Production	152.8	0.2	0.0	0.0	120.3	273.2
Heat and Power Generation	3.1	0.0	0.0	0.0	0.7	3.8
Production of Mineral Products	37.9	0.0	0.0	0.0	0.0	38.0
Transportation	0.8	0.0	0.0	0.0	0.0	0.8
Open Burning Processes	46.2	0.0	2.5	0.0	0.0	48.7
Production of Chemicals and Consumer Goods	0.0	0.0	0.0	0.9	0.0	0.9
Miscellaneous	47.4	0.0	0.0	0.0	0.0	47.4
Disposal	0.0	0.3	0.0	0.0	28.4	28.7
Total	**339.8**	**0.5**	**2.5**	**0.9**	**152.0**	**495.8**

Note1: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Reference: National Implementation Plan, Lao People's Democratic Republic (2016)



Reference: National Implementation Plan, Lao People's Democratic Republic (2016)

Figure B.1–3 Comparison of dioxin/furan inventories in 2005 and 2015

(12) Lebanon

Table B.1–14 PCDD/PCDF emissions from each source group to different matrices in 2004-2014

Group	Source Groups	Annual Releases (g TEQ/a)					
		Air	Water	Land	Product	Residue	%
1	Waste Incineration	14.5	0.0	0.0	0.0	0.1	1
2	Ferrous and Non-Ferrous Metal Production	11.9	0.0	0.0	0.0	10.3	1
3	Heat and Power Generation	3.7	0.0	0.0	0.0	0.0	0
4	Production of Mineral Products	36.4	0.0	0.0	0.0	0.9	2
5	Transportation	2.2	0.0	0.0	0.0	0.0	0
6	Open Burning Processes	400.4	0.0	10.1	0.0	0.0	26
7	Production of Chemicals and Consumer Goods	0.0	0.0	0.0	44.4	0.0	3
8	Miscellaneous	0.0	0.0	0.0	0.0	0.3	0
9	Disposal	0.0	22.6	0.0	35.5	917.7	61
10	Identification of Potential Hot-Spots				86	0.0	5.4
1-10	Total	469.2	22.6	10.1	165.9	929.3	100
	Grand Total	1597					

Reference: National Implementation Plan, Lebanon (2017)

(13) Marshall Islands

Table B.1–15 Summary of Annual Dioxin and Furan Releases

Source Categories	Annual Releases (mg TEQ/a)				
	Air	Water	Land	Products	Residue
Waste Incineration (medical and quarantine)	160.0	0.0	0.0	0.0	0.8
Ferrous and Non-Ferrous Metal Production	50.4	0.0	0.0	0.0	0.0
Power Boilers and Home Cooking	23.2	0.0	0.0	0.0	0.0
Production of Mineral Products	0.25	0.0	0.0	0.0	0.0
Transportation and Stationary Generators	0.84	0.0	0.0	0.0	0.0
Uncontrolled Combustion Processes	17.2	0.0	0.0	0.0	13.2
Production of Chemicals and Consumer	-	-	-	-	-
Goods	0.0	0.0	0.0	0.0	0.0
Miscellaneous	8.4	0.0	0.0	0.0	0.0
Disposal/Land filling	0.0	0.0	0.0	0.0	0.0
Total	260.3	0.0	0.0	0.0	14.0

Note1: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Note2: Information on year is not specified in the reference document.
Reference: National Implementation Plan, Marshall Islands (2008)

(14) Maldives

Table B.1–16 PCDD/PCDF emissions in Maldives

CLASS	SOURCE CATEGORIES	POTENTIAL RELEASE ROUTE (MG TEQ/T)					PRODUCTION	ANNUAL RELEASE G TEQ/A				
		AIR	WATER	LAND	PROD-UCT	RESI-DUE	t/a	AIR	WATER	LAND	PROD-UCT	RESI-DUE
	Open burning processes											
	Biomass burning						0	0.000	0	0.000	0	0
1	Agricultural residue burning in the field of cereal and other crops stubble, impacted, poor burning conditions	30	ND	10	NA	NA		0.000		0.000		
2	Agricultural residue burning in the field of cereal and other crops stubble, not impacted	0.5	ND	0.05	NA	NA		0.000		0.000		
3	Sugarcane burning	4	ND	0.05	NA	NA		0.000		0.000		
4	Forest fires	1	ND	0.15	NA	NA		0.000		0.000		
5	Grassland and savannah fires	0.5	ND	0.15	NA	NA		0.000		0.000		

CLASS	SOURCE CATEGORIES	POTENTIAL RELEASE ROUTE (MG TEQ/T)					PRODUCTION	ANNUAL RELEASE G TEQ/A				
		AIR	WATER	LAND	PROD-UCT	RESI-DUE	t/a	AIR	WATER	LAND	PROD-UCT	RESI-DUE
	Waste burning and accidental fires						130,971	39.291	0	1.310	0	0
1	Fires at waste dumps (compacted, wet, high Corg content)	300	ND	10	NA	NA	130,971	39.291		1.310		
2	Accidental fires in houses, factories	400	ND	400	NA	NA		0.000		0.000		
3	Open burning of domestic waste	40	ND	1	NA	NA	0	0.000		0.000		
4	Accidental fires in vehicles (per vehicle)	100	ND	18	NA	NA		0.000		0.000		
5	Open burning of wood (construction/ demolition)	60	ND	10	NA	NA		0.000		0.000		
	Open Burning Processes							39.291	0	1.31	0	0.000

Reference: National Implementation Plan, Maldives (2017)

(15) Mongolia

Table B.1–17 PCDD/PCDF releases per year in Mongolia in 2012

Group	Source Groups	Annual Release, gTEQ/year					Annual Release, %					Total releases, %
		Air	Water	Land	Product	Residue	Air	Water	Land	Product	Residue	
1	Waste Incineration	41.1	0.0	0.0	0.0	0.2	29.56	0.00	0.00	0.00	0.15	**29.71**
2	Ferrous & Non-Ferrous Metal Production	2.2	0.0	0.0	0.0	1.9	1.56	0.00	0.00	0.00	1.35	**2.91**
3	Heat and Power Generation	7.8	0.0	0.0	0.0	3.6	5.64	0.00	0.00	0.00	2.56	**8.21**
4	Production of Mineral Products	2.7	0.0	0.0	0.0	0.0	1.93	0.00	0.00	0.00	0.00	**1.93**
5	Transportation	0.2	0.0	0.0	0.0	0.0	0.16	0.00	0.00	0.00	0.00	**0.16**
6	Open Burning Processes	56.7	0.0	2.6	0.0	0.0	40.76	0.00	1.85	0.00	0.00	**42.61**
7	Production of Chemicals and Consumer Goods	0.0	0.0	0.0	10.7	0.0	0.00	0.00	0.00	7.66	0.00	**7.66**
8	Miscellaneous	0.1	0.0	0.0	0.0	0.3	0.05	0.00	0.00	0.00	0.20	**0.25**
9	Disposal	0.0	1.3	0.0	0.0	7.9	0.00	0.91	0.00	0.00	5.65	**6.56**
10	Hot-Spots				0.0		0.00	0.00	0.00	0.00	0.00	**0.00**
1-10	**TOTAL**	**110.8**	**1.3**	**2.6**	**10.7**	**13.8**	**79.7**	**0.9**	**1.8**	**7.7**	**9.9**	
GRAND TOTAL		**139**					**100**					

Source: Dioxin and Furan Inventory report

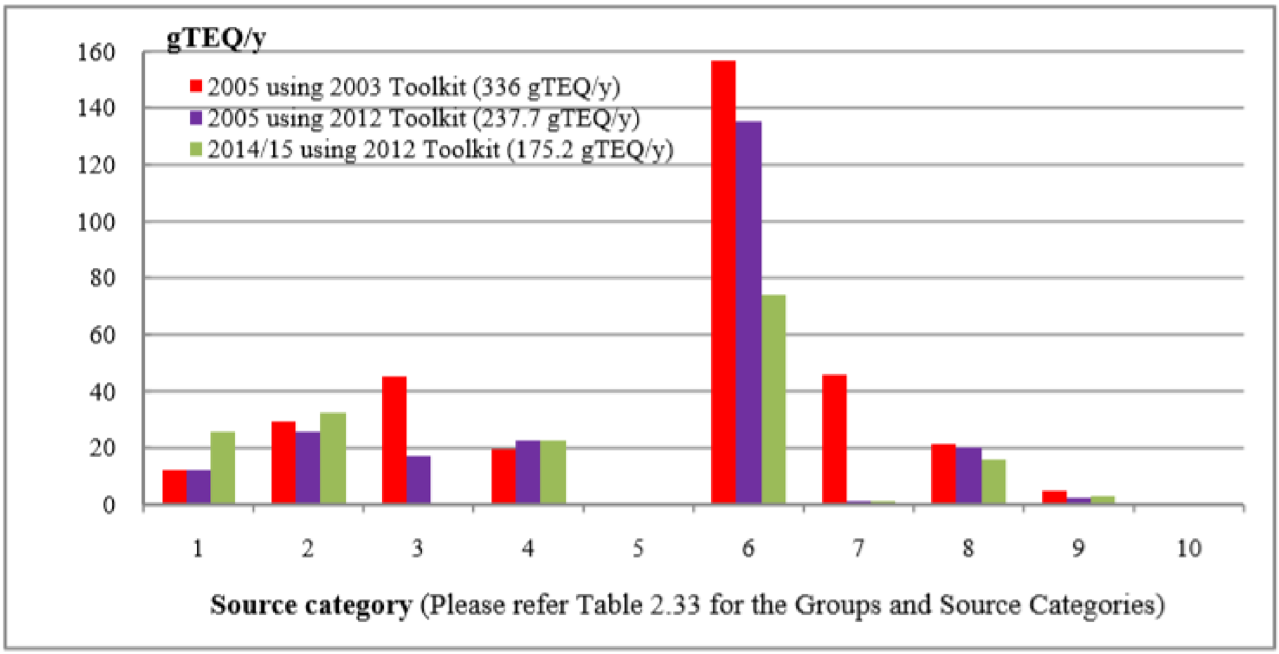
Note1: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Note2: Information on year is not specified in the reference document.
Reference: National Implementation Plan, Mongolia (2014)
"Toolkit for Identification and Quantification of Releases of Dioxins, Furans and Other classified sources"

(16) Nepal

Table B.1–18 National PCDD/PCDF Inventories 2014/2015 (g TEQ/y)

Group	Source Groups	Annual Releases (g TEQ/y)					Group Total gTEQ/y
		Air	Water	Land	Product	Residue	
1	Waste Incineration	25.1	0.0	0.0	0.0	0.8	25.9
2	Ferrous and Non-Ferrous Metal Production	4.7	0.0	0.0	0.0	27.7	32.4
3	Heat and Power Generation	0.2	0.0	0.0	0.0	0.0	0.2
4	Production of Mineral Products	19.9	0.0	0.0	2.2	0.7	22.8
5	Transportation	0.1	0.0	0.0	0.0	0.0	0.1
6	Open Burning Processes	41.2	0.0	32.6	0.0	0.0	73.8
7	Production of Chemicals and Consumer Goods	0.0	0.0	0.0	1.3	0.0	1.3
8	Miscellaneous	15.2	0.0	0.0	0.0	0.4	15.6
9	Disposal	0.0	0.1	0.0	1.7	1.2	3.0
10	Identification of Potential Hot-Spots				0.0	0.0	0.0
1-10	Total	106.5	0.1	32.6	5.2	30.9	**175.2**

Note: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Reference: National Implementation Plan, Nepal (2017)



Reference: National Implementation Plan, Nepal (2017)

Figure B.1–3 Comparison of total PCDD/Fs releases from each group and source category for the inventory years 2003 and 2014/2015

(17) Niue

Table B.1–19 Overall annual releases from the different source categories (mg TEQ/a)

Cat.	Source Categories	Annual Releases (mg TEQ/a)				
		Air	Water	Land	Products	Residues
1	Waste Incineration	227.408	0.000	0.000	0.000	1.100
2	Ferrous and Non-Ferrous Metal Production	0.000	0.000	0.000	0.000	0.000
3	Power generation and heating	0.609	0.000	0.000	0.000	0.000
4	Production of mineral products	0.000	0.000	0.000	0.000	0.000
5	Transportation	0.443	0.000	0.000	0.000	0.000
6	Uncontrolled combustion Processes	163.400	0.000	4.120	0.000	165.800
7	Production of chemicals and consumer goods	0.000	0.000	0.000	0.000	0.000
8	Miscellaneous	0.001	0.000	0.000	0.000	0.000
9	Disposal/Land filling	0.000	0.000	0.000	0.000	0.000
10	Identification of Potential Hot-Spots	-	-	-	-	-
1 - 9	Total	391.9	0.0	4.1	0.0	166.9

Note: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Reference: National Implementation Plan, Niue (2005)

(18) Oman

Table B.1–20 National PCDD/PCDF inventories in 2002 (g TEQ/y)

Source Categories		Annual Releases (g TEQ/y) Air	Residues
Waste incineration	Medical waste incinerator	1.335	0.01
Ferrous and Non-Ferrous Metal Production	Iron and steel, foundries	0.0000045	0.000075
	Copper production	0.01	0.00024
	Aluminum production	(0.015)	(0.04)
Power generation		(0.0801644)	
Production of mineral products	Cement production	1.14	0.19
	Glass production	0.015	0.00075
	Ceramic production	?	?
	Asphalt mixing	0.00084	0.0072
Transportation			
Uncontrolled Combustion Processes	Burned vehicles	0.0274	0.0053
Production and Use of Chemicals and Consumer Goods			
Miscellaneous	Crematoria	0.0022	
	Cigarettes burning	(27.464)	
Disposal			
Hot Spot			

Note1: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Note2: Values in parentheses are information read across from reference document.
Reference: National Implementation Plan, Oman (2008)

(19) Pakistan

Table B.1–21 PCDD/Fs release in Pakistan for updated inventory 2016 (g TEQ/year)

Group	**Source Groups**	Annual Releases (g TEQ/a) Air	Water	Land	Product	Residue
1	Waste Incineration	1130,51	0,00	0,00	0,00	5,71
2	Ferrous and Non-Ferrous Metal Production	265,42	0,00	0,00	0,00	171,42
3	Heat and Power Generation	4,44	0,00	0,00	0,00	2,23
4	Production of Mineral Products	335,14	0,00	0,00	38,21	12,74
5	Transportation	4,82	0,00	0,00	0,00	0,00
6	Open Burning Processes	1833,50	0,00	215,90	0,00	0,00
7	Production of Chemicals & Consumer Goods	0,01	43,83	0,00	236,66	48,12
8	Miscellaneous	0,01	0,00	0,00	0,00	0,01
9	Disposal	0,00	1,42	0,00	0,00	141,53
10	Identification of Potential Hot-Spots	NA	Unknown	unknown	NA	NA
1-10	**Total**	**3573,8**	**45,2**	**215,9**	**274,9**	**381,8**
	Grand Total			**4491,6**		

Note: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Reference: National Implementation Plan, Pakistan (2020)

(20) Palau

Table B.1–22 Estimated releases of dioxins and furans (g TEQ/year)

Source Categories	Annual Releases (mg TEQ/a)				
	Air	Water	Land	Products	Residue
Waste Incineration	408.500	0.000	0.000	0.000	2.0
Ferrous and Non-Ferrous Metal Production	0.000	0.000	0.000	0.000	0.0
Power Generation and Heating	7.370	0.000	0.000	0.000	0.0
Production of Mineral Products	0.533	0.000	0.000	0.000	3.6
Transportation	11.389	0.000	0.000	0.000	0.0
Uncontrolled Combustion Processes	78.100	0.000	0.080	0.000	138.0
Production of Chemicals and Consumer Goods	0.000	0.000	0.000	0.000	0.0
Miscellaneous	0.001	0.000	0.000	0.000	0.0
Disposal/Landfilling	0.000	0.000	0.000	0.000	0.0
Identification of Potential Hot-Spots					
Total	**505.9**	**0.0**	**0.1**	**0.0**	**143.6**

(*TEQ = toxic equivalents)

Reference: National Implementation Plan, Palau (2007)

(21) Philippines

Table B.1–23 Philippines national source inventory of dioxins and furans in 2013 (g TEQ/a)

Group No.	Source Groups	Annual Releases (g TEQ/a)					
		Air	Water	Land	Product	Residue	Total
1	Waste Incineration	0.009	0.000	0.000	0.000	0.315	0.324
2	Ferrous & Non-ferrous Metal Production	17.696	0.088	0.000	0.000	13.514	31.298
3	Power Generation and Heating	14.912	0.000	0.000	0.000	9.598	24.510
4	Mineral Products	9.657	0.000	0.000	0.000	0.033	9.690
5	Transportation	3.241	0.000	0.000	0.000	0.000	3.241
6	Open Burning	373.817	0.000	64.724	0.000	0.000	438.541
7	Product & Use of Chemicals & Consumer Goods	12.512	0.054	0.000	3.305	0.044	15.915
8	Miscellaneous	0.512	0.000	0.000	0.268	0.533	1.563
9	Disposal/Landfill	0.000	1.982	0.000	10.206	242.869	255.057
10	Contaminated Sites and Hot-Spots				0.000		0.000
Total		**431.996**	**2.124**	**64.724**	**13.779**	**266.906**	**779.529**

Reference: National Implementation Plan, Philippines (2014)

(22) Qatar

Table B.1–24 Summary of PCDD and PCDF emissions (g TEQ/year)

Category	Emissions to the air	To waste water	In solid waste
Incineration	0.4820	-	0.083
Metals production	0.1200	-	1.728
Power generation	0.2200	-	-
Biomass burning	0.7650	-	-
Cement production	0.044	-	-
Asphalt mixing	-	-	-
Transportation	1.2000	-	-
Oil and gas industry	0.3450	<0.0006	4.002
Tobacco	0.0002	-	-
Total	3.1762	<0.0006	5.813

Note1: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Reference: National Implementation Plan, Qatar (2010)

(23) Samoa

Table B.1–25 Estimated dioxin and furan releases in Samoa (g TEQ/a)

Source	Annual Releases (g TEQ/a)				
	Air	Water	Land	Products	Residue
Waste Incineration	0.797	0.000	0.000	0.000	0.000
Ferrous and Non-Ferrous Metal Production	0.000	0.000	0.000	0.000	0.000
Power Generation and Heating	0.009	0.000	0.000	0.000	0.000
Production of Mineral Products	0.000	0.000	0.000	0.000	0.000
Transportation	0.003	0.000	0.000	0.000	0.000
Uncontrolled Combustion Processes	0.245	0.000	0.020	0.000	0.180
Production of Chemicals and Consumer Goods	0.000	0.000	0.000	0.000	0.000
Miscellaneous	0.000	0.000	0.000	0.000	0.150
Disposal/Landfilling	0.000	0.000	0.000	0.000	0.000
Identification of Potential Hot-Spots	-	-	-	-	-
Total	1.1	0.0	0.0	0.0	0.3

Note: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Note2: Information on year is not specified in the reference document.
Reference: National Implementation Plan, Samoa (2004)

(24) Sri Lanka

Table B.1–26 Summary inventory of releases of dioxins for Sri Lanka, 2002 (g I-TEQ per year)

	Category	Releases, g I-TEQ per year				
		Air	Water	Land	Products	Residues
1	Waste Incineration	20.3	0.055	NA	NA	0.133
2	Ferrous and non- ferrous metal production and processing	5.52	ND	NA	NA	49.8
3	Power generation, heat and cooking	19.3	ND	ND	NA	0.096
4	Mineral products	1.37	NA	ND	ND	0.002
5	Transport	0.54	NA	NA	NA	ND
6	Uncontrolled combustion	121	ND	ND	NA	29.4
7	Chemical and consumer products production and use	ND	ND	ND	0.446	ND
8	Miscellaneous	3.46	ND	ND	ND	0.074
9	Disposal/landfill	ND	0.024	ND	6.00	0.022
10	"Hot spots"	Site of chlorine production. Residues from chlorine bleaching of pulp	-	-	-	-
	Total	171	0.079	ND	6.45	79.5

Note1: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Note2: Data is based on information from *Preliminary Inventory of Dioxin and Furans, Ministry of Environment 2006*
Reference: National Implementation Plan, Sri Lanka (2007)

(25) Tajikistan

Table B.1–27 Dioxins and furans emissions from certain categories of sources in 2003 (g/TEQ per year)

	Emissions g/TE per year				
	Air	Water	soil	Product	slag
Uncontrolled combustion:	3,966	0,000	0,000	0,000	7,424
Production of ferrous and non-ferrous metals	13,435	0,000	0,000	0,000	6,915
Production of electric and thermal energy	12,530	0,000	0,000	0,000	0,509
Production from mineral raw materials	0,750	0,000	0,000	0,000	133,384
Transport	0,401	0,000	0,000	0,000	91,500
Production and use of chemical substances and consumer goods	0,000	0,000	0,000	0,000	0,000
Total:	31,082	0,000	0,000	0,000	232,308

Note: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Reference: National Implementation Plan, Tajikistan (2007)

(26) Thailand

Table B.1–28 Source categories of PCDD/PCDF inventory matrix in 2005 (g I-TEQ/a)

Sector	Source Categories	Annual Releases (g I-TEQ/a)				
		Air	Water	Land	Product	Residue
1	Waste Incineration	42.37	0.000	0.000	0.000	32.45
2	Ferrous and Non-Ferrous Metal Production	20.20	0.000	0.000	0.000	99.64
3	Power Generation and Heating	33.33	0.000	0.000	0.000	14.28
4	Production of Mineral Products	11.14	0.000	0.000	0.000	0.17
5	Transportation	11.69	0.000	0.000	0.000	0.00
6	Uncontrolled Combustion Processes	144.24	0.000	6.64	0.000	236.10
7	Production of Chemicals and Consumer Goods	1.52	1.33	0.000	8.31	384.16
8	Miscellaneous	21.81	0.000	0.000	0.000	6.48
9	Disposal/Landfill					
10	Identification of Potential Hot-Spots					
1-9	Total	286.30	1.33	6.64	8.31	773.30

Note1: Information on TEF used for the calculation of TEQ is not specified in the reference document.
Note2: Data is based on information from *Pollution Control Department, 2005*
Reference: National Implementation Plan, Thailand (2007)

(27) Tonga

Table B.1–29 Estimated emission of dioxins and furans in Tonga 2006

Cat.	Source Categories	Annual Releases (g TEQ/a)				
		Air	Water	Land	Products	Residue
1	Waste Incineration[8]	0.418	0.000	0.000	0.000	0.0
2	Ferrous and Non-Ferrous Metal Production[9]	0.098	0.000	0.000	0.000	0.0
3	Power Generation and Heating[10]	0.079	0.000	0.000	0.000	0.0
4	Production of Mineral Products[8]	0.005	0.000	0.000	0.000	0.0
5	Transportation[11]	0.005	0.000	0.000	0.000	0.0
6	Uncontrolled Combustion Processes[12,13]	20.452	0.000	0.033	0.000	3.2
7	Production of Chemicals and Consumer Goods[14]	0.000	0.000	0.000	0.000	0.0
8	Miscellaneous[16]	0.000	0.000	0.000	0.000	0.0
9	Disposal/Landfilling[15]	0.000	0.224	0.000	0.007	0.0
10	Identification of Potential Hot-Spots[14]	0.000	0.000			
1-9	**Total**	**21.1**	**0.2**	**0.0**	**0.0**	**3.2**
	Grand Total			24.5		

NOTE: The unintentional production of PCDD/PCDF was assessed in 2006 in accordance with the Toolkit and emission Factor 2003.

Reference: National Implementation Plan, Tonga (2009)

(28) Vietnam

Table B.1–30 The amount of PCDD/PCDF releases into environment in Vietnam

No.	Activity	Weight of emission *(g TEQ/year)*					
		Air	*Water*	*Soil*	*Product*	*Waste*	***Total***
1	Waste incineration	287.8	0	0	0	177.9	***465.7***
2	Metal industry	8.81	0	0	0	38.98	***47.8***
3	Uncontrolled burning	24.3	0	0.87	0.37	1.11	***26.6***
4	Cement production	17.9	0	0	0	0	***17.9***
5	Paper production	0.006	0	0	0.657	5.33	***6.47***
6	Transportation	3.99	0	0	0	0	***3.99***
Total		**568**					

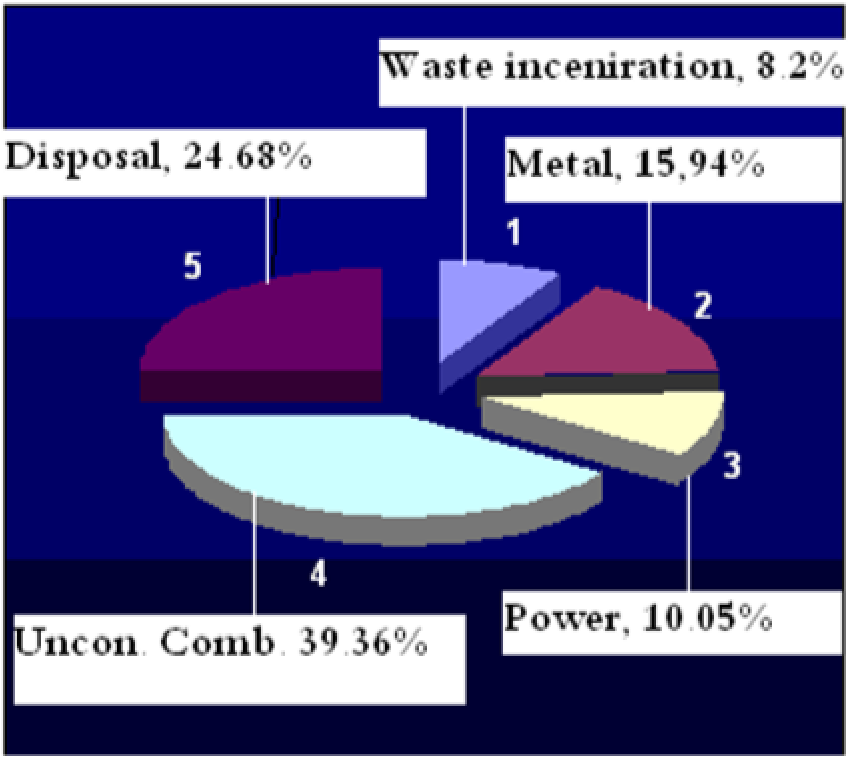
Reference: National Implementation Plan, Vietnam (2017)

(29) Yemen

Table B.1–31 Summary of estimated PCDD/PCDF releases in Yemen

#	Sub-category	Annual release (g TEQ/a)					Total	%
		Air	Water	Land	Product	Residue		
1	Waste incineration	50.34	0	0	0	34.28	84.61	8.20
2	Ferrous and non-ferrous metal production	121.38	0.025			43.01	164.41	15.94
3	Power generation and heating	98.33				5.3770	103.70	10.05
4	Mineral products	14.44					14.44	1.40
5	Transport	3.5131	0	0	0	0	3.51	0.34
6	Uncontrolled combustion process	135.39		0.01		270.53	405.93	39.36
7	Production and use of chemicals and consumer goods				0.0023		0.0023	0.00
8	Miscellaneous	0.01				0.20	0.21	0.00
9	Disposal/landfill	2.00	150.32			102.22	254.54	24.68
1-9	Total	425.40	150.35	0.01	0.0023	455.62	1031.38	100
	%	41.25	14.58	0.00	0.00	44.18	100	

Reference: National Implementation Plan, Yemen (2008)



Reference: National Implementation Plan, Yemen (2008)

Figure B.1–4 The percentage of the different compounds of the dioxins and furans in Yemen

B.2 HCB

(1) Japan

Table B.2–1 HCB emission inventory in Japan (kg/year)

Source of emission	Emission (kg/year) (Estimates) 2002	2018
Part II Source categories	85	78
Waste incinerators	44 (Water) 0.061	52
Cement kilns	11	13
Production of pulp	0.080 (Water)0.080	NO
Thermal processes in the metallurgical industry	30	13
Secondary copper production	NO	NO
Sinter plants in the iron and steel industry	16	4.4
Secondary aluminum production	3.0	2.0
Secondary zinc production	11	6.7
Part III Source categories	100	53
Thermal processes in the metallurgical industry not mentioned in Part II	100	48
Fossil fuel-fired utility and industrial boilers	0.38	0.29
Firing installations for wood and other biomass fuels	0.034	3.4
Specific chemical production processes	0.24	0.23
Crematoria	0.16	0.17
Motor vehicles	NE	0.047
Smoldering of copper cables	0.42	0.37
Other source categories	1.9	1.3
Total	190	132

NE: Not Estimated; NO: Not Occurring

Note 1: “Water” means amount released into water as part of releases.

Note 2: The total figure is not compatible with the sum of figures in each column due to rounding.

Note 3: HCB emission estimation was made using emission factors calculated based on measured data obtained from domestic sampling survey.

Reference: Submission from Japan (2020)

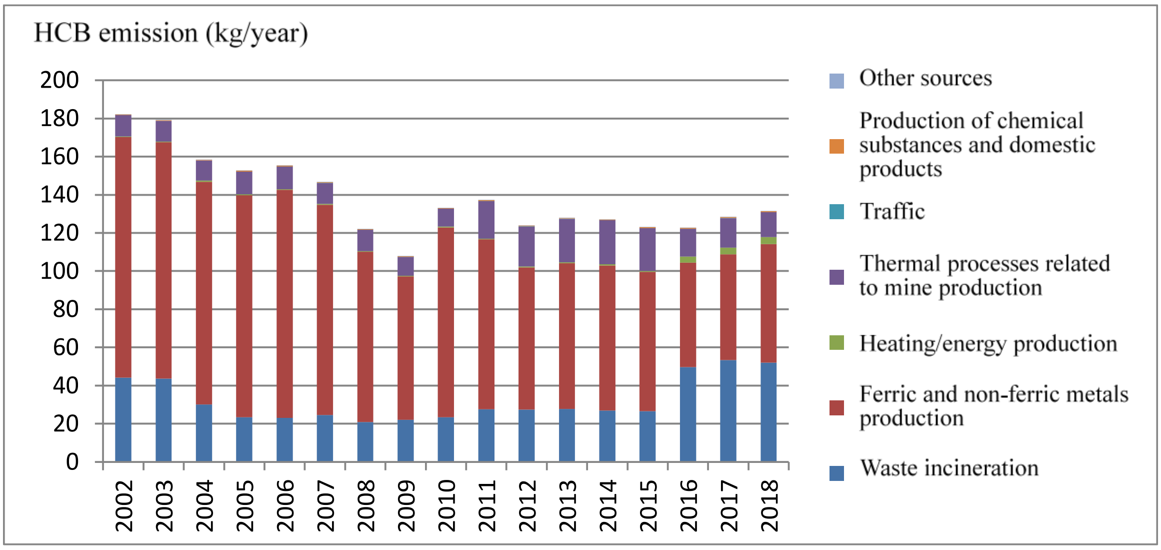
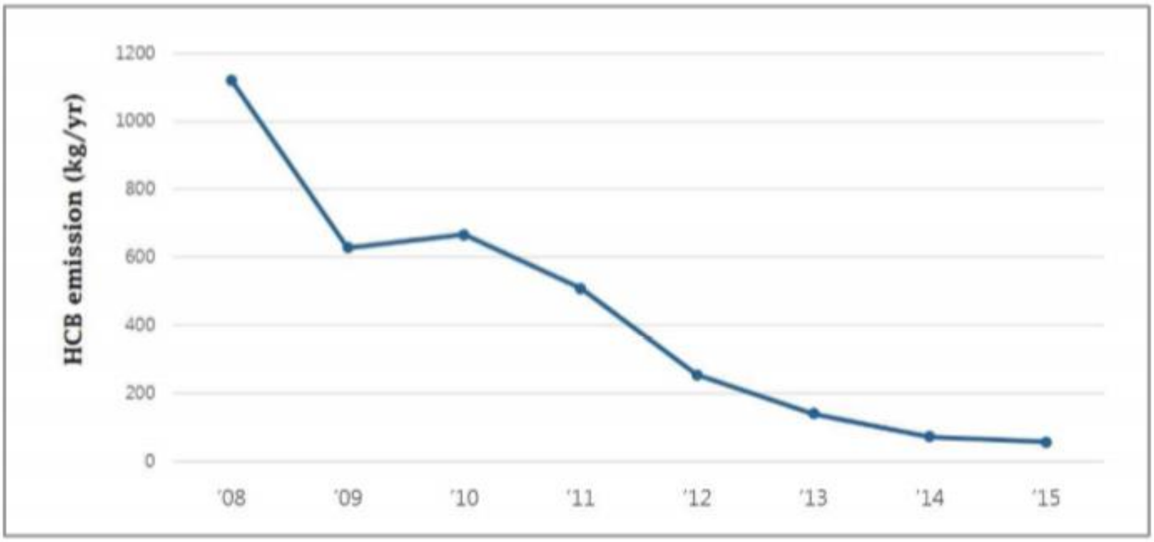


Figure B.2–1 HCB emission inventory in Japan (kg/year)

(2) Korea (Republic of)



Reference: National Implementation Plan, Korea (Republic of) (2019)

Figure B.2–2 HCB emission trend from industrial sources (2008-2015)

(3) Sri Lanka

Table B.2–2 Estimated air releases of HCB from open burning (g)

		Activity statistic	Emission factor	Estimated annual release,
			Air	Air
Open burning of wastes	Landfill fires and open burning	142,500 t	0.035 mg/kg	4990 g

Data source: Preliminary Inventory of Dioxin and Furans, Ministry of Environment 2006
Note2: Information on year is not specified in the reference document.
Reference: National Implementation Plan, Sri Lanka (2007)

B.3 PCBs

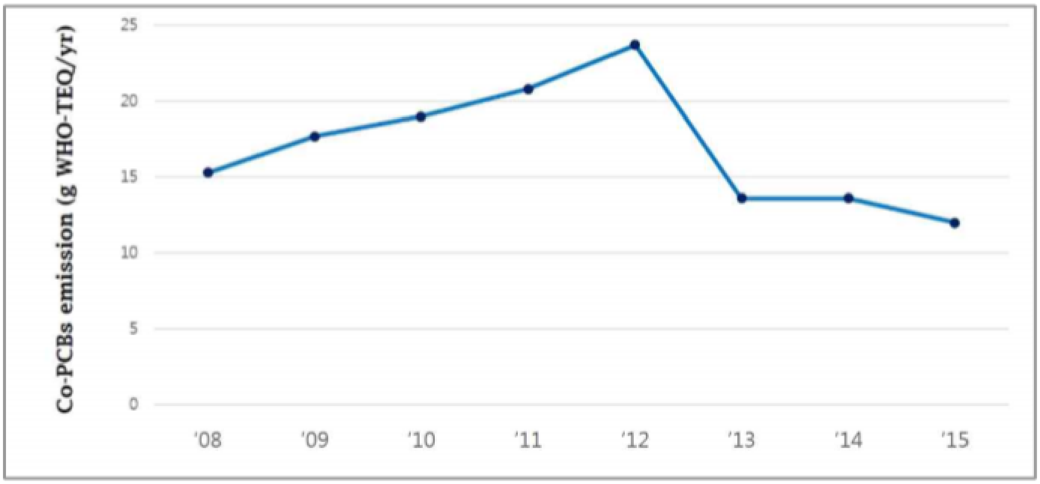
(1) Japan

Table B.3–1 PCBs emission inventory in Japan (kg/year)

Source of emission			Emission (kg/year) (Estimates) 2002	2018
Part II Source categories			450	351
	Waste incinerators		15 (Water) 0.18	5.9
	Cement kilns		350	280
	Production of pulp		5.7 (Water) 5.7	NO
	Thermal processes in the metallurgical industry		82	65
		Secondary copper production	NO	NO
		Sinter plants in the iron and steel industry	45	20
		Secondary aluminum production	10	4.7
		Secondary zinc production	26	40
Part III Source categories			100	81
	Thermal processes in the metallurgical industry not mentioned in Part II		100	78
	Fossil fuel-fired utility and industrial boilers		0.84	0.88
	Firing installations for wood and other biomass fuels		0.28	0.59
	Specific chemical production processes		0.031	0.027
	Crematoria		0.44	0.47
	Motor vehicles		NE	1.0
	Smoldering of copper cables		0.084	0.074
Other source categories			5.1	3.1
Total			560	435

NE: Not Estimated; NO: Not Occurring
Note 1: "Water" means amount released into water as part of releases.
Note 2: The total figure is not compatible with the sum of figures in each column due to rounding.
Note 3: PCB emission estimation was made using emission factors calculated based on measured data obtained from domestic sampling survey.
Reference: Submission from Japan (2020)

(2) Korea (Republic of)



Reference: National Implementation Plan, Korea (Republic of) (2019)

Figure B.3–1 *dl*-PCBs emission trend from industrial sources (2008-2015)

B.4 PeCBz

(1) Japan

Table B.4–1 PeCBz emission inventory in Japan (kg/year)

Source of emission			Emission (kg/year)（Estimates）	
			2012	2018
Part II Source categories			290	276
	Waste incinerators		163	162
	Cement kilns		91	76
	Production of pulp		NO	NO
	Thermal processes in the metallurgical industry		36	38
		Secondary copper production	NO	NO
		Sinter plants in the iron and steel industry	18	17
		Secondary aluminum production	0.56	1.8
		Secondary zinc production	18	20
Part III Source categories			51	57
	Thermal processes in the metallurgical industry not mentioned in Part II		51	57
	Fossil fuel-fired utility and industrial boilers		NE	NE
	Firing installations for wood and other biomass fuels		NE	NE
	Specific chemical production processes		NE	NE
	Crematoria		NE	NE
	Motor vehicles		NE	NE
	Smoldering of copper cables		NE	NE
Other source categories			NE	NE
Total			341	333

NE: Not Estimated; NO: Not Occurring

Note 1: The total figure is not compatible with the sum of figures in each column due to rounding.

Note 2: PeCBz emission estimation was made using emission factors calculated based on measured data obtained from domestic sampling survey.

Reference: Submission from Japan (2020)

B.5 Polychlorinated naphthalenes (PCNs)

(1) Japan

Table B.5–1 PCNs emission inventory in Japan (kg/year)

Source of emission			<Reference> Emission (kg/year) （Estimates） 2018
Part II Source categories			355
	Waste incinerators		12
	Cement kilns		306
	Production of pulp		NO
	Thermal processes in the metallurgical industry		36
		Secondary copper production	NO
		Sinter plants in the iron and steel industry	NE
		Secondary aluminum production	3.4
		Secondary zinc production	33
Part III Source categories			23
	Thermal processes in the metallurgical industry not mentioned in Part II		23
	Fossil fuel-fired utility and industrial boilers		NE
	Firing installations for wood and other biomass fuels		NE
	Specific chemical production processes		NE
	Crematoria		NE
	Motor vehicles		NE
	Smoldering of copper cables		NE
Other source categories			0.22
Total			378

NE: Not Estimated; NO: Not Occurring

Note 1: The total figure is not compatible with the sum of figures in each column due to rounding.

Note 2: PCNs emission estimation was made using emission factors calculated based on measured data obtained from domestic sampling survey.

Reference: Submission from Japan (2020)

Annex C
Detail information on sampling and analytical method, and QA/QC for monitoring programs

Table C.1–1 Detail information on Sampling and Analytical Method, and QA/QC for Monitoring Programs (Core Media)

Country	Activities/programs	Media	Sampling	Analytical procedures	QA/QC
China	Chinese national monitoring program	Air	• Mainland of China ■ High volume sampler with PM_{10}-selective inlet; maximum flow rate of 250 mL/min for more than 3 days, total 1000 m^3. • Hong Kong SAR, Macao SAR ■ Total suspended particulate high volume sampler ■ Filter: quartz-fiber filter and a polyurethane foam plug (PUF) or PUF/XAD-2 resin/PUF adsorbent pack	Stable isotopically labeled substances were added as surrogate standard substances For PCDDs and PCDFs: • Soxhlet extraction • Cleanup with acid-base partitioning method and column chromatography • HRGC-HRMS For *dl*-PCBs: • Soxhlet extraction • Cleanup with acid-base partitioning method and column chromatography • HRGC-HRMS For PCBs: • Soxhlet extraction or extraction using an ASE • Cleanup with acid-base partitioning method and column chromatography • HRGC-HRMS or GC-MS/MS For PBDEs: • Soxhlet extraction or extraction using an ASE/Soxhlet • Cleanup with acid-base partitioning method and column chromatography • HRGC-HRMS For OCPs (except toxaphene) and industrial chemicals: • Mainland of China ■ ASE extraction ■ Cleanup with Florisil column chromatography ■ HRGC-HRMS • Hong Kong SAR ■ Soxhlet extraction ■ Cleanup with Florisil column chromatography	• Initial calibration (% RSD for each chemical) • Detection limit and quantitation limit • Recovery test • Blank test • Duplicate measurement

Country	Activities/programs	Media	Sampling	Analytical procedures	QA/QC
				■ GC-µECD For Toxaphene • Mainland of China ■ Soxhlet extraction ■ Cleanup with acidic silica gel and multi-layer silica gel chromatography column ■ GC-MS/MS • Hong Kong SAR ■ Soxhlet extraction ■ Cleanup with Florisil column chromatography ■ GC-ECNI-MS For Chlordecone • Soxhlet extraction • Cleanup with Florisil chromatography columns • LC/MS/MS For HBCDs: • Soxhlet extraction • Cleanup with column chromatography including multi-layer silica gel • LC/MS/MS	
		Water	• Mainland of China ■ Two parallel samples were collected ■ 500 ml/sample • Hong Kong SAR ■ Collected from three depths (i.e., 1m below surface, mid-depth and 1m above bottom) ■ Rosette sampler with separate 2.5L opaque Niskin sampling bottles ■ 12.5L of composite sample/site	For PFOS and PFOA: • Mainland of China ■ Extracted and cleaned up with Oasis WAX solid phase extraction column ■ LC-ESI-MS/MS • Hong Kong SAR ■ Stable isotopically labeled PFOS was added ■ Extracted and cleaned up with solid phase extraction columns ■ LC-MS/MS	• Initial calibration (% RSD for each chemical) • Detection limit and quantitation limit • Recovery test • Blank test • Duplicate measurement
Japan	Chemicals in the Environment[1]	Air	• Filters: Quartz fiber filter, PUF, Activated Carbon Fiber Filter • High Volume sampler: 700 L/min, 24 hr, total 1,000 m^3.	^{13}C-labeled substances are added as surrogate standard substances in all samples For Chlordecone, PFOS and PFOA: • Soxhlet extraction • LC/MS/MS-SRM-ESI	• Recovery test • Blank test • Detection limit and quantitation limit

Country	Activities/programs	Media	Sampling	Analytical procedures	QA/QC
			Duplicate for 3 consecutive days. • Middle Volume sampler: 100 L/min, 7 days, total 1,000 m^3	For HBCDs: • Soxhlet extraction • Cleanup with silica-gel column • LC/MS/MS-SRM-ESI For SCCPs: • Soxhlet extraction • Cleanup with silica-gel column • LC/MS-SIR-APCI For Toxaphene: • Soxhlet extraction • Cleanup with silica-gel column • APGC-Qtof For HCBD • Thermal Desorption • GC/MS-SIM-EI For PCP and PCA: • Soxhlet extraction • GC/HRMS-SIM For other POPs: • Soxhlet extraction • Cleanup with Florisil or Silica-gel column • GC/HRMS-SIM	• Duplicate measurement • Travel blank test
		Water	• 40 L/sample • 1 sample/site	For PFOS and PFOA: • Solid-phase extraction • LC/MS/MS • Addition of ^{13}C-labeled substances as surrogate standard substances	
	Environmental survey on Dioxins[2]	Air	• Quartz fiber filter, PUF • High Volume sampler: 700 L/min, 24 hr. Duplicate for 7 days. • Middle Volume sampler: 100 L/min, 7 consecutive days	• Soxhlet extraction • Cleanup with sulfuric acid silica-gel or multi-layer silica-gel column, and alumina column • HRGC/HRMS	• Recovery test • Blank test • Detection limit and quantitation limit • Duplicate measurement • Travel blank test
	Monitoring survey on human exposure to chemicals (Survey on accumulation and exposure of Dioxins)[3]	Blood	• Collected at the area which survey has done in the past • Man/woman with age of 40-60, in principle	For PCDD/PCDFs and *dl*-PCBs • Addition of ^{13}C-labeled substances as surrogate standard substances • Solvent extraction	• Detection limit and quantitation limit

Country	Activities/programs	Media	Sampling	Analytical procedures	QA/QC
			• 51 mL/donor	• Clean-up with multi-layer silica-gel column and active carbon silica-gel column • GC/HRMS For PFOS, PFOA and PFOS • Addition of ^{13}C-labeled substances as surrogate standard substances • Solvent extraction • LC/MS/MS	
	Survey of dioxin levels in human milk, and study on developmental effects to infants.[4]	Human milk	• Collected 30-50mL of milk from primiparous breast-feeding women at the 30th day after delivery	For PCDD/PCDFs and *dl*-PCBs • Solvent extractions • Cleanup with silica gel, aluminum oxide and activated charcoal column • GC/MS	
Cambodia, Lao PDR, Malaysia, Vietnam	POPs Monitoring Project in East Asian Countries[5]	Air	• Quartz fiber filter, PUF and active carbon fibre felt • High Volume sampler: 700 L/min, 24 hr, total 1,000 m^3	• Cleanup with Florisil column (and silica gel column) • GC/HRMS or GC/LRMS	• Recovery test • Blank test • Standard samples containing known concentration of analytes • Duplicate measurement • Travel blank test

Table C.1–2 Detail Information on Sampling and Analytical Method, and QA/QC for Monitoring Programs (Other Media)

Country	Activities/programs	Media	Sampling	Analytical procedures	QA/QC
Japan	Chemicals in the environment 1	Water	• 40 L/sample • 1 sample/site	^{13}C-labeled substances are added as surrogate standard substances in all samples For Chlordecone and HBCDs: • Solid-phase or Shaking extraction • Cleanup with silica-gel column or Gel Permeation Chromatography (GPC) • LC/MS/MS-SRM-ESI For PFHxS: • Solid-phase extraction • LC/MS/MS For PCP and PCA: • Liquid-liquid extraction • GC/HRMS-SIM EI For HCBD: • Distillation extraction • GC/HRMS-SIM EI For other POPs: • Solid-phase or Shaking extraction • Cleanup with Florisil column or Silica-gel column • GC/HRMS-SIM EI, GC/TOF-MS EI or GC/TOF-MS NCI	• Recovery test • Blank test • Duplicate measurement • Travel blank test
		Sediment	• 3 samples/site • Pay attention not to dry the sample • Centrifuged at 3,000 rpm for about 20 minutes before the analysis	^{13}C-labeled substances are added as surrogate standard substances in all samples For PFOS and PFOA: • Shaking extraction • LC/MS/MS-SRM-ESI For Chlordecone and HBCDs: • Accelerated Solvent Extraction • Cleanup with Silica-gel column • LC/MS/MS-SRM-ESI For Toxaphene: • Soxhlet or Accelerated Solvent extraction • Cleanup with Silica-gel column and Graphitic carbon cartridge • GC/TOF-MS NICI For PBDEs:	

Country	Activities/programs	Media	Sampling	Analytical procedures	QA/QC
				• Accelerated Solvent extraction, Soxhlet extraction or Shaking extraction • Cleanup with activated carbon column • GC/HRMS-SIM-EI For SCCPs: • Accelerated Solvent extraction, Soxhlet extraction or Shaking extraction • Cleanup with Florisil column • GC/TOF-MS EI and NICI For other POPs: • Accelerated Solvent extraction, Soxhlet extraction or Shaking extraction • Cleanup with Silica-gel and Gel Permeation Chromatography (GPC) and/or Florisil column • GC/HRMS-SIM	
		Biota (Japanese seabass)	• Several individuals (1~2-year-old) of 20~50cm are used as one sample.	^{13}C-labeled substances are added as surrogate standard substances in all samples For PFOS and PFOA: • Accelerated Solvent extraction • LC/MS/MS-SRM-ESI For HBCDs and Chlordecone: • Accelerated solvent or Soxhlet extraction • Cleanup with silica-gel column • LC/MS/MS-SRM-ESI For SCCPs: • Soxhlet extraction • Cleanup with Silica-gel • GC-Orbitrap/MS For HCBD: • Distillation extraction • GC/HRMS-SIM EI For DDTs, HCB, Mirex, PeCBz and Toxaphene: • Soxhlet extraction • Cleanup with Florisil column • GC/HRMS- SIM EI or GC-TOFMS For other POPs: • Soxhlet or Solvent extraction • Cleanup with Florisil or Silica-gel column	

Country	Activities/programs	Media	Sampling	Analytical procedures	QA/QC
				• GC/HRMS-SIM EI	
	Environmental survey on Dioxins 2	Water, Groundwater	• Collected with glass or stainless-steel sampler	• Solid-phase extraction or liquid-liquid extraction • Clean-up with sulfuric acid silica-gel or multi-layer silica-gel column, and then clean-up with alumina column, HP/LC and/or Activated carbon column. • GC/MS-SIM	• Recovery test • Detection limit and quantitation limit • Blank test • Duplicate measurement
		Sediment	• Collected with mud sampler such as Ekman-birge bottom sampler. • Collect surface 10 cm layer of sediment for 3 times and mixed them into one sample.	• Solvent extraction • Clean-up with sulfuric acid silica-gel or multi-layer silica-gel column, and then clean-up with alumina column and/or activated carbon column. • GC/HRMS-SIM	
		Soil	• Collected surface 5 cm layer of soil, and used 5-point mixture method, in principle. • After taking out gravel, plant residues, etc. and fracturing of clod and soil aggregate, put air dried sample through 2 mm sieve.	• Solvent extraction • Clean-up with sulfuric acid silica-gel or multi-layer silica-gel column, and then clean-up with alumina column and/or Activated carbon column. • GC/HRMS-SIM	
	Marine environmental monitoring survey[6]	Sediment	• 1 sample/site • Collected with multiple corer and used surface 3 cm layer	For PCBs: • Alkali decomposition with GC/ECD analysis; or • Soxhlet extraction and Florisil column clean up with GC/HRMS analysis For HCHs: • Extraction with hexane/acetone • GC/MS-SIM For PCDDs/PCDFs and *dl*-PCBs: • Soxhlet extraction • HRGC/MS For PFOS and PFOA: • Solid-phase extraction • LC/MS/MS For Endosulfan: • Extraction with acetone and hexane • Cleanup with Florisil column • GC/MS-NCI For HBCD:	• Recovery test • Blank test • Detection limit and quantitation limit • Duplicate measurement • Travel blank test

Country	Activities/programs	Media	Sampling	Analytical procedures	QA/QC
				• Ultrasonic extraction • LC/MS/MS For PBDEs: • Extraction with toluene • HRGC/HRMS	
		Biota	• Several individuals/sample • Sampled at intertidal zone or bought from fishery operator	For PCBs: • Extraction with hexane/acetone • GC/ECD of GC/HRMS For PCDDs/PCDFs and *dl*-PCBs: • Extraction hexane • Cleanup with silica-gel column and alumina column • HRGC/MS	• Recovery test • Blank test • Detection limit and quantitation limit • Duplicate measurement • Travel blank test
	Marine pollution survey[7]	Sediment	• Collected with Smith-McIntyre mud-sampler • Used surface 1 cm layer	For PCBs: • *n*-Hexane extraction • Cleanup with Activated Alumina and Silica-gel column • GC/ECD	• Detection limit and quantitation limit
	Monitoring survey on human exposure to chemicals (Survey on accumulation and exposure of Dioxins)3	Food	• All meals for 3 consecutive days • Collected meals from people with blood collected • Chose sampling area which survey has done in the past	For PCDD/PCDF and *dl*-PCB • Addition of ^{13}C-labeled substances as surrogate standard substances • Solvent extraction • Clean-up with multi-layer silica-gel column and active carbon silica-gel column • GC/HRMS	• Detection limit and quantitation limit
	Survey on Dioxins in Livestock and Marine Products[8]	Food	• Collected over 200g of agricultural crops from the center of the field and 5 points on the diagonal from the center in 4 directions. • Collected over 1kg of chicken, chicken egg, beef and pork and 1L of milk for livestock. • Collected over 1kg of muscles from commercial fish	For PCDD/PCDF and *dl*-PCB • HRGC-HRMS	• Recovery test • Blank test • Detection limit and quantitation limit

Annex D
Detail information on air concentration in the region

D.1 China

Table D.1–1 Locations of the ambient air sampling sites

The codes of the sampling sites	Sampling sites	Longitude	Latitude
B1	Changdao	120° 41′ 44″ E	37° 59′ 23″ N
B2	Wuyi Mountain	117° 43′ 48″ E	27° 35′ 12″ N
B3	Luan	116° 09′ 36″ E	31° 33′ 05″ N
B4	Shennongjia	110° 16′ 16″ E	31° 27′ 26″ N
B5	Daxinganling	121° 14′ 59″ E	50° 52′ 51″ N
B6	Qinghai Lake	100° 29′ 36″ E	36° 35′ 02″ N
B7	Qingyuan	124° 56′ 16″ E	41° 51′ 08″ N
B8	Lasa	90° 44′ 32″ E	29° 21′ 13″ N
B9	Lijiang	100° 14′ 60″ E	26° 52′ 54″ N
B10	Wulong	107° 44′ 47″ E	29° 30′ 39″ N
B11	Chengde	116° 29′ 40″ E	41° 07′ 11″ N
R1	Rizhao	119° 18′ 52″ E	35° 41′ 37″ N
R2	Yangshuo	110° 30′ 36″ E	24° 47′ 33″ N
R3	Luan	116° 22′ 15″ E	31° 29′ 09″ N
U1	Chongqing	106° 33′ 43″ E	29° 38′ 44″ N
U2	Wuhan	114° 09′ 36″ E	29° 58′ 20″ N
U3	Nanjing	118° 44′ 44″ E	32° 02′ 35″ N
HKA1	Tsuen Wan Station in Hong Kong	114° 6′ 53″ E	22° 22′ 18″ N
HKA2	Central/Western Station in Hong Kong	114° 8′ 38″ E	22° 17′ 6″ N

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People’s republic of China. (2020)

TableD.1–2 Concentrations of PCDD/PCDFs in air of remote sites during 2014-2019（fg/m^3）

（average concentration/range）

Sampling sites / congeners	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
2378-TCDF	13.2 7-19	15.5 ND-88	11.5 9-14	ND ND	1.7 ND-5	3.3 ND-10	4	ND	7	11	2
12378-PeCDF	12.0 5-23	18.9 ND-79	10.0 9-11	ND ND	1.0 ND-4	6.8 ND-35	ND	ND	4	5	ND
23478-PeCDF	15.1 5-34	5.8 ND-23	8.5 6-11	0.5 ND-1	0.4 ND-2	2.1 ND-8	3	ND	3	4	ND
123478-HxCDF	18.4 9-39	21.3 4-72	8.0 6-10	0.5 ND-1	1.8 ND-5	10.6 1-35	4	ND	ND	3	3
123678-HxCDF	19.3 12-37	14.7 ND-48	12.5 11-14	1.0 ND-2	1.9 ND-7	5.7 ND-29	10	ND	3	3	ND
234678-HxCDF	20.7 13-40	15.0 ND-52	13.0 11-15	1.0 ND-2	2.3 ND-9	4.8 ND-19	6	ND	3	3	3
123789-HxCDF	5.5 ND-13	1.5 ND-7	2.0 ND-4	0.5 ND-1	0.8 ND-2	2.9 ND-12	ND	ND	4	5	2
1234678-HpCDF	70.5 44-120	42.2 ND-210	39.5 35-44	4 4	7.5 ND-27	20.1 ND-99	33	ND	ND	ND	9
1234789-HpCDF	7.1 ND-16	9.7 ND-41	4.0 3-5	ND ND	0.8 ND-3	7.6 ND-40	3	ND	ND	2	ND
OCDF	71.6 31-110	119.6 ND-760	47.0 40-54	3.5 1-6	7.9 ND-26	14.0 ND-48	29	ND	7	9	6
2378-TCDD	1.8 ND-5	2.2 ND-12	1.0 ND-2	1.0 ND-2	1.0 ND-4	0.9 ND-8	ND	ND	7	9	2
12378-PeCDD	2.5 ND-5	0.9 ND-6	ND ND	0.5 ND-1	0.7 ND-3	0.8 ND-6	ND	ND	5	6	2
123478-HxCDD	1.1 ND-4	1.7 ND-19	ND ND	ND ND	ND ND	5.8 ND-33	ND	ND	ND	2	ND
123678-HxCDD	4.0 ND-9	0.8 ND-3	3.5 3-4	ND ND	0.3 ND-1	2.0 ND-10	ND	ND	2	3	ND
123789-HxCDD	3.3 ND-8	0.7 ND-4	1.0 ND-2	ND ND	ND ND	1.8 ND-10	ND	ND	2	3	ND
1234678-HpCDD	21.7 4-45	14.7 ND-50	15.0 12-18	2.0 1-3	4.5 ND-14	6.4 ND-22	8	ND	4	5	3
OCDD	61.6 40-78	59.0 ND-140	55.0 32-78	6.0 4-8	19.2 ND-60	13.0 ND-45	16	ND	26	50	6
PCDD/Fs WHO-TEQ	20.0 13.0-35.0	17.1 3.8-38.0	12.1 8.6-15.6	3.6 3.2-3.9	5.1 0.9-8.9	9.3 2.5-24.2	8.3	7.4	16.0	19.0	5.1

ND: below the detection limit

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

TableD.1–3 Concentrations of PCDD/PCDFs in air of urban sites during 2014-2019（fg/m^3）

（average concentration/range）

Sampling sites / congeners	U1	U2	U3
2378-TCDF	23.4 10-44	29.7 ND-86	45.1 21-86
12378-PeCDF	29.0 2-89	55.1 ND-130	64.2 21-153
23478-PeCDF	34.1 ND-68	106 5-330	114 19-340
123478-HxCDF	52.9 8-190	189.9 6-646	109.1 20-311
123678-HxCDF	54.2 14-190	200.5 13-622	124.7 34-319
234678-HxCDF	56.7 10-140	271.9 15-806	122.6 32-295
123789-HxCDF	20.8 ND-94	42.7 ND-170	44.2 13-110
1234678-HpCDF	217.1 29-898	767.3 25-2650	443.1 100-1177
1234789-HpCDF	32.6 ND-167	106.0 4.3-363	16.0 ND-36
OCDF	280.2 14-1863	454 9-1502	136 ND-362
2378-TCDD	2.4 ND-7	1.1 ND-4	4.1 ND-10
12378-PeCDD	4.7 ND-11	6.6 ND-30	9.5 ND-26
123478-HxCDD	4.3 ND-11	17.3 ND-43	15.2 ND-39
123678-HxCDD	11.3 ND-23	37.5 ND-104	28.4 ND-73
123789-HxCDD	10.9 ND-22	13.9 ND-55	13.2 ND-25
1234678-HpCDD	85.2 11-150	172 14-366	164 42-283
OCDD	187 28-301	517 33-1727	2192 84-7988
PCDD/Fs WHO-TEQ	46.5 12-111	134 12-306	109 24-284

ND: below the detection limit

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

TableD.1–4 Concentrations of PCDD/PCDFs in air of rural sites during 2014-2019（fg/m^3）

（average concentration/range）

Sampling sites / congeners	R1	R2	R3
2378-TCDF	6.7 ND-14	9.0 ND-16	8.2 ND-18
12378-PeCDF	6.1 ND-17	9.4 4-18	6.5 ND-14
23478-PeCDF	4.6 ND-16	11.2 ND-22	14.1 ND-37
123478-HxCDF	10.1 2-16	14.7 2-33	19.1 5-52
123678-HxCDF	16.7 2-29	16.7 3-34	18.9 7-46
234678-HxCDF	16.4 2-31	16.5 2-36	20.9 ND-52
123789-HxCDF	3.7 ND-12	4.5 ND-10	6.8 ND-15
1234678-HpCDF	51.3 6-89	59.4 10-140	67.4 27-162
1234789-HpCDF	4.4 1-7	6.6 ND-21	9.4 ND-29
OCDF	36.9 2-89	44.0 7-120	92.4 19-330
2378-TCDD	1.7 ND-4	2.3 ND-7	0.9 ND-3
12378-PeCDD	1.0 ND-3	2.3 ND-7	0.9 ND-29
123478-HxCDD	0.4 ND-2	3.3 ND-17	1.8 ND-2
123678-HxCDD	1.5 ND-6	4.7 ND-11	3.5 ND-8
123789-HxCDD	0.7 ND-2	10.0 1-66	2.8 ND-6
1234678-HpCDD	16.0 2-31	98.0 3-539	22.6 8-46
OCDD	28.0 4-46	631 56-4470	40.8 22-83
PCDD/Fs WHO-TEQ	12.5 1.0-22	19.2 6-50	18.7 9-34

ND: below the detection limit

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People’s republic of China. (2020)

TableD.1–5 Concentrations of *dl*- PCBs（fg/m^3） and indicator PCBs (pg/m^3) in air of remote sites during 2014-2019（average concentration/range）

sampling sites / congeners	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
PCB-77	178.7 100-293	73.8 ND-190	91.5 90-93	10.0 9-11	31.0 11-82	24.3 ND-61	21	11	16	24	23
PCB-81	23.2 9-56	14.7 ND-31	14.5 12-17	2.0 ND-4	10.5 2-35	4.3 ND-15	4	ND	6	7	6
PCB-105	89.8 27-216	75.5 28-180	48.5 37-60	13.5 10-17	27.5 16-54	29.3 ND-101	21	9	23	32	29
PCB-114	29.6 10-65	28.2 ND-45	18.5 18-19	3.5 2-5	9.7 3-28	6 ND-24	6	2	6	9	7
PCB-118	278.9 69-720	211.4 67-540	125 100-150	37.5 34-41	56.4 48-66	77.3 21-228	62	28	57	79	77
PCB-123	28.3 11-56	36.5 ND-98	23.5 5.0-42	9.0 8-10	13.6 4-26	21.0 ND-57	15	6	11	17	18
PCB-126	36.8 10-102	13.0 ND-30	14.0 14	3.5 ND-7	3.0 ND-6	5.8 ND-16	ND	ND	4	5	3
PCB-156	35.6 10-94	26.7 11-81	15 15	3.5 2-5	13.2 3-39	7.2 ND-19	6	3	7	10	7
PCB-157	14.5 4-40	17.5 4-90	5.5 5-6	1.5 1-2	10.0 1.1-34	3.3 ND-10	2.5	1	2	2	3
PCB-167	14.8 5-38	14.6 5-59	7 7	1.5 1-2	7.9 0.9-26	3.3 ND-11	2.3	1	4	4	3
PCB-169	14.1 3-42	5.5 ND-16	3.5 3-4	14.0 ND-28	14.5 1-55	1.2 ND-6	ND	ND	1	ND	26
PCB-189	13.9 4-33	8.1 3-19	6.5 6-7	0.5 ND-1	8.5 1.2-30	2.1 ND-7	2.2	ND	2	2	1
PCBs WHO-TEQ	4.3 1.14-11.9	1.57 0.58-3.41	1.6 1.55-1.6	0.8 0.044-1.5	0.8 0.096-2.31	0.69 0.14-1.84	0.12	0.1	0.4	0.5	1.2
PCB-28	2.57 1.6-4.3	16.1 0-137	2.81 2.2-3.4	3.07 1.10-5.03	1.62 0.83-3.8	4.38 0.72-12	1.8	0.43	2.33	2.5	9.4
PCB-52	0.94 0.22-2.1	4.34 0.53-17.18	1.33 1.0-1.7	0.50 0.49-0.50	0.31 0.22-0.36	0.92 0.20-2.8	0.63	0.24	0.30	0.52	1.0
PCB-101	0.43 0.25-0.62	2.75 0.36-11.46	0.32 0.32-0.33	0.16 0.10-0.21	0.14 0.07-0.18	0.39 0.08-1.0	0.18	0.07	0.17	0.26	0.20
PCB-138	0.38 0.09-1.01	0.83 0.07-3.00	0.17 0.16-0.18	0.08 0.07-0.092	0.08 0.03-0.13	0.1 0.03-0.37	0.08	0.08	0.11	0.19	0.13
PCB-153	0.59 0.09-1.01	0.85 0.08-2.86	0.17 0.17-0.17	0.09 0.07-0.10	0.08 0.059-0.10	0.1 0.03-0.34	0.08	0.07	0.12	0.15	0.20
PCB-180	0.10 0.01-0.30	0.08 0.02-0.34	0.04 0.03-0.04	0.02 0.02-0.021	0.02 0.01-0.04	0.01 ND-0.04	0.018	0.017	0.04	0.05	0.02
$\sum_6$ PCBs	4.80 3.17-7.40	25.1 3.47-16.5	4.85 3.89-5.8	3.89 2-5.78	2.24 1.35-4.37	5.94 1.18-16.2	2.78	0.89	3.07	3.67	11.0

ND: below the detection limit

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People’s republic of China. (2020)

TableD.1–6 Concentrations of *dl*- PCBs（fg/m^3） and indicator PCBs (pg/m^3) in air of urban sites during 2014-2019（average concentration /range）

Sampling Sites / congeners	U1	U2	U3
PCB-77	120 49-266	152 36-267	281 230-402
PCB-81	31.7 9.8-61	47.3 12-113	54.0 34-96
PCB-105	121 36-278	140 42-220	152 72-302
PCB-114	35.2 13-85	63.4 14-171	101.2 49-172
PCB-118	327 76-679	344 110-630	343 223-556
PCB-123	61.2 13-103	71.3 19-140	106 33-167
PCB-126	32.9 11-58	51.1 10-133	70.7 27-159
PCB-156	63.9 14-262	66.3 12-188	72.8 33-177
PCB-157	19.1 4-35	23.0 5.2-63	35.2 19-82
PCB-167	18.4 4.9-38	21.9 5.6-46	29.4 7-72
PCB-169	9.8 ND-20	21.0 2.9-67	27.2 12-66
PCB-189	14.7 5.2-24	44.0 4.1-152	46.9 13-125
PCBs WHO-TEQ	3.7 1.3-6.31	5.9 1.2-15	8.1 3.4-18
PCB-28	5.02 0.07-8.73	6.12 3.82-8.00	6.30 2.86-9.89
PCB-52	1.31 0.28-2.50	2.22 0.72-4.50	2.73 1.80-3.98
PCB-101	2.02 0.30-5.26	0.83 0.22-1.30	1.08 0.60-1.72
PCB-138	0.42 0.12-1.4	0.36 0.17-0.70	0.41 0.32-0.60
PCB-153	0.55 0.2-2.1	0.37 0.22-0.72	0.42 0.31-0.62
PCB-180	0.10 0.04-0.27	0.07 0.03-0.17	0.08 0.07-0.09
$\sum_6$PCBs	9.70 2.9-15	9.85 5.18-15.00	10.92 8.52-13.31

ND: below the detection limit

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People’s republic of China. (2020)

TableD.1–7 Concentrations of *dl*- PCBs（fg/m^3） and indicator PCBs (pg/m^3) in air of rural sites during 2014-2019（average concentration/range）

Sampling sites / congeners	R1	R2	R3
PCB-77	60.7 13-110	84.4 44-140	48.5 35-63
PCB-81	11.8 2-18	24.4 8-53	10.6 7-16
PCB-105	41.0 22-66	117 22-400	39.6 26-56
PCB-114	14.5 ND-28	27.9 8-62	13.6 8-23
PCB-118	100 58-170	180 71-331	91.9 54-150
PCB-123	29.0 8-71	60.8 8-150	23.7 6-42
PCB-126	15.9 2-28	16.0 4-25	15.2 6-26
PCB-156	13.6 3-19	28.5 14-84	13.2 7-19
PCB-157	5 ND-7	13.3 ND-24	4.7 2-7
PCB-167	7.0 4-9	13.0 6-32	6.1 3-10
PCB-169	4.1 2-5	3.6 ND-11	1.9 ND-6
PCB-189	8.1 ND-10	8.0 2-13	5.9 2-12
PCBs WHO-TEQ	1.8 0.25-3.1	1.84 0.46-2.8	1.6 0.71-2.7
PCB-28	2.15 0.83-3.9	4.53 0.81-22.0	3.86 0.51-11.0
PCB-52	0.73 0.39-1.5	1.5 0.44-6.00	0.84 0.47-1.40
PCB-101	0.28 0.17-0.50	1.11 0.18-3.10	0.33 0.18-0.48
PCB-138	0.14 0.046-0.18	0.31 0.12-0.96	0.15 0.08-0.24
PCB-153	0.14 0.6-0.20	0.28 0.02-0.54	0.16 0.09-0.25
PCB-180	0.03 0.013-0.039	0.06 0.03-0.12	0.04 0.01-0.07
$\sum_6$ PCBs	3.45 1.50-6.3	7.77 2.15-32.0	5.38 1.38-12.83

ND: below the detection limit

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

TableD.1–8 Concentrations of HBB and PBDEs in air of remote sites during 2014-2019（pg/m^3）（average concentration/range）

sampling sites / congeners	B1	B2	B4	B5	B6	B3	B9	B10	B11
BB153	0.02 ND-0.06	0.03 ND-0.11	0.02 ND-0.03	0.03 0.0002-0.06	0.03 ND-0.11	0.07	0.03	0.04	0.01
BDE-17	0.12 0.1-0.15	0.31 0.11-0.82	0.12 0.05-0.19	0.07 ND-0.17	0.21 0.02-0.71	0.10	0.02	0.07	0.01
BDE-28	0.27 0.23-0.34	0.54 0.17-1.56	0.51 0.05-0.96	0.36 0.01-1.01	0.44 0.04-1.59	0.25	0.02	0.06	0.02
BDE-47	1.27 0.34-2.25	1.35 0.14-6.56	0.54 0.11-0.97	0.20 0.04-0.46	1.92 0.16-10.6	0.32	0.08	0.22	0.11
BDE-99	0.35 0.19-0.44	0.58 0.09-2.88	0.24 0.04-0.43	0.07 0.03-0.13	0.49 0.04-2.31	0.28	0.05	0.06	0.10
BDE-100	0.09 0.01-0.15	0.15 0.01-0.86	0.05 0.01-0.09	0.01 0.01-0.01	0.16 ND-0.88	0.02	0.01	0.01	0.02
BDE-153	0.12 0.01-0.23	0.05 0.02-0.09	0.12 ND-0.24	0.03 ND-0.09	0.05 ND-0.10	0.49	ND	0.01	ND
BDE-154	0.49 0.02-1.34	0.26 ND-0.99	0.39 0.35-0.43	0.42 0.01-1.21	0.31 ND-1.34	0.04	0.99	1.19	0.79
BDE-183	0.24 0.07-0.43	0.09 ND-0.25	0.46 0.02-0.90	0.15 ND-0.45	0.14 0.01-0.37	1.04	0.08	0.01	0.01
Σ_8PBDEs	2.97 1.61-4.58	3.34 0.91-12.8	2.41 0.71-4.13	1.30 0.89-1.74	3.72 0.64-16.3	2.54	1.25	1.63	1.06

ND: below the detection limit

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

Table D.1–9 Concentrations of HBB and PBDEs in air of urban sites during 2014-2019（pg/m^3）（average concentration/range）

sampling sites / congeners	U1	U2	U3
BB153	0.02 ND-0.080	0.06 0.0004-0.16	0.07 0.05-0.09
BDE-17	0.48 0.05-1.35	0.14 0.04-0.22	0.11 0.06-0.17
BDE-28	0.79 0.06-2.17	0.44 0.11-0.66	0.27 0.14-0.39
BDE-47	4.52 0.26-26.82	0.74 0.22-1.20	0.48 0.24-0.73
BDE-99	1.77 0.15-7.74	0.42 0.10-0.63	0.52 0.26-0.77
BDE-100	0.54 0.02-2.69	0.08 0.02-0.12	0.04 0.02-0.06
BDE-153	0.53 0.02-2.36	0.34 0.06-0.57	0.85 0.40-1.29
BDE-154	1.34 0.03-4.54	0.45 0.06-0.74	0.71 0.08-1.34
BDE-183	1.44 0.26-6.75	1.08 0.08-1.70	1.89 0.79-2.99
$\sum_8$ PBDEs	11.43 1.92-42.21	3.69 0.70-5.83	4.86 3.28-6.44

ND: below the detection limit

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

TableD.1–10 Concentrations of HBB and PBDEs in air of rural air sites during 2014-2019 (pg/m^3) (average concentration/range)

sampling sites / congeners	R1	R2	R3
BB153	0.04 ND-0.09	0.03 ND-0.10	0.04 ND-0.12
BDE-17	0.14 0.03-0.25	0.70 0.07-2.82	0.10 0.02-0.15
BDE-28	0.32 0.07-0.44	0.95 0.05-3.06	0.22 0.02-0.34
BDE-47	1.25 0.06-3.35	2.45 0.15-16.2	0.60 0.07-1.49
BDE-99	0.30 0.05-0.60	1.38 0.17-7.35	0.25 0.04-0.44
BDE-100	0.09 0.01-0.24	0.37 0.04-2.27	0.06 ND-0.14
BDE-153	0.11 0.01-0.28	0.18 0.02-0.59	0.09 ND-0.19
BDE-154	0.22 0.02-0.63	0.48 ND-1.74	0.39 0.02-1.04
BDE-183	0.27 0.03-0.69	0.92 0.09-4.00	0.20 0.04-0.36
$\sum_8$ PBDEs	2.70 1.01-4.84	7.44 1.97-30.66	1.91 1.23-2.94

ND: below the detection limit

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

Table D.1–11 Concentrations of organochlorine pesticides and industrial chemicals in air of remote sites during 2014-2019（pg/m^3） （average concentration/range）

Sampling sites congeners	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
PeCBz	48.5 48.5	5.15 4.7-5.6	NA NA	13.3 13.3	2.60 2.60	10.5 10-10.9	NA	NA	NA	NA	NA
HCB	62.8 27.8-114	19.3 3.91-58.83	48.2 40.0-56.4	58.7 43.0-78.2	53.3 10.8-	32.0 2.77-112	72.5	44.0	14.0	251	47.99
Aldrin	0.10 ND-0.4	0.13 ND-0.74	ND ND	1.83 ND-5.50	0.01 ND-0.05	0.33 ND-1.9	ND	ND	ND	ND	ND
Dieldrin	0.23 ND-0.9	0.24 ND-0.8	ND ND	0.17 ND-0.50	0.10 ND-0.4	0.17 ND-0.7	ND	ND	ND	ND	ND
Endrin	ND ND	0.01 ND-0.09	ND ND	ND ND	ND ND	0.002 ND-0.02	ND	ND	ND	ND	ND
p,p′-DDT	1.80 1.52-2.10	0.87 0.39-1.90	0.61 0.0008-	1.73 0.26-4.60	0.08 0.03-0.13	0.54 0.03-4.18	0.10	0.04	1.82	0.35	0.48
p,p′-DDD	1.72 0.9-3.59	0.64 0.1-1.20	0.24 0.0008-0.49	0.74 0.24-1.60	0.09 0.04-0.16	0.72 0.01-6.60	0.26	0.14	11.50	0.20	1.83
p,p′-DDE	5.95 3.89-	1.84 0.68-3.33	3.93 0.0009-7.86	5.70 0.99-14.1	0.93 0.33-2.22	0.85 0.07-2.1	0.44	0.12	3.97	3.03	4.04
o, p′-DDT	6.89 1.4-15.0	2.94 0.6-6.87	3.13 0.002-6.26	2.31 0.82-3.7	0.44 0.07-1.02	1.36 0.06-11.6	0.39	0.39	7.83	0.66	13.01
o, p′-DDD	0.66 0.31-1.19	1.13 0.2-6.29	0.04 0.0003-0.08	0.62 0.22-1.4	0.18 0.01-0.37	0.22 ND-0.84	1.14	0.05	6.22	0.68	3.14
o,p′-DDE	0.94 0.2-1.55	0.58 0.1-1.22	1.44 0.0007-2.88	0.79 0.35-1.6	0.11 0.03-0.21	0.41 0.02-3.08	0.64	0.10	8.74	0.45	0.26
trans-Chlordane	0.54 0.02-1.38	0.77 ND-2.29	0.83 0.02-1.64	0.59 0.02-1.1	0.26 ND-0.70	0.42 ND-2.19	1.07	0.64	0.13	0.02	0.01
cis-Chlordane	0.23 0.08-0.6	0.38 ND-0.97	0.02 0.0007-0.04	0.48 0.08-1.2	0.06 ND-0.13	0.19 0.02-1.03	0.07	0.02	0.41	0.06	0.05
Endosulfan-I	5.00 5.00	22.70 11.4-34.0	NA NA	12.30 12.30	5.60 5.60	4.30 1.3-7.30	NA	NA	NA	NA	NA
Endosulfan-II	7.40 7.40	10.9 2.9-18.9	NA NA	2.30 2.30	0.20 0.20	0.30 ND-0.60	NA	NA	NA	NA	NA
trans-Nonachlor	0.35 0.04-0.54	0.55 0.04-2.11	0.40 0.02-0.77	0.31 0.03-0.6	0.24 0.07-0.32	0.22 0.01-0.70	0.25	0.10	0.01	0.02	0.01
cis-Nonachlor	0.01 ND-0.03	0.12 ND-0.89	0.01 ND-0.03	0.02 ND-0.03	0.09 ND-0.28	0.05 ND-0.33	0.22	0.16	0.04	0.01	ND
Oxychlordane	0.27 0.01-0.41	0.14 ND-0.32	0.02 0.01-0.04	0.14 ND-0.23	0.11 0.02-0.19	0.20 0.01-0.58	0.42	ND	0.11	0.15	0.38
Heptachlor	0.06 0.04-0.07	0.18 0.03-0.93	0.06 0.003-0.12	0.19 0.03-0.5	0.02 ND-0.04	0.04 ND-0.12	0.03	ND	0.32	0.06	0.04
trans-Heptachlor	0.04 ND-0.16	0.11 ND-0.55	0.02 ND-0.04	0.04 ND-0.13	0.01 ND-0.02	0.07 ND-0.22	0.02	ND	0.72	0.09	0.52
cis-Heptachlor Epoxide	0.35 0.01-0.58	0.3 ND-1.53	0.02 ND-0.03	0.18 ND-0.3	0.29 ND-0.85	0.30 0.01-1.49	2.20	0.40	0.55	0.25	1.54
Mirex	0.18 0.1-0.24	0.92 0.2-4.51	0.37 0.004-0.74	0.38 0.28-0.5	0.08 0.07-0.10	0.19 0.01-1.23	0.12	0.11	0.79	0.16	0.12
α-HCH	7.39 3.64-11.0	3.67 1.16-9.00	4.31 0.002-8.61	9.83 3.91-21.5	2.94 1.36-4.87	5.12 0.46-11.3	3.01	0.44	1.81	8.62	2.38
β-HCH	2.18 0.76-3.89	1.51 0.6-2.92	0.33 0.0002-0.66	1.96 0.31-4.6	0.67 0.1-1.44	1.52 0.06-6.6	0.38	0.52	1.97	1.60	2.67
γ-HCH	5.80 1.78-11.64	5.64 0.88-33.7	0.14 0.001-0.27	5.02 0.48-8.8	2.97 1.30-7.51	2.67 0.13-5.84	0.81	ND	15.80	5.86	5.14
δ-HCH	0.51 0.16-0.93	0.57 0.10-2.13	0.18 0.002-0.35	0.11 ND-0.22	0.07 ND-0.14	0.47 ND-1.41	0.47	ND	0.53	0.12	0.54

ND: below the detection limit; NA: not analysis

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

Table D.1–12 Concentrations of organochlorine pesticides and industrial chemicals in air of urban sites during 2014-2019（pg/m^3） average concentration/range）

Sampling sites / congeners	U1	U2	U3
PeCBz	21.7 12.5-30.8	14.1 14.1	NA NA
HCB	65.2 14.5-189	76.4 56.1-135	273 9.16-507
Aldrin	1.64 ND-4.8	1.41 ND-4.5	0.58 ND-2.32
Dieldrin	0.93 ND-5.40	0.21 ND-0.60	0.09 ND-0.36
Endrin	0.52 ND-4.10	ND ND	ND ND
p,p′-DDT	3.99 0.82-11.6	3.68 1.67-6.80	2.04 0.61-3.88
p,p′-DDD	4.26 0.06-17.1	5.98 1.12-23.8	0.95 0.34-1.79
p,p′-DDE	7.91 2.98-20.3	11.71 7.22-17.7	8.62 4.18-16.5
o, p′-DDT	8.17 0.33-21.4	8.27 2.64-19.4	9.04 1.79-16.1
o, p′-DDD	3.48 0.05-14.9	0.83 0.19-1.7	0.42 0.25-0.59
o,p′-DDE	1.98 0.14-7.30	1.63 0.60-2.36	3.35 1.67-6.79
trans-Chlordane	0.91 0.08-1.70	1.05 0.07-2.32	13.5 0.01-34.4
cis-Chlordane	0.40 0.14-0.9	0.83 0.13-2.00	8.73 0.72-22.3
Endosulfan-I	10.15 1.5-18.8	18.7 18.7	NA NA
Endosulfan-II	1.35 ND-2.7	2.60 2.6	NA NA
trans-Nonachlor	0.36 0.02-0.64	0.71 0.04-1.48	3.88 0.40-8.75
cis-Nonachlor	0.06 ND-0.3	0.05 ND-0.21	0.34 0.14-0.70
Oxychlordane	0.37 ND-0.91	0.25 0.03-0.56	0.22 0.05-0.43
Heptachlor	4.27 0.07-35.4	1.49 0.20-5.90	3.74 1.42-6.57
trans-Heptachlor Epoxide	0.24 ND-1.16	0.04 ND-0.21	0.04 ND-0.22
cis-Heptachlor Epoxide	1.24 0.05-4.61	0.34 0.03-0.87	0.22 0.06-0.45
Mirex	0.92 0.09-2.88	0.75 0.49-1.18	3.30 1.53-7.03
α-HCH	10.8 3.88-17.7	11.6 6.00-17.4	21.1 1.66-38.7
β-HCH	5.11 0.13-14.5	2.15 0.34-3.64	1.97 0.40-3.32
γ-HCH	5.10 0.30-13.3	5.17 0.82-11.2	4.44 0.58-11.8
δ-HCH	1.66 ND-9.09	0.55 ND-0.91	1.21 0.40-3.09

ND: below the detection limit; NA: not analysis

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People’s republic of China. (2020)

Table D.1–13 Concentrations of organochlorine pesticides and industrial chemicals in air of rural sites during 2014-2019（pg/m^3）（average concentration/range）

congeners \ Sampling sites	R1	R2	R3
PeCBz	2.50 2.50	8.95 3.00-14.9	6.40 6.40
HCB	102 9.20-173	44.4 13.3-90.3	89.9 8.4-160
Aldrin	0.19 ND-0.7	0.22 ND-1.1	0.12 ND-0.40
Dieldrin	0.10 ND-0.4	1.64 ND-8.70	0.01 ND-0.07
Endrin	ND ND	1.20 ND-7.27	ND ND
p,p′-DDT	0.54 0.09-1.16	3.78 0.08-15.7	1.17 0.11-2.60
p,p′-DDD	0.58 ND-1.72	3.60 0.3-17.2	2.91 0.07-11.9
p,p′-DDE	8.59 0.9-18.7	8.71 2.82-31.1	77.9 1.19-373
o, p′-DDT	2.67 0.27-5.99	7.21 0.33-18.7	3.51 0.32-6.50
o, p′-DDD	0.20 0.02-0.61	0.82 0.08-2.4	1.79 0.07-7.91
o,p′-DDE	0.73 0.05-1.77	2.42 0.2-5.25	2.61 0.17-9.29
trans-Chlordane	0.31 0.01-0.82	2.70 0.03-6.59	0.78 0.05-2.25
cis-Chlordane	0.16 ND-0.48	3.06 ND-18.1	0.42 0.18-0.90
Endosulfan-I	0.60 0.60	39.0 26.7-51.2	21.70 21.7
Endosulfan-II	0.20 0.20	22.3 8.5-36.1	10.4 10.4
trans-Nonachlor	0.33 0.06-0.85	1.57 0.04-5.85	0.29 0.03-0.51
cis-Nonachlor	0.04 ND-0.12	0.23 ND-0.82	0.04 ND-0.08
Oxychlordane	0.33 0.03-1.38	0.35 0.03-1.90	0.25 0.02-0.92
Heptachlor	0.09 0.01-0.28	0.55 0.13-2.00	0.15 0.04-0.30
trans-Heptachlor Epoxide	0.06 ND-0.19	0.18 ND-1.09	0.10 ND-0.47
cis-Heptachlor Epoxide	0.89 ND-3.92	1.59 ND-4.93	0.17 0.01-0.50
Mirex	0.25 0.06-0.63	0.92 0.08-2.13	0.60 0.06-1.47
α-HCH	6.40 3.97-9.00	6.77 1.23-23.2	9.15 1.11-19.1
β-HCH	3.38 0.34-14.4	6.27 0.64-26.6	2.02 0.45-5.00
γ-HCH	6.19 1.16-22.6	6.67 1.03-17.8	5.65 0.09-16.7
δ-HCH	0.89 ND-3.58	4.08 ND-13.9	0.40 ND-0.70

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People’s republic of China. (2020)

Table D.1–14 Annual averages of PCDD/PCDFs and PCBs in ambient air of Hong Kong SAR from 2014 to 2018

POPs	Average Concentration in Ambient Air (Range)				
	2014	**2015**	**2016**	**2017**	**2018**
PCDD/PCDFs (fg/m^3)	1275 (174-4703)	1044 (152-4998)	726 (159-1969)	1258 (116-5287)	1107 (113-6072)
PCDD/PCDFs (pg I-TEQ/m^3)	0.045 (0.009-0.283)	0.032 (0.008-0.114)	0.023 (0.008-0.070)	0.030 (0.008-0.103)	0.026 (0.008-0.086)
dl- PCBs (pg/m^3)	1.71 (0.69-3.16)	1.67 (0.73-3.43)	1.57 (0.77-2.89)	1.31 (0.73-2.08)	1.38 (0.74-2.58)
dl- PCBs (pg WHO-TEQ/m^3)	0.004 (0.002-0.015)	0.003 (0.002-0.009)	0.003 (0.002-0.006)	0.002 (0.002-0.006)	0.004 (0.002-0.018)
indicator PCBs - ΣPCB_7 (pg/m^3)	16.4 (6.4-30.3)	17.1 (5.4-43.6)	12.0 (5.7-27.0)	12.8 (5.5-25.9)	11.7 (5.5-21.8)

*Note: For POPs concentrations that are lower than the method detection limit (MDL), one half of the MDL is used in calculat ing the annual averages.

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

Table D.1–15 Annual averages of other POPs in ambient air of Hong Kong SAR from 2014 to 2018

POPS		Average concentration in Ambient air(Range)(pg/m^3)[1]					Method Detection Limit (MDL)	
		2014	2015	2016	2017	2018	(pg/sample)	(pg/m^3)[2]
Aldrin		0.68 (0.65-0.70)	1.02 (0.66 4.83)	11.16 (4.30-20.2)	6.83 (0.70-17.70)	3.93 (0.65-28.10)	440	1.3
Chlordane	cis-Chlordane	1.59 (0.55-13.00)	2.19 (0.56-8.93)	3.09 (0.55-9.40)	3.47 (0.55-7.60)	2.83 (0.55-19.20)	370	1.1
	trans-Chlordane	1.62 (0.55-13.00)	2.50 (0.57-10.48)	5.23 (0.55-21.40)	2.83 (0.55-7.30)	1.43 (0.55-8.70)	380	1.2
	cis-Nonachlor	0.74 (0.70-0.75)	0.75 (0.74.0.76)	0.75 (0.75-0.75)	1.97 (0.75-5.50)	0.74 (0.70-0.75)	490	1.5
	trans-Nonachlor	0.60 (0.55-0.60)	1.27 (0.59-5.85)	1.03 (0.60-5.80)	2.34 (0.60-5.40)	2.50 (0.55-10.70)	390	1.2
	Ozychlordane	0.79 (0.75-0.80)	0.80 (0.78-0.81)	3.12 (0.80-15.10)	2.98 (0.80-7.00)	3.78 (0.75-20.50)	520	1.6
DDT	2,4'-DDD	0.67 (0.65-0.70)	3.14 (0.63-8.66)	5.28 (0.65-9.60)	5.12 (0.70-12.10)	6.28 (0.65-49.90)	440	1.3
	2,4'-DDE	1.19 (0.60-7.40)	10.40 (0.62-37.03)	10.22 (3.30-20.60)	5.45 (0.60-15.50)	8.67 (0.60-55.50)	410	1.2
	2,4'-DDT	1.28 (1.10-2.80)	1.52 (1.12-5.81)	2.29 (1.10-4.50)	3.38 (1.10-8.40)	2.63 (1.10-10.20)	740	2.2
	4.4'-DDD	0.99 (0.95-1.00)	1.79 (0.984.83)	3.39 (1.00-9.60)	2.85 (1.00-9.80)	1.62 (0.95-7.10)	650	2.0
	4.4'-DDE	5.94 (0.75-20.00)	9.19 (4.96-18.72)	14.27 3.30-21.10)	7.51 (1.80-26.30)	5.93 (0.80-11.90)	530	1.6
	4.4'-DDT	3.85 (0.80-16.00)	3.76 (0.86-4.83)	4.56 (0.85-10.40)	3.18 (0.80-7.60)	1.09 (0.80-3.80)	560	1.7
Dieldrin		6.65 (0.6-16.00)	8.57 (3.32-13.28)	12.58 (0.60-28.20)	7.95 (3.10-15.70)	9.82 (0.60-33.60)	410	1.2
Endrin		0.60 (0.55-0.60)	0.60 (0.59-0.60)	2.01 (0.60-7.50)	3.02 (0.55-7.80)	1.14 (0.55-7.20)	390	1.2
Hexachlorobenzene		39.45 (9.40-130.00)	39.26 (9.80-96.05)	40.39 (4.80-136.00)	39.20 (3.40-105.00)	39.98 (1.05-115.00)	690	2.1
Heptachlor	Heptachlor	1.15 (0.85-4.00)	3.19 (0.88-10.49)	14.02 (0.90-56.40)	9.27 (0.90-22.70)	4.15 (0.85-15.00)	580	1.8
	cis-Heptachlor expoxide	1.14 (1.10-1.15)	1.15 (1.13-1.16)	1.34 (0.50-4.10)	3.84 (1.15-7.90)	3.06 (1.10-21.40)	750	2.3
Pentachlorobenzene		2.14 (1.00-5.40)	6.25 (1.01-21.38)	13.24 （5.30-31.20）	18.09 (1.00-69.00)	9.36 (1.00-34.10)	670	2.0
Mirez		1.71 (0.50-8.90)	2.32 (0.516.34)	2.91 (0.50-6.00)	4.09 （2.30-8.30)	1.43 （0.50-530)	340	1.0
Endosulfan	α-Endosulfan	98.42 (12.00-430.00)	93.07 (10.23-404.48)	57.95 (11.50-134.40)	51.26 （3.60-134.00)	29.77 (0.50-138.00)	340	1.0
	β-Endosulfan	11.39 (0.7-61.00)	6.40 (0.72-20.53)	5.42 (0.70-13.20)	7.35 (0.70-19.00)	4.50 (0.70-19.60)	470	1.4
HCH	α-HCH	1.53 (0.85-4.60)	8.85 (0.88-23.85)	12.01 (6.70-187.20)	10.23 (0.90-21.10)	14.34 (0.85-36.40)	580	1.8
	β-HCH	2.18 (0.60-19.00)	2.25 (0.63-19.99)	33.99 (0.65-115.00)	13.43 (3.10-26.30)	16.73 (0.60-31.30)	420	1.3
	γ-HCH (Lindance)	5.40 (0.65-12.00)	6.62 (0.65-18.14)	13.91 (0.65-22.60)	7.75 (1.90-14.10)	7.68 (0.65-24.20)	430	1.3
	δ-HCH	0.74 (0.70-0.75)	0.73 (0.72-0.74)	3.65 (0.70-11.40)	3.00 (0.70-6.20)	9.20 (0.70-29.10)	480	1.5
PFOA		14.30 (5.80-29.20)	18.20 (7.30-40.10)	16.70 (8.00-32.90)	14.40 (6.30-30.40)	15.70 (7.20-38.10)	800	2.4
PFOS		2.10 (0.50-4.70)	4.80 (0.90-23.00)	4.40 (0.20-14.60)	8.00 (0.90-19.30)	7.00 (0.50-22.80)	100	0.3
Chlordecone		BDL[3]	BDL[3]	BDL[3]	BDL[3]	BDL[3]	200	0.6
Toxaphene	Parlar 26	BDL[3]	BDL[3]	BDL[3]	BDL[3]	BDL[3]	100	0.3
	Parlar 50	BDL[31	BDL[3]	BDL[3]	BDL[3]	BDL[3]	100	0.3
	Parlar 62	BDL[3]	BDL[3]	BDL[3]	BDL[3]	BDL[3]	100	0.3
PBDE	BDE47			879.20 (12.50-4120.00)	738.10 (51.60-3770.00)	3346.68 (12.20-28300.00)	200	0.6
	BDE99			334.50 (3.10-1470.00)	298.00 (17.80-1650.00)	1813.97 (3.05-14300.00)	200	0.6
	BDE153			12.10 (3.00-47.20)	10.80 (3.00-54.30)	81.12 (3.00-582.00)	200	0.6
	BDE154			7.50 (3-25.7)	6.30 (3-29.4)	48.33 (3-342)	200	0.6
	SUIN of BDE 183 &BDE175			6.10 (6.10-6.20)	6.10 (5.90-6.20)	6.04 (5.85-6.20)	400	1.2
HBB	PBB153			3.00 (3.00-3.10)	3.00 (3.00-3.10)	3.02 (2.95-3.10)	200	0.6
HBCD	α-HBCD					3.65 (2.95-6.90)	200	0.6
	β-HBCD					BDL[3]	200	0.6
	γ-HBCD					3.32 (2.95-6.60)	200	0.6

Note:

[1] For POPs concentrations that are lower than the method detection limit (MDL), one half of the MDL is used in calculating the annual averages.

[2] Air sampling volume is assumed to be 330m³.

[3] BDL = all data below method detection limit.

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020）

D.2 Japan

Table D.2–1 Air concentrations of POPs in Japan (pg/m^3)

FY		2013		2014	2015	2016	2017	2018
Season		warm	cold	warm	warm	warm	warm	warm
Total PCBs		130 (24-1,100)	55 (tr (19)-300)	150 (28-1,300)	110 (17-950)	140 (16-1,300)	110 (26-3,300)	100 (20-750)
HBB		-	-	-	nd (nd-1.1)	-	-	-
PBDEs (Br: 4 – 10)	Te-BDE	-	-	0.47 (tr (0.09)-2.3)	tr (0.3) (nd-2.7)	0.4 (nd-28)	0.34 (tr (0.06)-4.1)	0.26 (0.05-3.9)
	Pe-BDE	-	-	tr (0.14) (nd-0.80)	nd (nd-0.9)	nd (nd-28)	0.10 (nd-3.4)	nd (nd-4.1)
	Hx-BDE	-	-	nd (nd-0.4)	nd (nd-2.0)	nd (nd-2.7)	nd (nd-2.1)	nd (nd-1.5)
	Hp-BDE	-	-	nd (tr (0.4)-nd)	nd (nd-tr (0.6))	nd (nd-1.3)	nd (nd-3.2)	nd (nd-1.3)
	Oc-BDE	-	-	tr (0.10) (nd-0.7)	nd (nd-3.8)	nd (nd-1.6)	0.23 (nd-5.7)	0.14 (nd-1.3)
	No-BDE	-	-	nd (nd-tr (3))	nd (nd-12)	tr (0.9) (nd-11)	0.8 (nd-40)	0.7 (nd-3.0)
	De-BDE	-	-	tr (5.0) (nd-64)	4.3 (nd-61)	5 (nd-86)	4.4 (nd-140)	3.4 (nd-19)
PCN (Cl: 1-8)	Total	-	-	130 (5.4-1,600)	-	130 (9.0-660)	120 (7-920)	110 (5.3-590)
	Mo-CN			75 (2.3-980)		73 (4.5-520)	72 (3.1-720)	71 (2.9-450)
	Di-CN	-	-	25 (tr (1.0)-240)	-	22 (2.3-160)	18 (1.9-180)	18 (1.2-190)
	Tr-CN	-	-	11 (1.1-350)	-	8.3 (0.70-39)	7.3 (1.2-150)	6.1 (0.68-34)
	Te-CN	-	-	14 (0.7-1,000)	-	12 (0.3-42)	6.8 (0.54-120)	6.6 (0.40-33)
	Pe-CN	-	-	2.1 (0.06-50)	-	2.3 (nd-7.7)	1.4 (0.05-14)	1.3 (0.04-11)
	Hx-CN	-	-	0.23 (nd-0.99)	-	0.17 (nd-1.2)	0.12 (0.01-1.2)	0.12 (nd-2.5)
	Hp-Cn	-	-	tr (0.025) (nd-0.19)	-	nd (nd-0.11)	nd (nd-0.1)	tr (0.019) (nd-0.065)
	Oc-CN	-	-	nd (nd-0.39)	-	nd (nd-0.36)	tr (0.01) (nd-0.15)	nd (nd-0.12)

nd: not detected
tr (): concentrations between MDL and MQL
Values are median, and ones in parenthesis are the range.
Reference: Ministry of the Environment, Japan. “Chemicals in Environment.” (http://www.env.go.jp/chemi/kurohon/en/; (Access on May 2020))

Table D.2–2 Concentrations of POPs in ambient air in Hedo, Japan in 2014 (pg/m^3)

Chemicals	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total PCBs	35	46	71	83	90	96	37	22	27
Te-BDE	(0.1)	0.5	0.5	0.5	0.6	0.6	4.6	0.4	(0.2)
Pe-BDE	nd	(0.14)	(0.15)	(0.17)	0.18	0.21	3.2	0.24	(0.15)
Hx-BDE	nd	nd	nd	nd	nd	nd	nd	nd	(0.3)
Hp-BDE	nd	nd	nd	nd	nd	nd	nd	nd	(0.1)
Oc-BDE	nd	nd	nd	(0.2)	nd	nd	nd	(0.1)	(0.3)
No-BDE	nd	nd	(0.5)	1.7	(0.5)	(0.7)	nd	nd	(0.4)
De-BDE	nd	nd	(4)	11	nd	(7)	nd	nd	nd

nd.: not detected.
Values in parenthesis: concentrations between MDL and MQL.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2014.

Table D.2–3 Concentrations of POPs in ambient air in Hedo, Japan in 2015 (pg/m^3)

Chemicals	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total PCBs	31	29	31	35	39	50	38	34	54	46	48	33
Te-BDE	(0.2)	(0.2)	(0.2)	0.4	0.3	0.5	0.6	0.6	1.3	(0.2)	0.5	0.3
Pe-BDE	(0.12)	(0.12)	(0.08)	(0.14)	(0.12)	0.19	(0.17)	0.26	0.39	(0.08)	0.20	(0.15)
Hx-BDE	(0.2)	(0.2)	nd	nd	nd	nd	nd	nd	nd	nd	nd	(0.1)
Hp-BDE	(0.1)	(0.2)	(0.1)	nd	nd	nd	nd	nd	nd	nd	nd	(0.1)
Oc-BDE	(0.3)	(0.3)	(0.1)	nd	(0.1)	nd	nd	nd	nd	nd	nd	(0.2)
No-BDE	(0.4)	(0.4)	nd	(0.5)	nd	nd	nd	nd	nd	nd	nd	(0.8)
De-BDE	nd	(3)	nd	(7)	nd	nd	nd	nd	nd	nd	nd	nd

nd : not detected.
Values in parenthesis: concentrations between MDL and MQL.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2015.

Table D.2–4 Concentrations of POPs in ambient air in Hedo, Japan in 2016 (pg/m^3)

Chemicals	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total PCBs	38	21	23	52	45	74	58	130	63	52	38	31
Te-BDE	(0.2)	(0.2)	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	(0.1)	(0.3)
Pe-BDE	(0.07)	(0.10)	(0.11)	0.24	(0.17)	0.23	0.41	0.19	0.22	0.46	(0.08)	(0.15)
Hx-BDE	nd	nd	nd	nd	nd	(0.1)	nd	nd	nd	nd	nd	(0.1)
Hp-BDE	nd	nd	nd	nd	nd	0.5	nd	nd	nd	nd	nd	(0.1)
Oc-BDE	nd	nd	nd	nd	nd	0.5	nd	nd	nd	nd	nd	(0.1)
No-BDE	nd	nd	nd	(0.5)	nd	nd	nd	nd	nd	nd	nd	(1.0)
De-BDE	nd	nd	nd	(6)	nd	nd	nd	nd	nd	nd	nd	(7)
PCN (1Cl)	-	-	-	8.3	5.8	6.7	5.7	28	11	7.3	11	8.9
PCN (2Cl)	-	-	-	2.9	1.9	2.1	1.3	5.5	2.7	3.6	3.8	2.7
PCN (3Cl)	-	-	-	1.5	1.5	2.2	1.6	5.0	1.9	1.5	1.8	1.1
PCN (4Cl)	-	-	-	1.4	1.1	2.	1.6	4.4	2.1	1.2	0.96	0.73
PCN (5Cl)	-	-	-	0.13	0.13	0.16	0.11	0.34	0.16	0.10	0.12	0.10
PCN (6Cl)	-	-	-	(0.02)	(0.02)	(0.02)	nd	0.05	nd	nd	0.04	(0.03)
PCN (7Cl)	-	-	-	nd	nd	nd	nd	nd	nd	nd	nd	(0.02)
PCN (8Cl)	-	-	-	nd	nd	nd	nd	nd	nd	nd	nd	(0.02)

nd : not detected.
Values in parenthesis: concentrations between MDL and MQL.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2016.

Table D.2–5 Concentrations of POPs in ambient air in Hedo, Japan in 2017 (pg/m^3)

Chemicals	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total PCBs	27	55	46	79	48	75	91	63	83	62	62	55
Te-BDE	0.3	0.3	0.3	0.38	0.61	0.44	0.58	0.36	0.67	0.36	(0.17)	0.27
Pe-BDE	0.25	(0.10)	(0.10)	(0.16)	0.79	0.25	0.33	0.19	0.34	0.21	nd	(0.16)
Hx-BDE	nd	nd	(0.2)	nd	nd	nd	nd	nd	nd	nd	nd	nd
Hp-BDE	nd	nd	(0.2)	(0.1)	nd	nd	nd	nd	nd	nd	nd	nd
Oc-BDE	nd	(0.1)	0.3	(0.2)	(0.1)	nd	nd	nd	nd	nd	nd	nd
No-BDE	(0.4)	1.2	1.2	(0.4)	nd	nd	nd	nd	nd	nd	nd	nd
De-BDE	(6)	13	11	nd	(4)	nd	nd	nd	nd	nd	nd	nd
PCN (1Cl)	8.5	14	7.5	10	4.9	6.7	6.0	6.7	12	6.6	9.5	10
PCN (2Cl)	2.4	5.1	3.3	4.3	2.1	3.5	3.5	2.9	4.5	2.6	2.9	3.2
PCN (3Cl)	1.3	1.8	1.3	2.2	1.2	2.0	2.3	1.8	2.1	1.7	1.2	1.4
PCN (4Cl)	0.80	1.3	1.0	2.0	0.99	2.0	2.2	1.8	2.3	1.7	1.1	1.1
PCN (5Cl)	0.11	0.23	0.23	0.31	0.13	0.22	0.22	0.25	0.31	0.21	0.24	0.31
PCN (6Cl)	(0.03)	0.07	0.09	0.07	(0.02)	(0.03)	(0.02)	nd	(0.02)	(0.02)	(0.03)	0.06
PCN (7Cl)	nd	(0.02)	0.06	(0.02)	nd	nd	nd	nd	nd	nd	nd	(0.02)
PCN (8Cl)	nd	(0.02)	0.08	0.04	(0.02)	(0.02)	nd	nd	nd	nd	nd	(0.01)

nd : not detected.
Values in parenthesis: concentrations between MDL and MQL.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2017.

Table D.2–6 Concentrations of POPs in ambient air in Hedo, Japan in 2018 (pg/m^3)

Chemicals	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total PCBs	37	19	27	48	93	90	48	67	73	37	48	57
Te-BDE	0.27	(0.17)	0.28	(0.2)	0.7	0.6	0.5	0.4	0.5	(0.2)	(0.2)	0.3
Pe-BDE	(0.10)	nd	(0.11)	(0.07)	0.26	0.38	0.35	0.29	0.26	(0.12)	(0.08)	(0.15)
Hx-BDE	nd	(0.1)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Hp-BDE	nd	(0.1)	nd	nd	(0.1)	(0.1)	nd	nd	nd	(0.1)	(0.1)	nd
Oc-BDE	nd	(0.1)	nd	(0.1)	(0.1)	(0.1)	nd	(0.1)	(0.1)	(0.1)	(0.1)	nd
No-BDE	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
De-BDE	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PCN (1Cl)	6.6	8.7	9.3	5.9	4.6	5.4	7.4	9.2	10	5.4	5.0	8.3
PCN (2Cl)	2.7	2.3	2.5	2.1	2.9	3.1	2.8	3.0	3.2	2.0	2.3	3.6
PCN (3Cl)	1.4	0.74	1.3	0.93	1.4	1.2	0.83	1.3	1.5	0.97	1.6	1.4
PCN (4Cl)	1.3	0.47	0.63	0.70	1.6	1.4	1.2	1.4	1.8	0.97	1.6	2.2
PCN (5Cl)	0.34	0.12	0.13	0.12	0.23	0.18	0.20	0.24	0.23	0.13	0.19	0.33
PCN (6Cl)	0.07	(0.03)	(0.02)	(0.02)	0.05	nd	nd	nd	(0.03)	(0.02)	nd	(0.04)
PCN (7Cl)	(0.02)	nd	nd	nd	nd	-	-	-	nd	nd	-	nd
PCN (8Cl)	(0.01)	(0.01)	(0.01)	nd	nd	-	-	nd	nd	nd	-	nd

nd : not detected.
Values in parenthesis: concentrations between MDL and MQL.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2018.

Table D.2–7 Concentrations of POPs in ambient air in Hedo, Japan in 2019 (pg/m^3)

Chemicals	Jan.	Feb.	Mar.
Total PCBs	26	36	29
Te-BDE	(0.2)	(0.2)	0.3
Pe-BDE	(0.12)	(0.12)	(0.15)
Hx-BDE	nd	nd	nd
Hp-BDE	(0.1)	nd	(0.1)
Oc-BDE	(0.1)	nd	(0.1)
No-BDE	nd	nd	nd
De-BDE	nd	nd	nd
PCN (1Cl)	15	7.2	6.1
PCN (2Cl)	2.7	2.3	2.2
PCN (3Cl)	1.2	1.2	1.0
PCN (4Cl)	0.67	0.83	0.67
PCN (5Cl)	0.14	0.15	0.11
PCN (6Cl)	(0.03)	(0.03)	(0.03)
PCN (7Cl)	(0.02)	nd	nd
PCN (8Cl)	(0.02)	-	nd

nd: not detected.
Values in parenthesis: concentrations between MDL and MQL.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2018.

Table D.2–8 Concentrations of POPs in ambient air in Fukue (Goto Islands), Japan in 2014 (pg/m^3)

Chemicals	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total PCBs	37	35	35	52	41	43	49	23	26
Te-BDE	0.3	(0.1)	1.5	1.3	0.6	0.7	0.4	0.3	(0.2)
Pe-BDE	(0.10)	nd	0.85	0.63	0.25	0.24	(0.13)	nd	(0.09)
Hx-BDE	nd	nd	nd	nd	nd	nd	nd	nd	nd
Hp-BDE	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Oc-BDE	(0.2)	(0.3)	(0.1)	0.4	(0.1)	(0.2)	(0.2)	(0.2)	0.4
No-BDE	nd	nd	nd	(0.6)	nd	2.4	(0.4)	(0.6)	0.9
De-BDE	nd	10	11	8	nd	nd	9	tr (5)	8

nd: not detected.
Values in parenthesis: concentrations between MDL and MQL.
From April to September, the value is a concentration of one specific day. From October to December, the value is a mean concentration for 3 consecutive days.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2014.

Table D.2–9 Concentrations of POPs in ambient air in Fukue (Goto Islands), Japan in 2015 (pg/m^3)

Chemicals	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total PCBs	30	30	42	40	49	40	44	64	58	66	50	24
Te-BDE	0.3	(0.2)	0.3	0.8	1.0	0.7	0.8	0.7	0.5	0.3	(0.2)	(0.1)
Pe-BDE	(0.13)	(0.09)	(0.10)	0.19	0.51	0.31	0.42	0.33	0.21	(0.07)	(0.10)	nd
Hx-BDE	nd	nd	nd	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	nd	nd	(0.1)
Hp-BDE	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	nd	nd	(0.1)
Oc-BDE	0.6	(0.2)	(0.2)	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	0.3	nd	0.3
No-BDE	1.0	nd	nd	(0.5)	(0.7)	nd	nd	nd	nd	(0.7)	nd	nd
De-BDE	nd	nd	(3)	(4)	nd	nd	nd	nd	nd	nd	nd	nd

nd: not detected.
Values in parenthesis: concentrations between MDL and MQL.
From April to September, the value is a concentration of one specific day. From October to December, the value is a mean concentration for 3 consecutive days.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2015.

Table D.2–10 Concentrations of POPs in ambient air in Fukue (Goto Islands), Japan in 2016 (pg/m^3)

Chemicals	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total PCBs	23	24	29	35	60	59	73	110	62	95	50	22
Te-BDE	(0.2)	(0.2)	(0.2)	0.5	1.1	1.0	0.8	0.7	0.5	0.3	0.3	0.3
Pe-BDE	(0.12)	nd	(0.10)	0.22	0.77	0.62	0.89	0.44	0.48	nd	(0.12)	nd
Hx-BDE	(0.2)	(0.1)	nd	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	nd	(0.1)	(0.1)
Hp-BDE	(0.1)	nd	nd	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	nd	(0.1)	(0.1)
Oc-BDE	0.4	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.2)
No-BDE	(1.0)	nd	(0.5)	(0.5)	(0.5)	(0.9)	nd	nd	nd	(0.7)	(0.6)	(0.6)
De-BDE	(8)	nd	(7)	nd	10	11	(8)	nd	nd	(9)	(5)	(8)
PCN (1Cl)	-	-	-	7.7	7.6	12	15	15	11	8.6	14	20
PCN (2Cl)	-	-	-	2.9	2.8	3.2	3.0	4.0	3.4	2.6	3.4	2.8
PCN (3Cl)	-	-	-	1.7	1.7	2.3	1.5	2.4	1.6	1.6	1.2	0.88
PCN (4Cl)	-	-	-	0.79	1.2	1.3	1.5	2.2	1.4	1.2	0.85	0.57
PCN (5Cl)	-	-	-	0.13	0.14	0.17	0.16	0.20	0.12	0.16	0.15	0.13
PCN (6Cl)	-	-	-	0.04	0.04	0.04	(0.03)	(0.03)	(0.02)	0.04	0.05	(0.03)
PCN (7Cl)	-	-	-	nd	nd	nd	nd	nd	nd	(0.02)	(0.02)	(0.02)
PCN (8Cl)	-	-	-	(0.02)	(0.02)	nd	nd	nd	nd	(0.02)	(0.04)	(0.02)

nd: not detected.
Values in parenthesis: concentrations between MDL and MQL.
From April to September, the value is a concentration of one specific day. From October to December, the value is a mean concentration for 3 consecutive days.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2016.

Table D.2–11 Concentrations of POPs in ambient air in Fukue (Goto Islands), Japan in 2017 (pg/m^3)

Chemicals	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total PCBs	27	35	30	-	-	-	-	-	-	62	51	19
Te-BDE	(0.2)	0.6	(0.2)	-	-	-	-	-	-	0.24	0.27	0.24
Pe-BDE	nd	(0.18)	nd	-	-	-	-	-	-	(0.10)	(0.11)	nd
Hx-BDE	(0.1)	nd	nd	-	-	-	-	-	-	nd	(0.1)	nd
Hp-BDE	(0.1)	nd	(0.1)	-	-	-	-	-	-	nd	(0.2)	nd
Oc-BDE	(0.2)	(0.2)	(0.2)	-	-	-	-	-	-	nd	0.3	(0.1)
No-BDE	(0.5)	nd	(0.4)	-	-	-	-	-	-	nd	(0.4)	nd
De-BDE	nd	nd	nd	-	-	-	-	-	-	nd	nd	nd
PCN (1Cl)	24	9.9	9.4	-	-	-	-	-	-	30	15	25
PCN (2Cl)	3.6	2.8	2.2	-	-	-	-	-	-	8.8	3.8	2.9
PCN (3Cl)	1.2	1.1	0.90	-	-	-	-	-	-	2.5	1.5	0.98
PCN (4Cl)	0.65	0.80	0.73	-	-	-	-	-	-	1.4	1.6	0.97
PCN (5Cl)	0.14	0.18	0.13	-	-	-	-	-	-	0.23	0.44	0.36
PCN (6Cl)	0.05	0.05	0.04	-	-	-	-	-	-	nd	nd	nd
PCN (7Cl)	(0.02)	nd	(0.02)	-	-	-	-	-	-	nd	0.05	(0.02)
PCN (8Cl)	(0.04)	nd	(0.02)	-	-	-	-	-	-	nd	0.05	(0.02)

nd: not detected.
Values in parenthesis: concentrations between MDL and MQL.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2017.

Table D.2–12 Concentrations of POPs in ambient air in Fukue (Goto Islands), Japan in 2018 (pg/m^3)

Chemicals	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total PCBs	30	33	27	-	-	-	-	-	-	49	38	37
Te-BDE	(0.17)	(0.23)	0.68	-	-	-	-	-	-	0.31	(0.16)	(0.18)
Pe-BDE	(0.12)	(0.11)	(0.31)	-	-	-	-	-	-	(0.16)	nd	(0.10)
Hx-BDE	(0.1)	(0.1)	nd	-	-	-	-	-	-	nd	nd	nd
Hp-BDE	(0.2)	(0.1)	nd	-	-	-	-	-	-	(0.1)	nd	0.2
Oc-BDE	0.3	(0.2)	nd	-	-	-	-	-	-	0.3	nd	0.3
No-BDE	(0.5)	(0.5)	nd	-	-	-	-	-	-	(0.5)	nd	(0.4)
De-BDE	nd	nd	nd	-	-	-	-	-	-	nd	nd	(4)
PCN (1Cl)	25	13	6.6	-	-	-	-	-	-	11	13	22
PCN (2Cl)	4.2	3.0	2.0	-	-	-	-	-	-	2.8	3.3	4.0
PCN (3Cl)	1.8	1.9	0.99	-	-	-	-	-	-	1.3	1.2	1.6
PCN (4Cl)	1.3	1.5	0.65	-	-	-	-	-	-	1.2	1.1	1.6
PCN (5Cl)	0.41	0.32	0.12	-	-	-	-	-	-	0.28	0.19	0.31
PCN (6Cl)	nd	nd	nd	-	-	-	-	-	-	nd	nd	nd
PCN (7Cl)	0.05	(0.03)	nd	-	-	-	-	-	-	(0.03)	nd	0.04
PCN (8Cl)	0.06	(0.03)	nd	-	-	-	-	-	-	0.04	0.04	0.06

nd: not detected.
Values in parenthesis: concentrations between MDL and MQL.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2018.

Table D.2–13 Concentrations of POPs in ambient air in Fukue (Goto Islands), Japan in 2019 (pg/m^3)

Chemicals	Jan.	Feb.	Mar.
Total PCBs	24	26	36
Te-BDE	(0.19)	(0.13)	(0.19)
Pe-BDE	(0.07)	(0.08)	(0.07)
Hx-BDE	nd	nd	nd
Hp-BDE	(0.1)	0.2	(0.1)
Oc-BDE	0.2	0.3	0.2
No-BDE	(0.4)	(0.5)	(0.4)
De-BDE	(4)	nd	(3)
PCN (1Cl)	37	19	8.3
PCN (2Cl)	3.1	3.6	2.8
PCN (3Cl)	0.90	0.97	1.0
PCN (4Cl)	0.53	0.63	0.73
PCN (5Cl)	0.16	0.16	0.21
PCN (6Cl)	nd	nd	nd
PCN (7Cl)	(0.03)	(0.02)	(0.03)
PCN (8Cl)	(0.03)	(0.02)	0.04

nd: not detected.
Values in parenthesis: concentrations between MDL and MQL.
Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2018.

D.3 Cambodia

Table D.3–1 Concentrations of PCBs in ambient air in Cambodia on 8 - 11 December 2015

Chemicals	Concentration (pg/m3)
Mo-CBs	24
Di-CBs	130
Tri-CBs	31
Te-CBs	46
Pe-CBs	64
Hx-CBs	25
Hp-CBs	4.4
Oc-CBs	0.22
No--CBs	N.D.
De-CB	0.05
Total PCBs	320

N.D.: not detected.

Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2015.

D.4 Lao People’s Democratic Republic

Table D.4–1 Concentrations of PCBs in ambient air in Lao People's Democratic Republic 30 October – 2 November 2017

Chemicals	Concentration(pg/m3)
Mo-CBs	94
Di-CBs	110
Tri-CBs	24
Te-CBs	37
Pe-CBs	90
Hx-CBs	49
Hp-CBs	6.6
Oc-CBs	1.0
No--CBs	0.15
De-CB	0.05
Total PCBs	410

N.D.: not detected.

Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2017.

D.5 Malaysia

Table D.5–1 Concentrations of PCBs in ambient air in Malaysia on 14 - 16 March 2017

Chemicals	Concentration (pg/m3)
Mo-CBs	24
Di-CBs	69
Tri-CBs	9.4
Te-CBs	8.3
Pe-CBs	2.5
Hx-CBs	0.91
Hp-CBs	0.16
Oc-CBs	N.D.
No--CBs	N.D.
De-CB	0.04
Total PCBs	110

N.D.: not detected.

Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2017.

D.6 Thailand

Table D.6–1 Concentrations of PCBs in ambient air in Thailand on 18 - 21 November 2014

Chemicals	Concentration(pg/m3)
Mo-CBs	10
Di-CBs	21
Tri-CBs	8.2
Te-CBs	5.6
Pe-CBs	2.4
Hx-CBs	1.1
Hp-CBs	0.64
Oc-CBs	0.05
No--CBs	N.D.
De-CB	0.05
Total PCBs	49

N.D.: not detected.

Reference: POPs Monitoring Project in East Asian Countries, Background Air Monitoring of Persistent Organic Pollutants in East Asian Countries 2014.

Annex E

Detail information on human milk concentration in the region

E1. China

Table E1-1 Concentrations of pesticide POPs (ng/g l.w.) in human milk from Macao SAR

Compounds	Concentrations (ng/g l.w.)	Compounds	Concentrations (ng/g l.w.)
α -HCH	N.D.	dieldrin	N.D.
β -HCH	116.1	endrin	N.D.
γ -HCH	N.D.	alpha- endosulfan	N.D.
δ -HCH	N.D.	beta- endosulfan	N.D.
heptachlor	N.D.	Endosulfan sulfate	0.4
trans-heptachlor epoxy	N.D.	*o,p'*-DDE	0.8
cis-heptachlor epoxy	2.6	*p,p'*-DDE	394.5
Oxygen chlordane	N.D.	*o,p'*-DDD	N.D.
cis-chlordane	0.1	*p,p'*-DDD	1.9
trans-chlordane	N.D.	*o,p'*-DDT	2.3
cis-nonachlor	0.6	*p,p'*-DDT	24.3
trans-nonachlor	4.3	PeCB	0.1
aldrin	N.D.	HCB	18.4

ND: below the detect limitation.

Table E1-2 Concentrations of indicator PCBs and PBDEs (ng/g l.w.) in human milk from Macao SAR

indicator PCBs	Concentrations (ng/g l.w.)	PBDE congeners	Concentrations (ng/g l.w.)
PCB28	0.8	BDE28	0.33
PCB52	0.1	BDE47	1.30
PCB101	0.2	BDE99	0.12
PCB138	4.0	BDE100	0.29
PCB153	7.0	BDE153	1.59
PCB180	2.8	BDE154	0.08
$\sum_6$PCBs	14.9	BDE183	0.20
		$\sum_7$PBDEs	3.89

Table E1-3 Concentrations of PCDD/PCDFs and *dl*-PCBs (pg/g l.w.) in human milk from Macao SAR

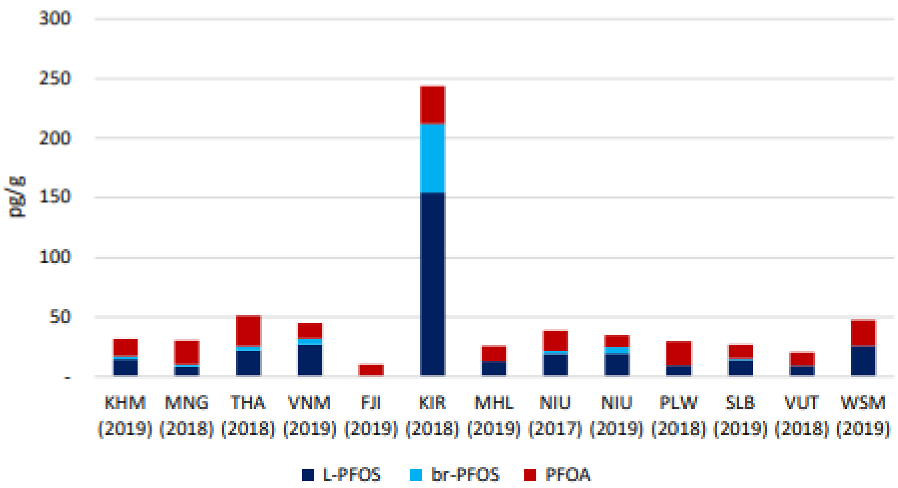
PCDD/PCDFs	**pg /g lipid**	***dl*-PCBs**	**pg/g lipid**
2,3,7,8-TCDD	0.71	PCB-77	2.9
1,2,3,7,8-PeCDD	1.85	PCB-126	20.9
1,2,3,4,7,8-HxCDD	1.02	PCB-169	13.5
1,2,3,6,7,8-HxCDD	2.97	PCB-81	4.5
1,2,3,7,8,9-HxCDD	0.78	PCB-105	738.9
1,2,3,4,6,7,8-HpCDD	7.12	PCB-114	130.6
OCDD	61.55	PCB-118	2,109
2,3,7,8-TCDF	0.68	PCB-123	44.9
1,2,3,7,8-PeCDF	0.63	PCB-156	686.4
2,3,4,7,8-PeCDF	4.61	PCB-157	157.3
1,2,3,4,7,8-HxCDF	1.81	PCB-167	231.2
1,2,3,6,7,8-HxCDF	1.73	PCB-189	71.3

2,3,4,6,7,8-HxCDF	0.90		
1,2,3,7,8,9-HxCDF	0.10		
1,2,3,4,6,7,8-HpCDF	1.47	$TEQ_{PCDD/Fs-TEF2005}$	5.1 pg TEQ/g lipid
1,2,3,4,7,8,9-HpCDF	0.09	$TEQ_{\mathit{dl}\text{-}PCBs-TEF2005}$	2.7 pg TEQ/g lipid
OCDF	0.54	Total $TEQ_{TEF2005}$	7.8 pg TEQ/g lipid

Table E-2 Concentrations of PFAS in human milk from Pacific Islands in 2017-2019

Concentration pg/g	L-PFOS	br-PFOS	ΣPFOS	PFOA	PFHxS
Asia-Pacific Average	**28.0**	**10.1**	**34.7**	**16.9**	**59.2**
FJI (2019)	<6.2	<1.2	<6.2	10.2	<5.5
KHM (2019)	14.6	2.60	17.2	14.6	<5.5
KIR (2018)	154.1	57.8	212	31.8	111
MHL (2019)	12.9	<1.2	12.9	12.9	<5.5
MNG (2018)	8.25	1.92	10.2	20.1	<5.5
PLW (2018)	9.49	<1.2	9.49	20.2	<5.5
SLB (2019)	14.0	1.30	15.3	11.5	<5.5
THA (2018)	21.8	3.72	25.5	25.8	7.32
VNM (2019)	26.8	5.27	32.1	13.0	<5.5
VUT (2018)	9.18	<1.2	9.18	11.2	<5.5
WSM (2019)	26.0	<1.2	26.0	21.5	<5.5
NIU (2017)	19.2	2.4	21.6	17.1	<5.5
NIU (2019)	19.5	5.4	24.9	10.0	<5.5

Reference: Contribution to GMP in the Asia-Pacific Region by expert laboratory., 2020



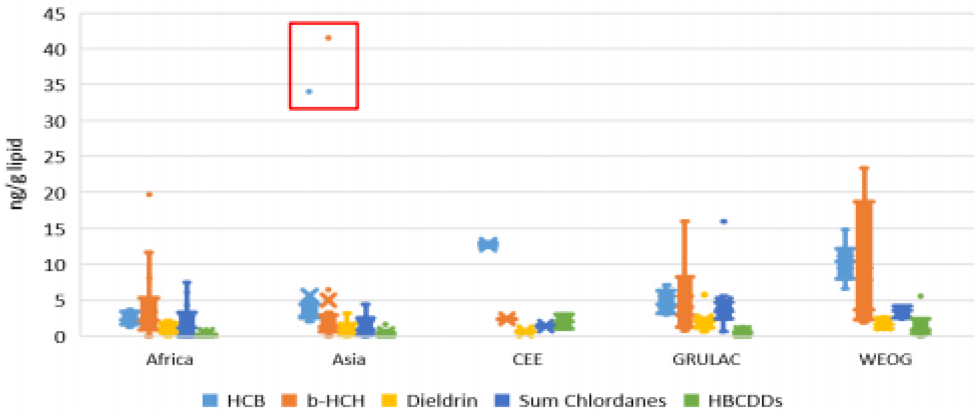
Reference: Contribution to GMP in the Asia-Pacific Region by expert laboratory, 2020

Figure E-1 Concentrations of PFAS in human milk in 2017-2019

Table E-3 Concentrations of OCPs and sum of indicator PCBs in human milk in 2016-2019

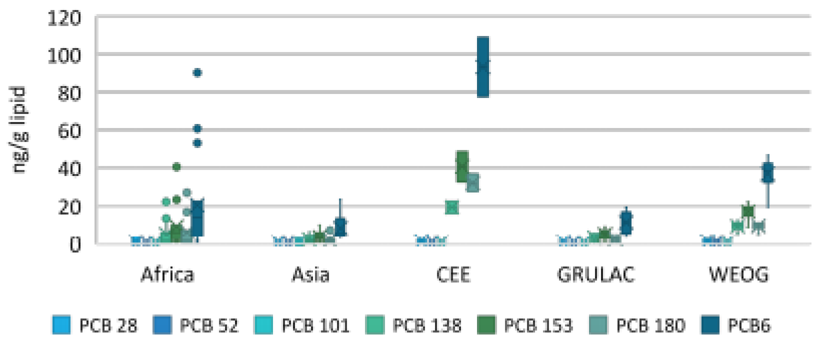
ISO-3	HCB	β-HCH	Dieldrin	Sum Chlordanes	HBCDDs	Sum DDTs	PCB6
KHM	2.48	0.57	nd	-	nd	83.5	3.7
MNG	34.0	41.6	0.50	2.45	0.50	41.0	15.6
THA	2.79	0.77	0.64	4.45	nd	425	3.25
VNM	4.80	3.32	nd	0.58	0.30	151	14.8
FJI	2.65	1.81	1.79	0.60	nd	94.6	4.45
KIR	3.00	1.53	nd	0.95	0.80	76.4	6.00
MHL	2.78	nd	0.82	2.51	0.50	27.7	23.4
NIU	2.30	0.70	3.16	0.91	nd	167	4.52
PLW	4.98	6.48	1.38	3.05	0.20	61.8	8.61
WSM	2.57	0.53	0.91	0.98	1.60	112	5.68
SLB	3.46	1.73	0.87	-	0.40	1,249	2.55
VUT	2.06	1.03	1.83	-	0.30	119	3.61

Reference: Contribution to GMP in the Asia-Pacific Region by expert laboratory., 2020



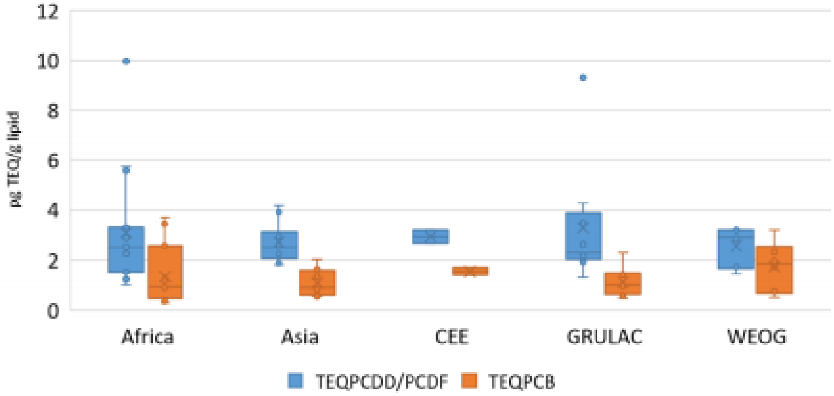
Reference: Contribution to GMP in the Asia-Pacific Region by expert laboratory., 2020

Figure E-2 Concentrations of OCPs in human milk in 2016-2019



Reference: Contribution to GMP in the Asia-Pacific Region by expert laboratory., 2020

Figure E-3 Concentrations of indicator PCBs in human milk in 2016-2019



Reference: Contribution to GMP in the Asia-Pacific Region by expert laboratory., 2020

Figure E-4 Concentrations of PCDD/PCDFs & *dl*-PCBs in human milk in 2016-2019

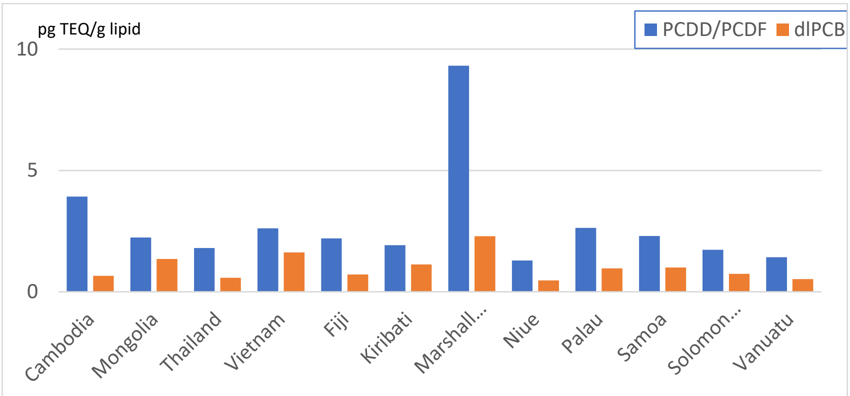
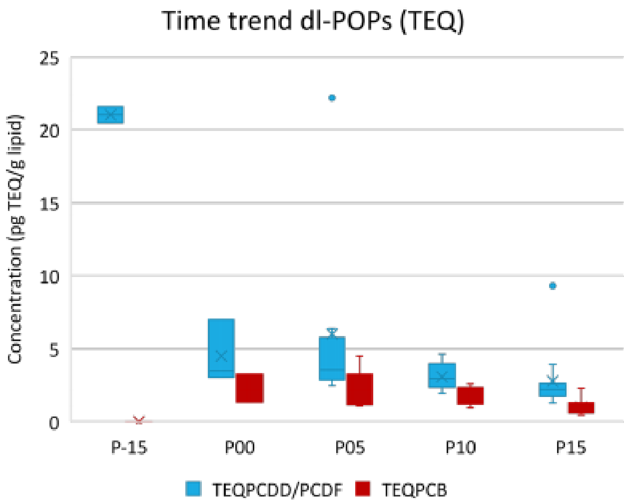


Figure E-5 Concentrations of PCDD/PCDFs & *dl*-PCBs in human milk in 2016-2019 (data from DWH of Stockholm Convention)



Note:
P-15: 1985-1989
P00: 2000-2004 P05: 2005-2009
P10: 2010-2014 P15: 2015-2019

Reference: Contribution to GMP in the Asia-Pacific Region by expert laboratory., 2020

Figure E-6 Time trend of PCDD/PCDFs & *dl*-PCBs in human milk in Asia-Pacific

Annex F
Detail information on human blood concentration in the region

F.1 Japan

Table F.1–1 Human blood concentration of PFHxS in Japan (ng/mL)

Survey Year (FY)		FY 2013	FY 2014	FY 2015	FY 2016
Region/District		2 regions	3 regions	3 regions	3 regions
No. of donor		83	81	77	80
Age	Average	52.4	49.3	49.1	49.1
	Range	26-77	35-64	24-60	32-63
PFHxS	Average	0.63	0.44	0.24	0.31
	SD	0.43	0.24	0.18	0.13
	Median	0.54	0.42	0.22	0.32
	Range	nd-1.8	nd-1.1	nd-0.80	0.071-0.76

Note 1: Calculated as 0 for the data below the quantification limit
Reference: Ministry of the Environment, Japan. “Survey on accumulation and exposure of chemical.” http://www.env.go.jp/chemi/kenkou/monitoring.html (only in Japanese; Accessed on May 2020)

Annex G
Detail information on concentration of PFOS in water in the region

G.1 China

Table G.1–1Concentrations of PFOS in the sea water in 2019（ng/L）

Yellow Sea	Sampling codes				
	YS-01	YS-02	YS-03	YS-04	YS-05
	0.16	0.21	0.22	0.21	0.15
Bohai Sea	Sampling codes				
	BH-01	BH-02	BH-03	BH-04	BH-05
	0.47	0.34	0.51	0.44	0.72

Detection Limit：0.02 ng/L
Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

TableG.1–2Concentrations of PFOS in the lake water in 2019（ng/L）

Qinghai Lake	Sampling codes			Taihu Lake	Sampling codes		
	QH-B	QH-D	QH-E		TH-01	TH-02	TH-02
	ND	ND	ND		13	13	11

Detection Limit：0.02 ng/L
Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

Table G.1–3 PFOS level in marine water of Hong Kong SAR from 2014 to 2018

Station	PFOS (ng/L)		
	2014	2016	2018
DM1	5	<RL	3
DM5	<RL	<RL	2
JM3	<RL	<RL	<RL
MM13	<RL	<RL	6
NM2	<RL	<RL	<RL
SM18	<RL	<RL	2
TM2	<RL	<RL	<RL
TM7	<RL	<RL	<RL
VM12	<RL	<RL	<RL
VM5	<RL	<RL	<RL

<RL: Below reporting limit. The reporting limit for PFOS is 2.0 ng/L.
Reporting limit (RL) means the smallest concentration (or amount) of analyte, that can be reported by a laboratory
Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

Table G.1–4 Annual averages of PFOS level in marine water of Hong Kong SAR from 2014 to 2018

Parameter	Average Concentration in Marine Water (ng/L)			Reporting Limit (ng/L)
	2014	2016	2018	
PFOS	1.4 (<2 – 5)	1 (<2 – <2)	1.9 (<2 – 6)	2

The average levels are calculated using half of the reporting limits when values are below reporting limits.

Reference: The persistent organic pollutants monitoring report for the third effectiveness evaluation under the Stockholm convention People's republic of China. (2020)

Annex H
Detail information on concentration in other media in the region

H.1 Water

Table H.1–1 Water concentrations of POPs in Japan (pg/L)

FY		FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Total PCBs		110 (tr (13)-2600)	120 (16-4800)	160 (34-4200)	120 (tr (7.2)-3100)	79 (nd-2400)	40 (tr (11)-2600)
HCB		11 (tr (4)-260)	9.7 (2.7-200)	13 (4.2-140)	11 (4.2-130)	10 (2.9-180)	11 (4.0-380)
Dieldrin		-	27 (2.7-200)	-	-	-	-
Endrin		-	2.2 (tr (0.4)-25)	-	-	-	-
DDT	*p ,p'* -DDT	-	3.9 (nd-380)	-	-	-	-
	p ,p' -DDE	-	17 (1.9-610)	-	-	-	-
	p ,p' -DDD	-	8.7 (1.0-87)	-	-	-	-
	o ,p' -DDT	-	1.0 (nd-63)	-	-	-	-
	o ,p' -DDE	-	0.6 (nd-560)	-	-	-	-
	o ,p' -DDD	-	3.2 (0.33-38)	-	-	-	-
Chlordane	*cis* -Chlordane	16 (2.9-260)	-	-	-	19 (2-210)	-
	trans -Chlordane	13 (3-200)	-	-	-	15 (tr (2)-150)	-
	Oxychlordane	1.8 (nd-12)	-	-	-	nd (nd-12)	-
	cis -Nonachlor	4.6 (tr (0.7)-74)	-	-	-	4.6 (tr (0.6)-36)	-
	trans -Nonachlor	11 (2.3-170)	-	-	-	14 (tr (2)-120)	-
Heptachlor	Heptachlor	-	tr (0.2) (nd-1.5)	-	-	nd (nd-6)	-
	cis -Heptachloro epoxide	-	3.4 (0.7-56)	-	-	3.5 (nd-83)	-
	trans -Heptachloro epoxide	-	nd (nd-nd)	-	-	nd (nd-nd)	-
Toxaphene	Parlar-26	-	-	-	-	-	nd (nd-5)
	Parlar-50	-	-	-	-	-	nd (nd-tr (2))
	Parlar-62	-	-	-	-	-	nd (nd-nd)
Mirex		-	-	-	-	-	nd (nd-1.0)
HCH	α -HCH	55 (9-1900)	41 (7.3-700)	40 (8.7-610)	36 (5.1-640)	45 (3.7-680)	-
	β -HCH	130 (20-1100)	110 (11-1100)	120 (21-1100)	96 (12-1100)	110 (12-830)	-
	γ -HCH	17 (3.2-560)	18 (3.5-350)	15 (2.6-110)	13 (1.8-130)	16 (2.1-190)	-
	δ -HCH	8.9 (tr (0.6)-320)	6.5 (0.7-590)	7.4 (0.8-310)	6.0 (tr (0.5)-920)	8.2 (tr (0.4)-690)	-
PBDE (Br: 4 – 10)	TeBDE	-	tr (6) (tr (4)-51)	4.1 (tr (1.2)-40)	tr (5) (tr (3)-47)	tr (4) (nd-12)	nd (nd-72)

	PeBDE	-	nd (nd-39)	tr (3.2) (nd-31)	tr (1.3) (nd-36)	tr (1) (nd-8)	nd (nd-110)
	HxBDE	-	nd (nd-8)	nd (nd-12)	nd (nd-9.1)	nd (nd-tr (6))	nd (nd-54)
	HpBDE	-	nd (nd-8)	nd (nd-28)	nd (nd-11)	nd (nd-30)	nd (nd-65)
	OcBDE	-	3.7 (nd-38)	3.1 (nd-36)	7.5 (nd-230)	nd (nd-33)	tr (1) (nd-69)
	NoBDE	-	38 (nd-590)	33 (nd-330)	45 (tr (2)-3900)	26 (nd-460)	12 (nd-170)
	DeBDE	-	230 (tr(14)-5600)	570 (140-13000)	160 (tr (12)-34000)	210 (nd-4100)	110 (12-2700)
PeCBz		10 (tr (3)-170)	7.0 (2.8-180)	11 (3.0-180)	-	5.9 (2.0-140)	9.7 (2.7-320)
Endosulfan	α - Endosulfan	-	-	-	-	-	nd (nd-tr (50))
	β - Endosulfan	-	-	-	-	-	nd (nd-tr (20)
HBCD	α - HBCD	-	nd (nd-1600)	-	-	-	-
	β - HBCD	-	nd (nd-tr (300))	-	-	-	-
	γ - HBCD	-	nd (nd-nd)	-	-	-	-
	δ - HBCD	-	nd (nd-nd)	-	-	-	-
	ε - HBCD	-	nd (nd-nd)	-	-	-	-
PCNs (Cl: 1-8)	PCN (1Cl)	-	-	-	-	-	nd (nd-220)
	PCN (2Cl)	-	-	-	-	-	tr (7) (nd-33)
	PCN (3Cl)	-	-	-	-	-	4.0 (nd-49)
	PCN (4Cl)	-	-	-	-	-	10 (1.3-120)
	PCN (5Cl)	-	-	-	-	-	2.7 (nd-73)
	PCN (6Cl)	-	-	-	-	-	nd (nd-11)
	PCN (7Cl)	-	-	-	-	-	nd (nd-3.2)
	PCN (8Cl)	-	-	-	-	-	nd (nd-tr (0.4))
HCBD		nd (nd-tr (43))	-	-	-	-	-
PCP		-	-	90 (nd-26000)	-	110 (nd-3500)	47 (nd-4400)
PCA		-	-	-	-	tr (8) (nd-1000)	tr (7) (nd-230)
SCCPs (C10-C13)	C10	-	-	-	-	nd (tr(1600)- nd)	nd (nd-1600)
	C11					nd (nd-3100)	nd (nd-3500)
	C12					nd (nd-10000)	nd (nd-3000)
	C13					nd (nd-10000)	nd (nd-11000)
PFHxS		-	-	-	-	-	130 (nd-2600)

nd: not detected.
tr (): concentrations between MDL and MQL
Values are median, and ones in parenthesis are the range.
Reference: Ministry of the Environment, Japan. "Chemicals in Environment." http://www.env.go.jp/chemi/kurohon/en/ (Access on May 2020)

Table H.1–2 Water concentrations of PCDD/PCDFs and *dl*-PCBs in Japan (pg-TEQ/L)

FY	2013	2014	2015	2016	2017
Average	0.19	0.18	0.18	0.18	0.17
Range	0.013-3.2	0.012-2.1	0.011-4.9	0.011-2.4	0.010-1.7
Number of sites	1,537	1,480	1,491	1,459	1,442

Note 1: WHO-TEF (2006) has been used
Note 2: In principle, the toxicity equivalent is calculated by using the value of 1/2 of the detection limit, when the measured value of each isomer is below the detection limit.
Reference: Ministry of the Environment, Japan. Environmental Survey of Dioxins.
https://www.env.go.jp/chemi/dioxin/report.html (Only in Japanese; Access on May 2020)

Table H.1–3 Ground water concentrations of PCDD/PCDFs and *dl*-PCBs in Japan (pg-TEQ/L)

FY	2013	2014	2015	2016	2017
Average	0.26	0.050	0.042	0.055	0.049
Range	0.011-110	0.012-1.0	0.0036-0.88	0.0073-3.7	0.0071-0.7
Number of sites	556	530	515	513	498

Note 1: WHO-TEF (2006) has been used
Note 2: In principle, the toxicity equivalent is calculated by using the value of 1/2 of the detection limit, when the measured value of each isomer is below the detection limit.
Reference: Ministry of the Environment, Japan. Environmental Survey of Dioxins.
https://www.env.go.jp/chemi/dioxin/report.html (Only in Japanese; Access on May 2020)

H.2 Bottom sediment in water

Table H.2–1 Sediment concentrations of initial POPs in Japan (pg/g dry)

FY		FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Total PCBs		8000 (tr (43)-650000)	5500 (tr (35)-440000)	7500 (nd-1100000)	5300 (tr (21)-770000)	6200 (nd-610000)	6500 (nd-720000)
HCB		91 (7.2-6600)	85 (tr (4)-5600)	90 (4-17000)	72 (4-6400)	65 (3-11000)	79 (3.1-8900)
Aldrin		-	-	-	-	-	3.8 (nd-270)
Dieldrin		-	-	-	-	-	33 (nd-860)
Endrin		-	-	-	-	-	5.9 (nd-7500)
DDT	*p, p'* -DDT	-	140 (tr (0.2)-12000)	-	-	-	-
	p, p' -DDE	-	610 (11-64000)	-	-	-	-
	p, p' -DDD	-	410 (4.9-21000)	-	-	-	-
	o, p' -DDT	-	24 (nd-2400)	-	-	-	-
	o, p' -DDE	-	32 (tr (0.5)-41000)	-	-	-	-
	o, p' -DDD	-	85 (tr (0.7)-3200)	-	-	-	-
Chlordane	*cis* -Chlordane	55 (tr (1.9)-5400)	-	-	-	36 (nd-2800)	-
	trans -Chlordane	65 (2.5-5600)	-	-	-	41 (tr (1)-3000)	-
	Oxychlordane	1.3 (nd-54)	-	-	-	tr (1) (nd-78)	-
	cis -Nonachlor	31 (tr (0.6)-3100)	-	-	-	25 (nd-1500)	-
	trans -Nonachlor	54 (2.2-4700)	-	-	-	39 (nd-2600)	-
Heptachlor	Heptachlor	-	tr (0.9) (nd-49)	-	-	1.1 (nd-40)	-
	cis -Heptachloro epoxide	-	1.7 (nd-310)	-	-	1.6 (nd-150)	-
	trans -Heptachloro epoxide	-	nd (nd-3.6)	-	-	nd (nd-nd)	-
Toxaphene	Parlar-26	-	-	-	-	-	nd (nd-nd)
	Parlar-50	-	-	-	-	-	nd (nd-tr (3))
	Parlar-62	-	-	-	-	-	nd (nd-tr (20))
Mirex		-	-	-	-	-	0.9 (nd-240)
HCH	α -HCH	98 (tr (0.6)-3200)	93 (nd-4300)	120 (1.1-9600)	77 (1.1-5000)	86 (1.0-1900)	-
	β -HCH	170 (4.5-6900)	140 (2.9-7200)	170 (2.5-5900)	160 (3.7-6000)	110 (5.7-3400)	-

	γ -HCH	35 (0.9-2100)	30 (nd-2600)	35 (tr (0.3)-2800)	25 (tr (0.7)-3100)	25 (tr (0.4)-1900)	-
	δ -HCH	29 (0.4-2500)	26 (0.4-3900)	28 (tr (0.4)-2900)	24 (nd-6100)	22 (tr (0.2)-1700)	-
HBB (#153, #154, #155, #156, #169)		-	-	nd (nd-15)	-	-	--
PBDEs (Br: 4 – 10)	TeBDE	-	tr (19) (nd-550)	28 (nd-1400)	tr (16) (nd-390)	10 (nd-570)	tr (16) (nd-3100)
	PeBDE	-	14 (nd-570)	20 (nd-1300)	tr (10) (nd-400)	tr (5.5) (nd-560)	24 (nd-2800)
	HxBDE	-	27 (nd-730)	15 (nd-820)	19 (nd-600)	24 (nd-570)	37 (nd-1300)
	HpBDE	-	tr (14) (nd-680)	21 (nd-1800)	17 (nd-1100)	16 (nd-580)	48 (nd-1900)
	OcBDE	-	58 (nd-2000)	tr (44) (nd-1400)	49 (nd-1400)	58 (nd-1900)	140 (nd-5500)
	NoBDE	-	470 (nd-42000)	420 (nd-11000)	390 (nd-26000)	490 (nd-29000)	770 (nd-56000)
	DeBDE	-	5000 (nd-980000)	7200 (40-490000)	5100 (nd-940000)	5700 (tr (27)-580000)	6300 (tr (14)-520000)
PFOS		-	79 (nd-980)	88 (7-2200)	61 (5-690)	-	57 (nd-700)
PFOA		-	50 (tr (6)-190)	48 (8-270)	27 (nd-190)	-	25 (nd-190)
PeCB		98 (2.2-3800)	78 (tr (1.2)-3600)	69 (2.4-2600)	71 (tr (1.1)-3700)	61 (1.3-2800)	77 (1.2-3400)
Endosulfan	α - Endosulfan	-	-	-	-	-	nd (nd-30)
	β - Endosulfan	-	-	-	-	-	nd (nd-41)
HBCD	α - HBCD	-	-	410 (nd-27000)	210 (nd-27000)	-	-
	β - HBCD	-	-	92 (nd-7600)	nd (nd-7400)	-	-
	γ - HBCD	-	-	450 (nd-60000)	190 (nd-50000)	-	-
	δ - HBCD	-	-	nd (nd-nd)	-	-	-
	ε - HBCD	-	-	nd (nd-nd)	-	-	-
PCNs (Cl: 1-8)	PCN (1Cl)	-	-	-	69 (nd-20000)	76 (nd-5500)	78 (nd-4500)
	PCN (2Cl)	-	-	-	68 (nd-24000)	77 (2.3-9000)	71 (nd-9000)
	PCN (3Cl)	-	-	-	150 (tr (0.9)-23000)	150 (tr (1.1)-7400)	140 (1.0-7500)
	PCN (4Cl)	-	-	-	290 (3.4-52000)	250 (5.7-5900)	240 (4.8-5700)
	PCN (5Cl)	-	-	-	140 (nd-28000)	120 (tr (0.5)-3300)	130 (2.2-4600)
	PCN (6Cl)	-	-	-	36 (nd-7000)	28 (nd-2300)	29 (nd-2500)
	PCN (7Cl)	-	-	-	5.7 (nd-860)	5.1 (nd-680)	6.0 (nd-800)
	PCN (8Cl)	-	-	-	1.4 (nd-190)	1.2 (nd-270)	1.7 (nd-230)
HCBD		nd (nd-1600)	-	-	-	-	-

PCP		-	-	-	-	390 (8-7400)	300 (nd-3900)
PCA		-	-	-	-	32 (nd-190)	tr (25) (nd-160)
SCCPs (C10-C13)	C10	-	-	-	-	nd (nd-17000)	nd (nd-7000)
	C11	-	-	-	-	nd (nd-37000)	nd (nd-tr (13000))
	C12	-	-	-	-	nd (nd-44000)	nd (nd-38000)
	C13	-	-	-	-	nd (nd-94000)	nd (nd-36000)
PFHxS		-	-	-	-	-	nd (nd-27)

nd: not detected.
tr (): concentrations between MDL and MQL
Reference: Ministry of the Environment, Japan. "Chemicals in Environment."
http://www.env.go.jp/chemi/kurohon/en/;(Access in May 2020)

Table H.2–2 Sediment concentrations of PCDD/PCDFs and *dl*-PCBs in Japan (pg-TEQ/g)

FY	2013	2014	2015	2016	2017
Average	6.7	6.4	7.1	6.8	6.7
Range	0.056-640	0.068-660	0.059-1,100	0.053-510	0.043-610
Number of sites	1,247	1,197	1,232	1,202	1,205

Note 1: WHO-TEF (2006) has been used
Note 2: In principle, the toxicity equivalent is calculated by using the value of 1/2 of the detection limit, when the measured value of each isomer is below the detection limit.
Reference: Ministry of the Environment, Japan. Environmental Survey of Dioxins.
https://www.env.go.jp/chemi/dioxin/report.html (Only in Japanese; Access on May 2020)

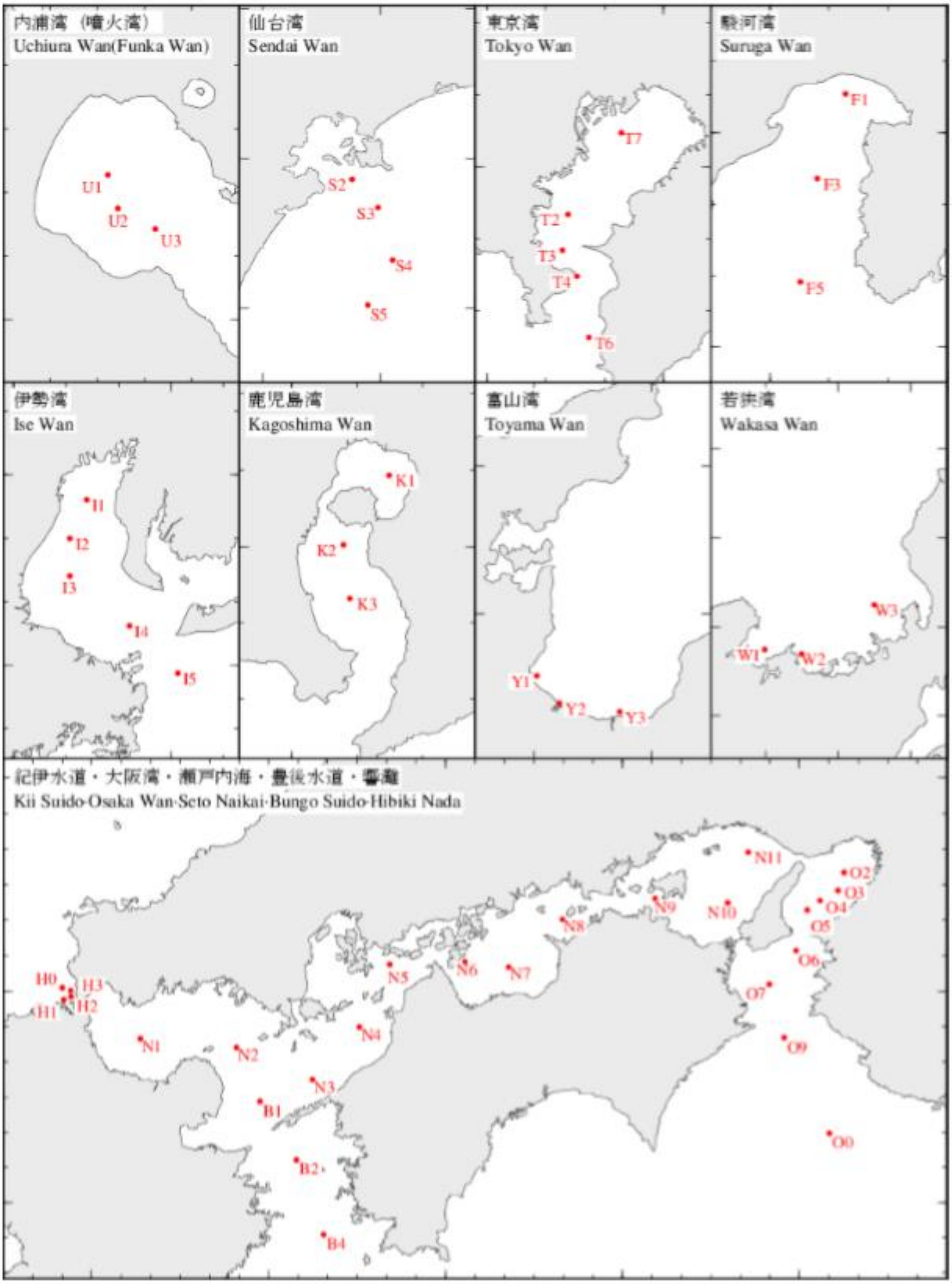


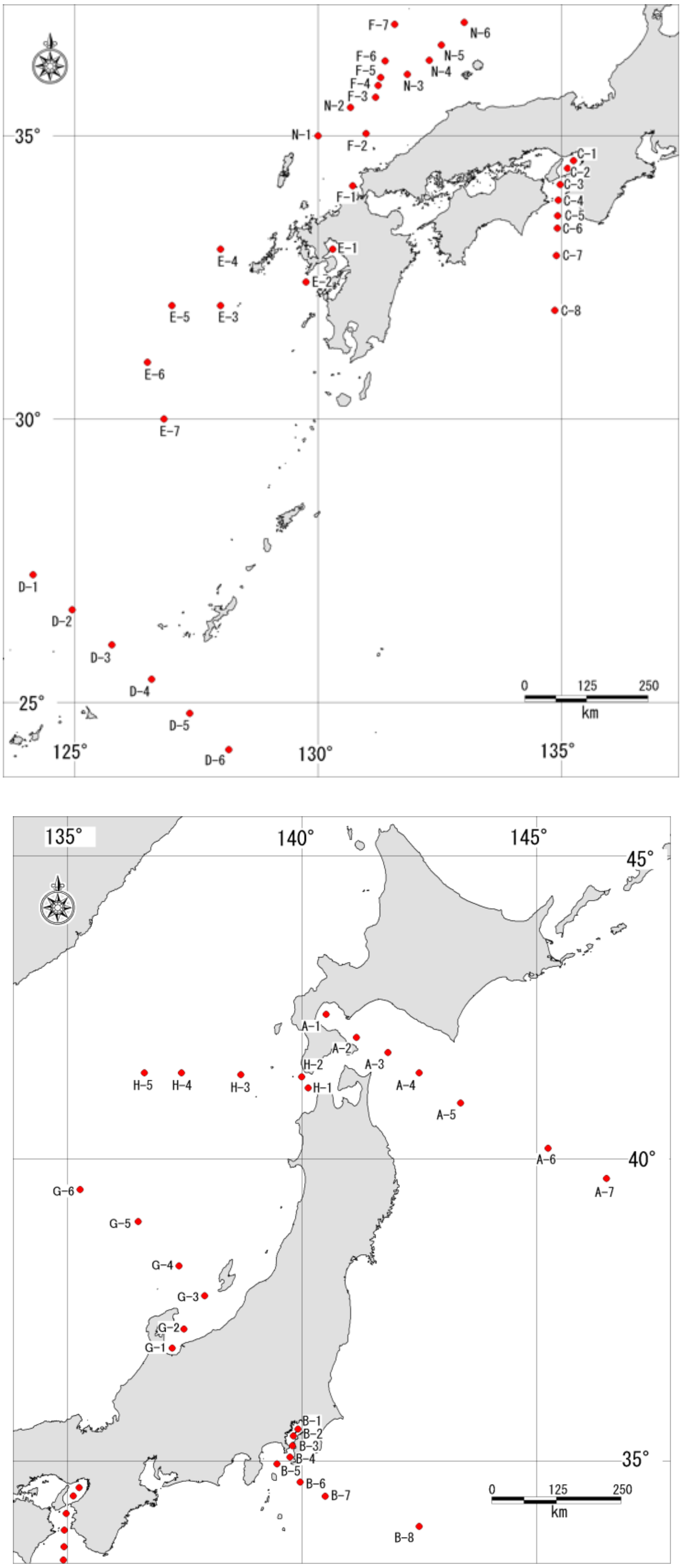
Figure H.2–1 Sampling sites and station numbers for Marine Pollution Survey, Japan

Reference: Hydrographic and Oceanographic Department Japan Coast Guard, Japan. "Marine Pollution Survey." https://www1.kaiho.mlit.go.jp/KANKYO/OSEN/osen.html (Only in Japanese; Access on May 2020)

Table H.2–3 Concentrations of PCBs in surface sediment in the major bays of Japan (FY 2013–2018) (μg/g-dry)

FY		2013	2014	2015	2016	2017	2018
Uchiura Wan	U1	0.0020	0.0032	0.0039	0.0044	0.0050	0.0028
	U2	0.0041	0.0031	0.0014	0.0016	0.0036	0.0013
	U3	0.0039	0.0021	0.0021	0.0033	0.0036	0.0028
Senndai Wan	S2	0.0027	0.0055	0.0025	0.0014	0.0008	0.0010
	S3	0.0033	0.0034	0.0022	0.0033	0.0017	0.0018
	S4	0.0017	0.0007	0.0008	0.0017	0.0016	0.0017
	S5	0.0009	0.0010	0.0013	0.0004	0.0006	0.0009
Tokyo Wan	T7	0.042	0.047	0.040	0.0035	0.036	0.034
	T1	-	-	-	-	-	0.0033
	T2	0.0046	0.0051	0.0024	0.0034	0.0032	0.0041
	T3	0.016	0.015	0.0033	0.0050	0.0033	0.0041
	T4	0.0038	0.0014	0.0014	0.0011	0.0008	0.0013
	T6	0.017	0.0054	0.018	0.0028	0.0081	0.0096
Suruga Wan	F1	0.087	0.021	0.026	0.035	-	-
	F2	0.036	-	-	-	-	-
	F3	0.064	-	0.031	0.097	-	-
	F5	0.064	0.031	0.056	0.040	-	-
Ise Wan	I1	0.011	0.0073	0.012	0.011	0.0089	0.0092
	I2	0.013	0.0098	0.014	0.010	0.012	0.011
	I3	0.015	0.0071	0.0098	0.0076	0.013	0.010
	I4	0.0017	0.0012	0.0013	0.0015	0.0028	0.0012
	I5	0.0005	0.0002	0.0005	0.0002	0.0003	0.0002
Osaka Wan	O1	0.028	0.014	0.040	0.023	-	-
	O2	0.011	0.0084	0.0099	0.0082	0.0086	0.0087
	O3	0.0094	0.0066	0.010	0.0091	0.0083	0.0079
	O4	0.0057	0.0040	0.0067	0.0056	0.0056	0.0071
	O5	0.0034	0.0032	0.0041	0.0042	0.0035	0.026
Kii Suido	O6	0.0030	0.0030	0.0043	0.0023	0.0029	0.0027
	O7	0.0055	0.0038	0.0066	0.0041	0.0049	0.0033
	O9	0.0022	-	0.0015	0.0010	0.0034	0.0022
Hibiki Nada	H1	0.0014	0.0010	0.0023	0.0011	0.0010	0.0023
	H2	0.0079	0.0082	0.0076	0.0051	0.0014	0.016
	H3	0.018	0.013	0.015	0.0038	0.033	0.030

Reference: Hydrographic and Oceanographic Department, Japan Coast Guard. "Marine Pollution Survey." https://www1.kaiho.mlit.go.jp/KANKYO/OSEN/osen.html (Only in Japanese; Access on May 2020)



Reference: Ministry of the Environment, Japan. "Marine Environmental Monitoring Survey."

Figure H.2–2Map of sampling sites for Marine Environmental Monitoring Survey, Japan

Table H.2–4 PCBs concentration in sediment of Japan Marine Environment (ng/g)

	GC-ECD	GC-HRMS
	FY 2015	
A-1	2.3	2.1
A-2	0.89	0.47
A-3	2.1	1.4
A-4	1.1	0.93
A-5	1.4	0.94
	FY 2018	
B-1	-	34
B-2	-	13
B-3	-	0.87
B-4	-	1.3
B-5	-	17
B-6	-	1.9
B-7	-	2.3

	GC-ECD	GC-HRMS
	FY2013	
D-3	1.2	-
D-4	2.5	-
	FY 2016	
H-1	(0.2)	0.037
H-2’	(0.4)	0.27
H-3	1.4	2.2
H-4	1.1	0.61

ND: not detected; -: no sampling
Values in parenthesis: Value above Limit of detection, but below limit of quantitation.
Reference: Ministry of the Environment, Japan. “Marine Environmental Monitoring Survey.”

Table H.2–5 Dioxins concentration in sediment of Japan Marine Environment (pg-TEQ/g(dry))

	PCDD	PCDF	*dl*-PCB
	FY 2015		
A-1	0.72	0.82	0.22
A-2	0.11	0.31	0.048
A-3	1.1	0.98	0.17
A-4	0.79	0.78	0.13
A-5	0.70	0.80	0.15
	FY 2018		
B-1	9200	3800	2700
B-2	2700	1400	850
B-3	230	99	49
B-4	1600	71	110
B-5	1200	310	1500
B-6	670	72	180
B-7	1100	140	190

	PCDD	PCDF	dl-PCB
	FY 2013		
D-3	0.17	0.11	0.033
D-4	0.42	0.0044	0.000069
	FY 2016		
H-1	0.014	0	0.00013
H-2	4.2	4.1	0.54
H-3	0.58	0.55	0.066
H-4	0.56	0.53	0.086

ND: not detected; -: no sampling
TEQs are calculated using TEF-2006
Reference: Ministry of the Environment, Japan. “Marine Environmental Monitoring Survey.”

Table H.2–6 HCHs concentration in sediment of Japan Marine Environment (ng/g (dry))

	α-HCH	β-HCH	γ-HCH	Total
FY 2015				
A-1	0.20	0.17	0.043	0.41
A-2	0.027	0.035	0.0062	0.068
A-3	0.13	0.092	0.033	0.26
A-4	0.079	0.051	0.023	0.15
A-5	0.057	0.033	0.018	0.11
FY2013				
D-3	0.025	0.017	0.008	0.050
D-4	0.002	0.002	0.002	0.006
FY 2016				
H-1	0.0008	0.0015	0.0010	0.0033
H-2’	0.0059	0.015	0.0029	0.024
H-3	0.24	0.21	0.10	0.55
H-4	0.12	0.079	0.059	0.26

ND: not detected; -: no sampling
Value in parenthesis: Value above limit of detection, but below limit of quantitation.
Reference: Ministry of the Environment, Japan. “Marine Environmental Monitoring Survey.”

Table H.2–7 Endosulfans concentration in sediment of Japan Marine Environment (ng/g (dry))

	α-endosulfan	β-endosulfan	Total
FY 2015			
A-1	<0.030	<0.030	ND
A-2	<0.030	<0.030	ND
A-3	<0.030	<0.030	ND
A-4	<0.030	<0.030	ND
A-5	<0.030	<0.030	ND
FY2013			
D-3	0.11	(0.007)	0.187
D-4	(0.062)	<0.030	0.062
FY 2016			
H-1	1.0	<0.030	1.0
H-2	0.93	0.10	1.0
H-3	0.70	<0.030	0.70
H-4	0.56	<0.030	0.56

ND: not detected; -: no sampling
Value in parenthesis: Value above limit of detection, but below limit of quantitation.
Reference: Ministry of the Environment, Japan. “Marine Environmental Monitoring Survey.”

Table H.2–8 PBDEs concentration in sediment of Japan Marine Environment (ng/g (dry))

	FY2015
A-1	0.5
A-2	ND
A-3	1.1
A-4	0.7
A-5	1.1
	FY 2018
B-1	38
B-2	5.7
B-3	ND
B-4	ND
B-5	7.2
B-6	2.7
B-7	4.4
	FY2013
D-3	0.8
D-4	ND

	FY 2014
F-5	39
	FY 2014
H-1	ND
H-2'	6.0
H-3	1.1
H-4	0.6
	FY 2014
N-1	1.0
N-2	0.9
N-3	16
N-4	4.7
N-5	9,1
	FY 2014
Y-6'SW	28
Y-6'	41

ND: not detected; -: no sampling
Value in parenthesis: Value above limit of detection, but below limit of quantitation.
Reference: Ministry of the Environment, Japan. "Marine Environmental Monitoring Survey."

Table H.2–9 HBCDs concentration in sediment of Japan Marine Environment (ng/g (dry))

	α-HBCD	β-HBCD	γ-HBCD	Total
		FY 2015		
A-1	<0.10	<0.10	(0.18)	0.18
A-2	<0.10	<0.10	<0.10	ND
A-3	<0.10	<0.10	(0.10)	0.10
A-4	<0.10	<0.10	(0.11)	0.11
A-5	<0.10	<0.10	<0.10	ND
		FY 2018		
B-1	0.37	< 0.10	(0.30)	0.67
B-2	0.68	(0.15)	(0.12)	0.95
B-3	<0.10	<0.10	<0.10	ND
B-4	<0.10	<0.10	<0.10	ND
B-5	0.47	<0.10	0.42	0.89
B-6	<0.10	<0.10	(0.10)	0.10
B-7	<0.10	<0.10	0.35	0.35
		FY2013		
D-3	< 0.10	< 0.10	< 0.10	ND
D-4	< 0.10	< 0.10	< 0.10	ND

	α-HBCD	β-HBCD	γ-HBCD	Total
		FY 2014		
F-5	50	31	270	350
		FY 2016		
H-1	<0.10	<0.10	<0.10	N.D.
H-2’	<0.10	<0.10	(0.24)	0.24
H-3	(0.32)	(0.14)	3.1	3.6
H-4	<0.10	<0.10	(0.18)	0.18
		FY 2014		
N-1	(0.12)	<0.10	0.51	0.63
N-2	0.82	0.49	3.9	5.2
N-3	20	12	100	140
N-4	4.7	3.3	24	32
N-5	9.1	5.7	45	60
		FY 2014		
Y-6’SW	43	25	210	270
Y-6’	46	30	270	350

ND: not detected
-: no sampling
Value in parenthesis: Value above limit of detection, but below limit of quantitation.
Reference: Ministry of the Environment, Japan. "Marine Environmental Monitoring Survey."

Table H.2–10 PFOS and PFOA concentrations in sediment of Japan Marine Environment (ng/g (dry))

	PFOS	PFOA
	FY2015	
A-1	0.13	0.18
A-2	<0.040	(0.047)
A-3	<0.040	<0.040
A-4	(0.044)	(0.052)
A-5	<0.040	<0.040
	FY 2018	
B-1	0.29	(0.05)
B-2	0.13	<0.04
B-3	<0.04	<0.04
B-4	<0.04	<0.04
B-5	0.23	(0.12)
B-6	<0.04	<0.04
B-7	(0.06)	(0.05)

	PFOS	PFOA
	FY2015	
C-6	<0.040	(0.061)
C-7	(0.043)	<0.040
	FY 2013	
D-3	< 0.040	< 0.040
D-4	< 0.040	< 0.040
	FY 2016	
H-1	(0.059)	0.27
H-2	0.27	0.56
H-3	(0.12)	(0.12)
H-4	<0.040	<0.040

ND: not detected; -: no sampling
Value in parenthesis: Value above limit of detection, but below limit of quantitation.
Reference: Ministry of the Environment, Japan. "Marine Environmental Monitoring Survey."

Table H.2–11 DDTs and Chlordane concentration in sediment of Japan Marine Environment in FY2013 (ng/g(dry))

	DDTs					
	p, p'-DDT	p, p'-DDE	p, p'-DDD	o, p'-DDT	o, p'-DDE	o, p'-DDD
D-1	<5	<5	<5	<5	<5	<5
D-2	<5	<5	<5	<5	<5	<5
D-3	<5	<5	<5	<5	<5	<5
D-4	<5	<5	<5	<5	<5	<5
D-5	<5	<5	<5	<5	<5	<5

	Chlordane				
	trans - Chlordane	*cis* - Chlordane	Oxychlordane	*trans* - Nonachlor	*cis* - Nonachlor
D-1	<10	<10	<10	<10	<10
D-2	<10	<10	<10	<10	<10
D-3	<10	<10	<10	<10	<10
D-4	<10	<10	<10	<10	<10
D-5	<10	<10	<10	<10	<10

Reference: Ministry of the Environment, Japan. "Marine Environmental Monitoring Survey."

H.3 Soil

Table H.3–1 Soil concentrations of PCDD/PCDFs and *dl*-PCBs in Japan (pg-TEQ/g)

FY	2013	2014	2015	2016	2017
Average	3.6	2.3	2.6	3.2	3.4
Range	0-230	0-100	0-100	0-210	0-150
Number of sites	921	872	852	833	835

Note 1: WHO-TEF (2006) has been used

Note 2: In principle, the toxicity equivalent is calculated by using the value of 1/2 of the detection limit, when the measured value of each isomer is below the detection limit.

Reference: Ministry of the Environment, Japan. Environmental Survey of Dioxins. https://www.env.go.jp/chemi/dioxin/report.html (Only in Japanese; Access on May 2020)

H.4 Biota

Table H.4–1 Concentration of initial POPs in seabass in Tokyo Bay, Japan (pg/g wet)

FY		FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Total PCBs		110,000	180,000	160,000	100,000	100,000	100,000
HCB		200	410	340	150	300	68
Aldrin		-	tr (0.8)	-	-	-	-
Dieldrin		-	840	-	-	-	-
Endrin		-	62	-	-	-	-
DDT	*p, p'* -DDT	800	-	-	-	-	840
	p, p' -DDE	16,000	-	-	-	-	13,000
	p, p' -DDD	1,700	-	-	-	-	1,000
	o, p' -DDT	160	-	-	-	-	210
	o, p' -DDE	3,000	-	-	-	-	2,000
	o, p' -DDD	430	-	-	-	-	240
Chlordane	*cis* -Chlordane	1,400	-	-	970	-	-
	trans -Chlordane	460	-	-	330	-	-
	Oxychlordane	170	-	-	150	-	-
	cis -Nonachlor	1,200	-	-	950	-	-
	trans -Nonachlor	2,300	-	-	1,900	-	-
Heptachlor	Heptachlor	tr (1)	-	tr (2.4)	tr (1.2)	-	-
	cis -Heptachloro epoxide	57	-	98	62	-	-
	trans -Heptachloro epoxide	nd	-	7	nd	-	-
Toxaphene	Parlar-26	-	-	61	-	-	tr (8)
	Parlar-50	-	-	46	-	-	17
	Parlar-62	-	-	nd	-	-	nd
Mirex		-	-	-	-	-	21
HCH	α -HCH	320	72	120	81	29	-
	β -HCH	130	200	150	100	110	-
	γ -HCH	81	29	35	43	14	-
	δ -HCH	32	7	14	10	5.3	-
HBB (#153, #154, #155, #156, #169)		-	-	nd	-	-	-
PBDE (Br: 4 – 10)	TeBDE	-	720	580	350	360	440
	PeBDE	-	180	110	81	87	100
	HxBDE	-	240	170	110	130	170
	HpBDE	-	44	tr (8)	28	42	29
	OcBDE	-	58	31	19	38	16
	NoBDE	-	40	35	nd	nd	nd
	DeBDE	-	190	380	nd	nd	nd
PFOS		-	680	1,400	620	1,200	-
PFOA		-	11	11	4	tr (5)	-
PeCB		tr (76)	280	230	64	170	27
Endosulfan	α - Endosulfan	-	nd	nd	-	-	-
	β - Endosulfan	-	nd	tr (11)	-	-	-
HBCD	α - HBCD	-	1,500	1,100	520	590	410
	β - HBCD	-	nd	nd	nd	nd	nd
	γ - HBCD	-	170	160	160	120	44
	δ - HBCD	-	nd	nd	-	-	-
	ε - HBCD	-	nd	nd	-	-	-
PCNs (Cl: 1-8)	PCN (1Cl)	-	-	tr (9)	tr (15)	12	tr (4)
	PCN (2Cl)	-	-	22	27	30	8
	PCN (3Cl)		-	45	46	43	15

	PCN (4Cl)	-	-	160	130	140	61
	PCN (5Cl)	-	-	120	99	110	70
	PCN (6Cl)	-	-	30	24	24	18
	PCN (7Cl)	-	-	nd	nd	tr (1)	nd
	PCN (8Cl)	-	-	nd	nd	nd	nd
HCBD		nd (nd-tr (4.0))	-	-	-	-	-
PCP		-	-	-	120	47	tr (10)
PCA		-	-	-	100	120	21
SCCP (C10-C13)	C10	-	-	-	1,900	1,200	nd
	C11	-	-	-	15,000	18,000	nd
	C12	-	-	-	8,700	8,900	nd
	C13	-	-	-	4,900	3,800	nd
Dicofol		-	-	-	-	-	tr (10)

nd: not detected.
tr (): concentrations between MDL and MQL
Reference: Ministry of the Environment, Japan. "Chemicals in Environment." http://www.env.go.jp/chemi/kurohon/en/(Access on May 2020)

Table H.4–2 Concentration of initial POPs in seabass in Osaka Bay, Japan (pg/g wet)

FY		FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Total PCBs		270,000	230,000	180,000	150,000	140,000	280,000
HCB		220	190	150	110	100	180
Aldrin		-	tr (1.6)	-	-	-	-
Dieldrin		-	1000	-	-	-	-
Endrin		-	58	-	-	-	-
DDT	*p, p'* -DDT	1,300	-	-	-	-	4,800
	p, p' -DDE	10,000	-	-	-	-	16,000
	p, p' -DDD	2,300	-	-	-	-	3,100
	o, p' -DDT	310	-	-	-	-	1,500
	o, p' -DDE	300	-	-	-	-	350
	o, p' -DDD	940	-	-	-	-	1,100
Chlordane	*cis* -Chlordane	5,700	-	-	1,800	-	-
	trans -Chlordane	2,700	-	-	720	-	-
	Oxychlordane	560	-	-	200	-	-
	cis -Nonachlor	3,000	-	-	1,100	-	-
	trans -Nonachlor	7,800	-	-	2,500	-	-
Heptachlor	Heptachlor	12	-	tr (1.8)	tr (1.8)	-	-
	cis -Heptachloro epoxide	190	-	79	55	-	-
	trans -Heptachloro epoxide	nd	-	10	nd	-	-
Toxaphene	Parlar-26	-	-	44	-	-	tr (9)
	Parlar-50	-	-	tr (12)	-	-	18
	Parlar-62	-	-	nd	-	-	nd
Mirex		-	-	-	-	-	6.4
HCH	α -HCH	150	47	26	22	130	-
	β -HCH	420	300	180	110	220	-
	γ -HCH	48	22	12	8	30	-
	δ -HCH	40	10	5.4	5	23	-
HBB (#153, #154, #155, #156, #169)		-	-	nd	-	-	-
PBDE (Br: 4 – 10)	TeBDE	-	500	440	340	280	420
	PeBDE	-	120	110	57	59	100
	HxBDE	-	140	130	110	110	160

	HpBDE	-	40	tr (6)	45	43	58
	OcBDE	-	51	60	55	51	64
	NoBDE	-	tr (10)	nd	nd	nd	nd
	DeBDE	-	nd	nd	nd	nd	nd
PFOS		-	650	380	370	900	-
PFOA		-	tr (8)	tr (9.6)	6	12	-
PeCB		81	62	40	27	32	47
Endosulfan	α - Endosulfan	-	nd	nd	-	-	-
	β - Endosulfan	-	tr (8)	nd	-	-	-
HBCD	α - HBCD	-	1,200	800	350	360	530
	β - HBCD	-	tr (10)	nd	nd	nd	nd
	γ - HBCD	-	300	200	93	94	130
	δ - HBCD	-	nd	nd	-	-	-
	ε - HBCD	-	tr (20)	nd	-	-	-
PCNs (Cl: 1-8)	PCN (1Cl)	-	-	29	32	29	69
	PCN (2Cl)	-	-	17	18	19	44
	PCN (3Cl)	-	-	27	24	33	51
	PCN (4Cl)	-	-	130	76	85	160
	PCN (5Cl)	-	-	100	62	69	150
	PCN (6Cl)	-	-	31	16	19	41
	PCN (7Cl)	-	-	nd	na	nd	tr (1)
	PCN (8Cl)	-	-	nd	nd	nd	nd
HCBD		nd (nd-nd)	-	-	-	-	-
PCP		-	-	-	100	tr (30)	30
PCA		-	-	-	49	59	68
SCCPs (C10-C13)	C10	-	-	-	1,500	1,300	nd
	C11	-	-	-	14,000	18,000	nd
	C12	-	-	-	6,700	8,000	nd
	C13	-	-	-	1,600	2,400	nd
Dicofol		-	-	-	-	-	60
PFHxS		-	-	-	-	-	-

nd: not detected.
tr (): concentrations between MDL and MQL
Reference: Ministry of the Environment, Japan. "Chemicals in Environment." (http://www.env.go.jp/chemi/kurohon/en/; (Access on May 2020))

Table H.4–3 PCBs concentration in biota of Japan Marine Environment

FY			2013	2014	2015		2016		2018
Analytical instruments			GC-ECD	GC-ECD	GC-ECD	GC-HRMS	GC-ECD	GC-HRMS	GC-HRMS
Mussels	molluscous part	Sendai Bay	-	7.0	-	-	5.5	7.2	-
		Tokyo Bay	-	13	-	-	6.0	9.7	-
		Ariake Sea	-	5.4	-	-	4.6	6.6	-
		Toyama Bay	-	7.4	-	-	3.4	3.5	-
Benthic sharks	liver	Sendai Bay	-	-	-	-	-	-	-
		Tokyo Bay	-	1,300	-	-	1,900	3,800	-
		Ariake Sea	-	190	-	-	210	300	-
		Toyama Bay	-	-	-	-	82	110	-
	muscle	Sendai Bay	-	-	-	-	-	-	-
		Tokyo Bay	-	12	-	-	13	19	-
		Ariake Sea	-	3.0	-	-	3.7	4.7	-
		Toyama Bay	-	-	-	-	1.1	0.50	-
Squids	liver	Oyashio Current	27	-	38	32	-	-	70
		Kuroshio Current	44	-	53	37	-	-	35
		East China Sea	62	-	73	75	-	-	83
		Sea of Japan	44	-	49	56	-	-	54
	muscle	Oyashio Current	3.3	-	1.1	0.37	-	-	0.81
		Kuroshio Current	2.8	-	1.1	0.70	-	-	0.43
		East China Sea	3.9	-	1.9	1.1	-	-	0.77
		Sea of Japan	3.4	-	1.7	0.73	-	-	0.71
Cods	liver	Oyashio Current	74	-	260	380	-	-	88
		Sea of Japan	210	-	210	220	-	-	620
	muscle	Oyashio Current	3.5	-	1.7	1.7	-	-	0.34
		Sea of Japan	2.5	-	1.5	1.2	-	-	1.9
Crustacean	muscle	Oyashio Current	-	-	-	-	-	-	-
		Sea of Japan	5.8	-	1.9	2.2	-	-	4.0

unit: ng/g(wet)
ND: not detected
* analyzed edible part including crab innards
Reference: Ministry of the Environment, Japan. “Marine Environmental Monitoring Survey.”

Table H.4–4 Dioxins concentration in biota of Japan Marine Environment

FY				2013	2014	2015	2016	2018
Mussels	molluscous part	Sendai Bay	PCDD	-	0.15	-	0.22	-
			PCDF	-	0.059	-	0.075	-
			dl-PCB	-	0.22	-	0.24	-
		Tokyo Bay	PCDD	-	0.18	-	0.045	-
			PCDF	-	0.17	-	0.075	-
			dl-PCB	-	0.31	-	0.28	-
		Ariake Sea	PCDD	-	0.16	-	0.15	-
			PCDF	-	0.085	-	0.061	-
			dl-PCB	-	0.16	-	0.23	-
		Toyama Bay	PCDD	-	0.18	-	0.035	-
			PCDF	-	0.27	-	0.028	-
			dl-PCB	-	0.48	-	0.15	-
Benthic sharks	liver	Sendai Bay	PCDD	-	-	-	-	-
			PCDF	-	-	-	-	-
			dl-PCB	-	-	-	-	-
		Tokyo Bay	PCDD	-	15	-	13	-
			PCDF	-	7.9	-	8.1	-
			dl-PCB	-	27	-	23	-
		Ariake Sea	PCDD	-	33	-	76	-
			PCDF	-	9.2	-	24	-
			dl-PCB	-	9.5	-	23	-
		Toyama Bay	PCDD	-	-	-	3.9	-
			PCDF	-	-	-	4.1	-
			dl-PCB	-	-	-	4.5	-
	muscle	Sendai Bay	PCDD	-	-	-	-	-
			PCDF	-	-	-	-	-
			dl-PCB	-	-	-	-	-
		Tokyo Bay	PCDD	-	0.12	-	0.041	-
			PCDF	-	0.058	-	0.015	-
			dl-PCB	-	0.13	-	0.038	-
		Ariake Sea	PCDD	-	0.082	-	0.021	-
			PCDF	-	0.026	-	0.0079	-
			dl-PCB	-	0.036	-	0.013	-
		Toyama Bay	PCDD	-	-	-	0.013	-
			PCDF	-	-	-	0.011	-
			dl-PCB	-	-	-	0.0091	-
Squids	liver	Oyashio Current	PCDD	0.73	-	0.55	-	76
			PCDF	1.0	-	0.67	-	130
			dl-PCB	2.0	-	2.3	-	5800
		Kuroshio Current	PCDD	0.94	-	0.67	-	41
			PCDF	0.95	-	0.53	-	11
			dl-PCB	3.2	-	3.1	-	4200
		East China Sea	PCDD	2.2	-	1.7	-	25
			PCDF	3.6	-	2.9	-	57
			dl-PCB	8.1	-	6.3	-	10000
		Sea of Japan	PCDD	2.3	-	1.9	-	80
			PCDF	3.5	-	2.4	-	58
			dl-PCB	6.9	-	6.2	-	6700
	muscle	Oyashio Current	PCDD	0.010	-	0.019	-	0.68
			PCDF	0.0084	-	0.0059	-	1.5
			dl-PCB	0.012	-	0.017	-	76
		Kuroshio Current	PCDD	0.010	-	0.0096	-	0.52
			PCDF	0.0079	-	0.0062	-	0.14
			dl-PCB	0.012	-	0.032	-	55
		East China Sea	PCDD	0.046	-	0.037	-	0.24
			PCDF	0.048	-	0.044	-	0.76
			dl-PCB	0.11	-	0.089	-	120
		Sea of Japan	PCDD	0.048	-	0.018	-	0.62
			PCDF	0.049	-	0.017	-	0.63
			dl-PCB	0.082	-	0.0064	-	100

unit: pg-TEQ/g (wet) ND: not detected
TEQs are calculated using TEF-2006
Reference: Ministry of the Environment, Japan. "Marine Environmental Monitoring Survey."

Table H.4–5 Dioxins concentration in biota of Japan Marine Environment (continue)

FY				2013	2014	2015	2016	2018
Cods	liver	Oyashio Current	PCDD	0.68	-	2.0	-	0.99
			PCDF	1.0	-	3.7	-	7.8
			dl-PCB	8.9	-	29	-	6700
		Sea of Japan	PCDD	2.4	-	1.7	-	15
			PCDF	5.2	-	3.1	-	72
			dl-PCB	31	-	24	-	65000
	muscle	Oyashio Current	PCDD	0.010	-	0.012	-	ND
			PCDF	0.0095	-	0.022	-	0.014
			dl-PCB	0.052	-	0.13	-	43
		Sea of Japan	PCDD	0.025	-	0.011	-	ND
			PCDF	0.042	-	0.020	-	0.19
			dl-PCB	0.23	-	0.12	-	220
Crustacean	muscle	Oyashio Current	PCDD	-	-	-	-	-
			PCDF	-	-	-	-	-
			dl-PCB	-	-	-	-	-
		Sea of Japan	PCDD	027	-	0.13	-	15
			PCDF	0.46	-	0.19	-	37
			dl-PCB	0.61	-	0.26	-	1100

unit: pg-TEQ/g(wet); ND: not detected
TEQs are calculated using TEF-2006
Reference: Ministry of the Environment, Japan. "Marine Environmental Monitoring Survey."

H.5 Food

Table H.5–1 Concentration of PCDD/PCDFs and *dl*-PCBs in food in Japan (pg-TEQ/g)

Survey Year (FY)		2013	2014	2015	2016
No. of Region/District		2 regions	3 regions	3 regions	3 regions
No. of sample		15	15	15	15
PCDD+PCDF	Mean	0.0033	0.0045	0.0037	0.0057
	SD	0.0033	0.0034	0.0017	0.0045
	Median	0.0026	0.0036	0.0036	0.0043
	Range	0.00038-0.011	0.00087-0.013	0.0013-0.0059	0.00081-0.016
dl-PCB	Mean	0.0042	0.0058	0.0051	0.0059
	SD	0.0060	0.0053	0.0039	0.0071
	Median	0.0024	0.0043	0.0036	0.0037
	Range	0.00044-0.023	0.00072-0.021	0.00056-0.013	0.00077-0.028
PCDD+PCDF+*dl*-PCB	Mean	0.0074	0.010	0.0089	0.012
	SD	0.0088	0.0088	0.0054	0.011
	Median	0.0047	0.0074	0.0071	0.0074
	Range	0.00085-0.033	0.0016-0.035	0.0022-0.018	0.0016-0.044

Note: TEQ is calculated with WHO TEF 2006.
Reference: Ministry of the Environment, Japan. "Survey on accumulation and exposure of chemicals"
http://www.env.go.jp/chemi/kenkou/monitoring.html (only in Japanese; Accessed on May 2020)

Table H.5–2 Concentration of dioxins in animal products in Japan (pg-TEQ/g wet weight)

Year (FY)	Product	Number of Sample	Minimum	Maximum	Average	Median
2014	Milk	20	0.000030	0.046	0.0080	0.0019
	Beef	20	0.00041	1.1	0.20	0.15
	Pork	20	0.000099	0.063	0.0057	0.00055
	Chicken	20	0.0022	0.12	0.034	0.024
	Chicken egg	20	0.00019	0.13	0.044	0.037
2017	Beef	30	0.011	3.5	0.35	0.19
	Pork	30	0.00050	0.044	0.0081	0.0032
2018	Milk	30	0	0.057	0.0045	0.000060
	Chicken	30	0.000020	0.039	0.0067	0.00055
	Chicken egg	30	0.00011	0.49	0.037	0.012

Note: Values are total of PCDD, PCDF, and *dl*-PCB concentration.
Reference: Ministry of Agriculture, Forestry and Fisheries. "Survey on Dioxins in Livestock and Marine Products"
https://www.maff.go.jp/j/syouan/tikusui/gyokai/g_kenko/busitu/tikusui_dioxin.html (only in Japanese; Accessed on May 2020)

Table H.5–3 Concentration of dioxins in fisheries products in Japan (pg-TEQ/g wet weight)

Year (FY)	Product	Number of Sample	Minimum	Maximum	Average	Median
2014	Amberjack (farmed)	20	1.4	3.8	2.4	2.1
	Common mackerel	20	0.45	1.8	1.1	1,2
2015	Eel (Farmed)	20	0.69	0.91	0.80	0.82
	Anchovy	20	0.067	0.47	0.22	0.14
	Konosirus punctatus	20	0.49	3.5	1.6	1.4
	Japanese sea bass	20	0.52	6.6	2.1	1.4
2016	Yellowtail (native)	30	0.83	3.4	1.7	1.4
	Atka mackerel	30	0.29	3.0	1.1	0.86
	Red snow crab	30	0.35	1.4	0.59	0.47
2017	Yellowtail (farmed)	30	1.3	3.2	2.4	2.6
	Large head hairtail	30	0.14	3.3	0.88	0.33
2018	Common mackerel	30	0.32	3.2	1.3	0.88
	Amberjack (farmed)	30	0.81	1.7	1.3	1.3

Note: Values are total of PCDD, PCDF, and *dl*-PCB concentration.
Reference: Ministry of Agriculture, Forestry and Fisheries. "Survey on Dioxins in Livestock and Marine Products"
https://www.maff.go.jp/j/syouan/tikusui/gyokai/g_kenko/busitu/tikusui_dioxin.html (only in Japanese; Accessed on May 2020)

Table H.5–4 Concentration of dioxins in agricultural products in Japan (pg-TEQ/g wet weight)

Year (FY)	Product	Number of Sample	Minimum	Maximum	Average	Median
2013	Spinach	19	0.00077	0.071	0.016	0.0057
	Japanese spinach	8	0.00013	0.0062	0.0033	0.0035
	Cabbage	10	0	0.0019	0.00020	0.0000045
	Welsh onions	9	0.00092	0.012	0.0062	0.0038
	Broccoli	4	0	0.00011	0.000027	0.0000015
	Japanese white radish (leaf)	5	0.0012	0.030	0.016	0.014
	egg plant	1	-	-	0	0
	tea leaf	1	-	-	0.011	0.011
2018	Spinach	10	0.0063	0.027	0.017	0.017
	Japanese spinach	5	0.00044	0.011	0.0021	0.0046
	Cabbage	10	0	0.00081	0.00021	0.0000045
	Welsh onions	10	0.000001	0.11	0.013	0.0012
	Broccoli	10	0	0.0025	0.00051	0.000047

Note: Values are total of PCDD, PCDF, and *dl*-PCB concentration.
Reference: Ministry of Agriculture, Forestry and Fisheries. “Survey on Dioxins in Livestock and Marine Products” https://www.maff.go.jp/j/syouan/tikusui/gyokai/g_kenko/busitu/tikusui_dioxin.html (only in Japanese; Accessed on May 2020)

Table H.5–5 National average of the daily intake of dioxins in 2013 to 2017 in Japan

FY	2013	2014	2015	2016	2017
Daily intake (pg TEQ/day)	28.86 (9.22-48.37)	10.51 (3.97-19.64)	9.14 (3.59-16.56)	27.22 (9.69-71.11)	32.52 (10.47-88.37)
Daily intake per body weight (pg TEQ/kg bw/day)	0.58 (0.18-0.97)	0.21 (0.08-0.39)	0.18 (0.07-0.33)	0.54 (0.19-1.42)	0.65 (0.21-1.77)

NOTE 1 From seven regions in Japan, about 120 food items each were bought. After that, these items were either cooked or not cooked, and divided into 13 groups. Samples were homogeneous mixture of these items and drinking water (14 food groups) and estimated the daily intake of dioxins from average Japanese diet.
NOTE 2 Analytes: 7 PCDD congeners; 10 PCDF congeners; 12 *dl*-PCB congeners
NOTE 3 Values are average, and ones in parenthesis are the range. Daily intake per body weight is calculated by using 50 kg for average Japanese body weight. TEQ is calculated by using WHO 2005 TEF.
NOTE4: Calculated as 0 for the data below the detection limit.
Reference: Tsutsumi T, Study on evaluation and development of its methodology for intake of dioxins and other toxic chemical substances through food.

Annex I
Additional information on review and discussion

I.1 Method for Statistical Analysis in data

I.1.1 Method for Statistical Analysis of data obtained by "Chemicals in the Environment"

As for data from Japan, data obtained by "Chemicals in the Environment"[1] was analyzed its temporal trend according to procedure shown in Figure I.1–1.

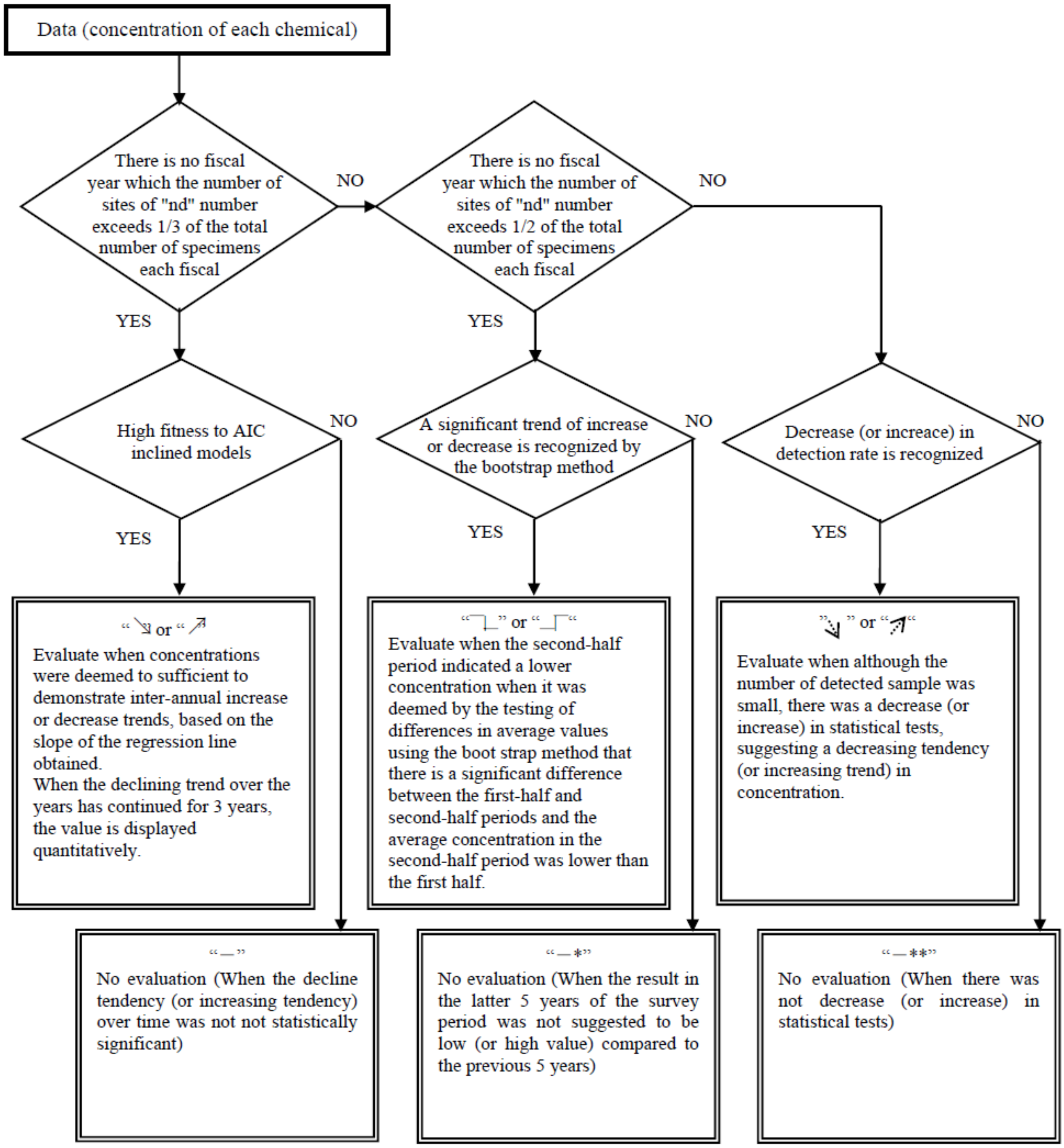


Figure I.1–1 Procedure for analysis of temporal trend and evaluation of the result for "Chemicals in the Environment," Japan.

Log-linear regression model

When assuming that the concentration of chemical substances remaining in the environment constantly decreases in a certain time period, regardless of the concentration level (Figure I.1–2: left), the relationship between the logarithm of concentration and time can be linearly regressed (Figure I.1–2: right). Therefore, the logarithmic linear regression model is applied.

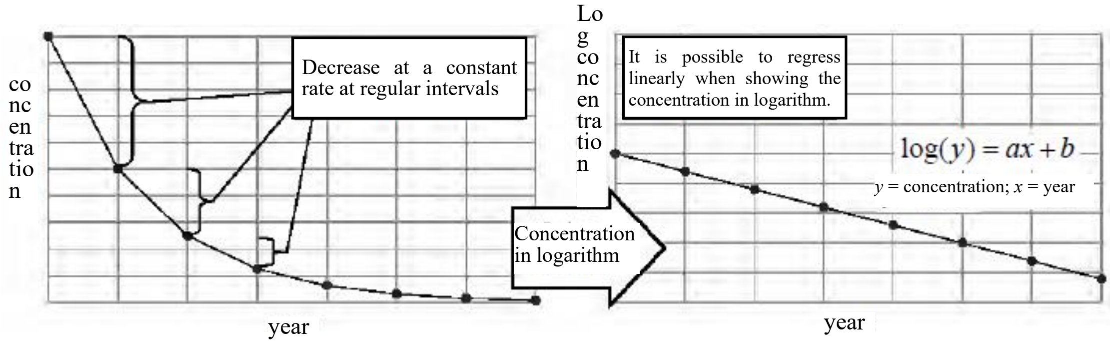


Figure I.1–2 Advantages of log-linear regression model

When the concentration distributions of the chemical substances remaining in the environment tend to show like Figure I.1–3 (left), it can be approximated by a logarithmic normal distribution as shown in Figure I.1–3 (right).

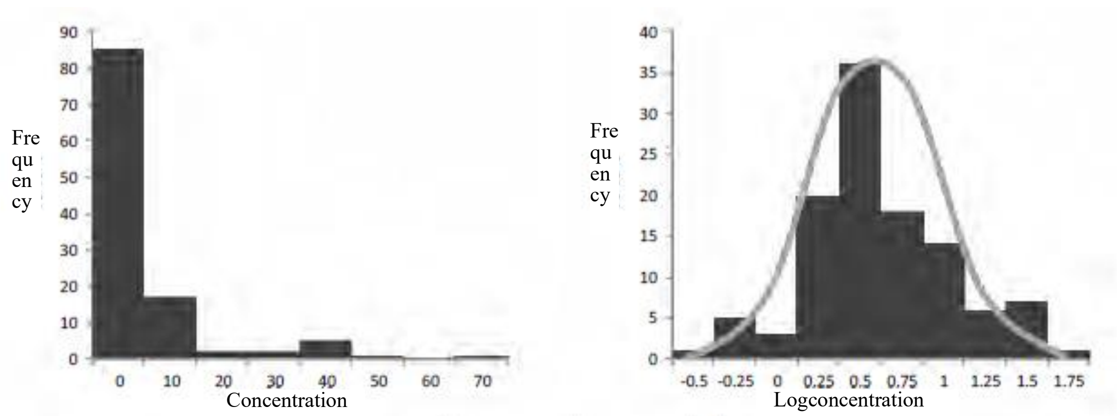


Figure I.1–3 Concentration distribution with concentrations in antilogarithm (left) and logarithm (right)

Furthermore, as shown in Figure I.1–4, if the concentrations decrease at a constant rate, the slope of the linear regression with an antilogarithm is more susceptible to data fluctuations at higher concentrations compared to fluctuations at low concentrations. However, in case of concentration in logarithm, the impact of data fluctuation is equivalent between high concentration and low concentration, therefore the overall tendency can be evaluated with one slope.

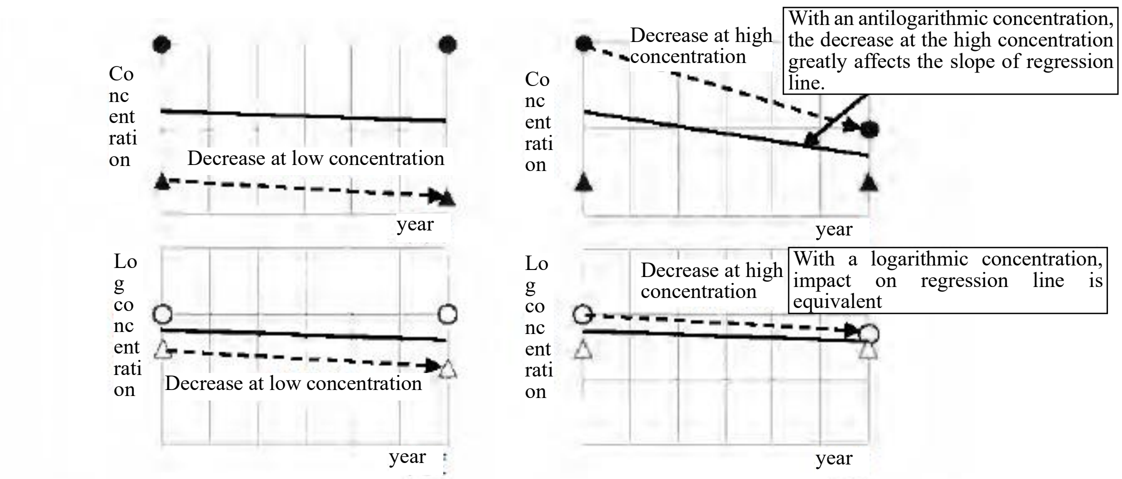


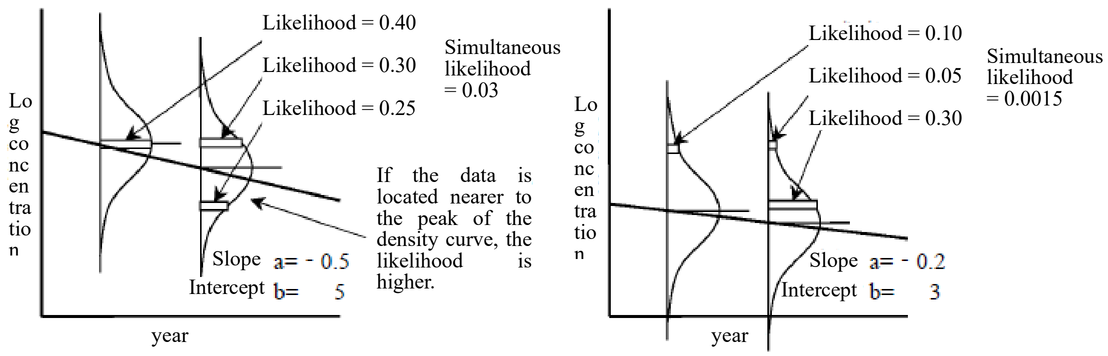
Figure I.1–4 Impact of concentration variation to log-linear regression model

Maximum likelihood estimation method not assuming parametric residual distributions

When the linear regression is applied to the inter-annual trend analyses, a regression line based on the least squares method is frequently used, only when the residuals have a normal distribution as a prerequisite. However, method described below does not assume a parametric residual distribution when calculating the regression line and can apply linear regression to data with non-normal distribution.

The maximum likelihood estimation method is a method to seek for the "most likely" parameter. When calculating a regression line, various values are substituted in the two parameters: slope *a* and intercept *b*. As a result, when the parameters are “most likely,” the regression line is considered most suitable.

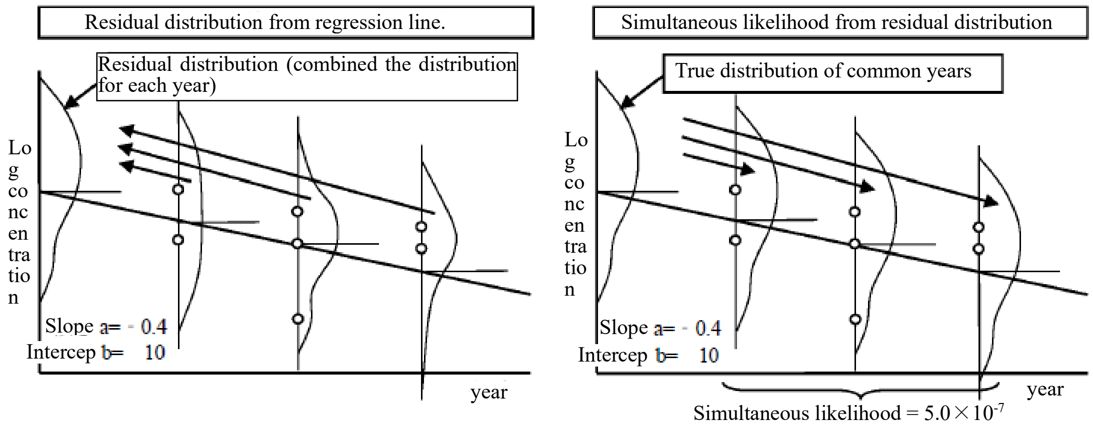
Above mentioned "most likely" means that the likelihood of data is the highest when the regression line is calculated (Figure I.1–5), and if there are several data available, the value obtained by multiplication of likelihood (simultaneous likelihood) is the highest. The likelihood of each data can be obtained by the location of the data in the probability density distribution of the population.



The regression line on the left with higher simultaneous likelihood is more suitable, and the most likely regression line is when a=-0.5 and b=5.

Figure I.1–5 Determination method of optimal regression line using maximum likelihood method

Since each data often has its own characteristic distribution, firstly, a residual distribution from the regression line for each fiscal year was created for the inter-annual trend analyses. After that, each residual distributions combined to obtain common distribution to all fiscal years for the analyses.



In the above example, the simultaneous likelihood with an appropriate regression line with a=-0.4 and b=10 is 5.0×10^{-7}.
Similarly, the simultaneous likelihood was calculated with various regression lines, and the regression line with the highest average likelihood was determined as optimum.

Figure I.1–6 Calculation of residual distribution used for maximum likelihood method and determination of optimal regression line

AIC (Akaike's information criterion)

The AIC (Akaike's Information Criterion) is a typical index for selecting effective models.

In the regression model, the error tends to decrease as the number of parameters increases. However, the model becomes complicated as a result, therefore, it could not be always a good model. Since AIC evaluate it inappropriate when the number of parameters increases, it could be an index for grasping a better model with considering the number of parameters. In addition, there is no limitation to the distribution of the model population. For these reasons, AIC is used to select the model with the optimum number of parameters. The formula for calculating AIC is shown below:

$$AIC = -2 * (\text{maximum logarithm likelihood}) + 2 * (\text{the number of model parameter})$$

The regression line obtained using the maximum likelihood method is a linear expression with the fiscal year as a parameter, as shown in Fig. 6. Firstly, AIC_1 and AIC_0 was calculated, and were compared to determine which model is more appropriate. AIC_1 is calculated from log-linear regression model, and AIC_0 is calculated using the 0th-order equation (log-linear regression linear model with slope 0) which considers the slope of the regression line does not change from a constant value that represents the whole due to accidental fluctuations. Generally, a model with a small AIC value is appropriate. Furthermore, the idea of posterior probability using Bayes' theorem was introduced to properly consider even when the difference in AICs is small.

$$p_1 = \exp\{-0.5\, AIC_1\} / (\exp\{-0.5\, AIC_0\} + \exp\{-0.5\, AIC_1\})$$

(p_1: posterior probability of first-order model, AIC_1: AIC in first-order equation, AIC_0: AIC in 0th-order equation)

The posterior probability of the first-order model p_1 ranges from 0 to 1, and it is considered that it is close to the first-order equation when p_1 is close to 1. When the posterior probability p_1 is 0.950 or greater, it was considered appropriate to have a slope in the inter-annual trend. The threshold of 0.950 was set based on the idea of a significance level of 5%.

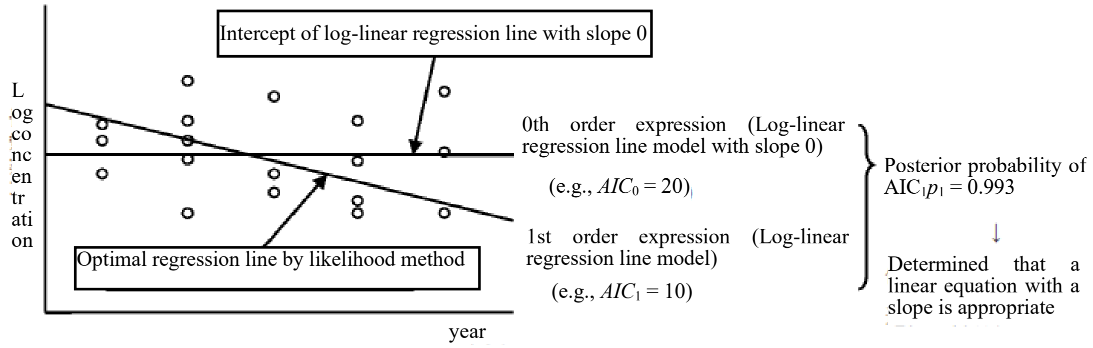


Figure I.1–7 Determination method of presence/absence of slope using AIC

Test of difference of mean values by bootstrap method

The commonly used test of the differences between the average values by the t-test can be used when normality of two data groups is obtained as a premise. On the other hand, the bootstrap method for testing the difference in mean values makes it possible to give asymptotic normality to a non-normal population by repeated extraction with random sampling. As a result, it is possible to test the difference between the average values regardless of the distribution of two data groups.

Specifically, the difference of the average values was tested in order to confirm whether there is a significant concentration difference between the first 6 years (Group A) and the last 6 years (Group B). The average values were calculated after randomly sampled from two sample groups, and then the distribution of the repeatedly obtained average values is a t distribution. Since it has extremely large degrees of freedom and can be considered as a normal distribution, it was tested whether there is a difference between samples (Figure I.1–8).

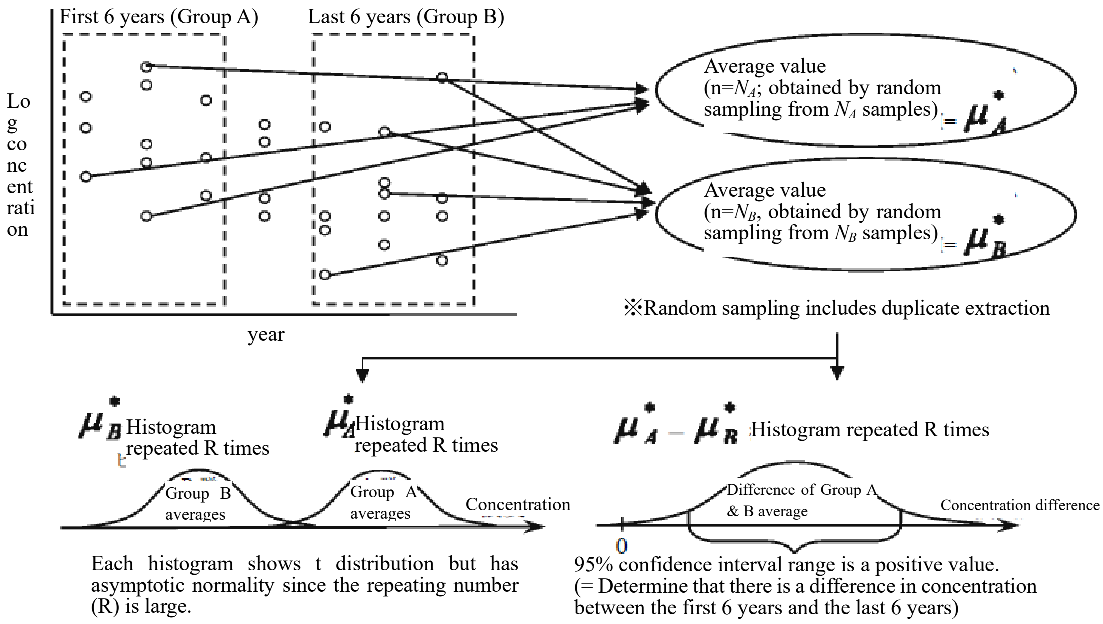


Figure I.1–8 Bootstrap method for testing differences in average values

When the 95% confidence interval is in the positive (of negative) range in the distribution of the average differences calculated by repeated extraction, the concentration in the last 6 years is determined to be significantly lower (or higher) compared with the first 6 years.

Analysis of inter-annual trends based on the detection rate

Focusing on the highest detection limit during the target period, the survey points where the concentration was below the detection limit were defined as "low concentration points," and trends were verified whether the number of low concentration points increased or decreased. The survey results of each substance are considered as either detected or not detected, and a regression line is calculated by the maximum likelihood method assuming a binomial distribution. Then the regression line was determined as most likely when the simultaneous likelihood is the highest. In consideration of the safety, the concept of posterior probability was applied, and it was determined to have a slope when the AIC posterior probability p_1 of the linear equation was 0.950 or greater.

In order to exclude the effect of different detection limits in each year, the highest detection limit is regarded as a unified detection limit, and then the ratio of the number of low concentration points in each survey year with the unified detection limit was calculated for the analyses.

I.2 Result of Temporal Trend Analysis on Other Media

The results of temporal trend analysis on other media are shown below. For results on core media, see “5.2 Review and Discussion” in the main report.

I.2.1 Water (except for PFOS and PFOA)

Table I.2–1 Result of trend analysis for Japanese national POPs monitoring program (water)

Substance groups	Substances	Period	Result of trend analysis (surface water)				
				River area	Lake area	River mouth area	Sea area
PCBs	Total PCBs	FY2002 – 2018	↘ Half-life: 7 years [6-10 years]	↘ Half-life: 8 years [7-10 years]	↘ Half-life: 7 years [5-12 years]	↘ Half-life: 10 years [7-17 years]	–
HCB	HCB	FY2002 – 2018	↘ Half-life: 14 years [10-20 years]	–	–	↘ Half-life: 8 years [7-11 years]	⏋⎿
Aldrin	Aldrin	FY2002 – 2009	–	–	–	–	–
Dieldrin	Dieldrin	FY2002 – 2014	–	–	–	–	–
Endrin	Endrin	FY2002 – 2014	–	–	↘	–	↘
DDTs	*p, p’*-DDT	FY2002 – 2014	↘	–	↘	–	–
	p, p’-DDE	FY2002 – 2014	–	–	–	–	–
	p, p’-DDD	FY2002 – 2014	–	–	–	–	–
	o, p’-DDT	FY2002 – 2014	↘	↘	↘	↘	↘
	o, p’-DDE	FY2002 – 2014	⏋⎿	x	x	–	⏋⎿
	o, p’-DDD	FY2002 – 2014	–	–	–	–	–
Chlordanes	*cis*-chlordane	FY2002 –	↘	↘	–	↘	↘

Substance groups	Substances	Period	Result of trend analysis (surface water)				
				River area	Lake area	River mouth area	Sea area
		2017					Half-life: 7 years [5-10 years]
	trans-chlordane	FY2002 – 2017	–	–	–	–	–
	Oxychlordane	FY2002 – 2017	x	⅂	x	–	x
	cis-nonachlor	FY2002 – 2017	–	–	–	–	–
	trans-nonachlor	FY2002 – 2017	–		–	–	–
Heptachlors	Heptachlor	FY2002 – 2017	x	x	x	x	⇘
	cis-heptachlor epoxide	FY2002 – 2017	↘	↘	–	–	–
	trans-heptachlor epoxide	FY2002 – 2017	x	x	x	x	x
Toxaphenes	Parlar-26	FY2002 – 2018	– **	– **	– **	– **	– **
	Parlar-50	FY2002 – 2018	– **	– **	– **	– **	– **
	Parlar-62	FY2002 – 2018	– **	– **	– **	– **	– **
Mirex	Mirex	FY2002 – 2018	– **	– **	– **	– **	– **
HCHs	*α*-HCH	FY2002 – 2017	↘ Half-life: 11 years [8-16 years]	–	–	–	–
	β-HCH	FY2002 – 2017	↘ Half-life: 13 years [10-20 years]	–	↘ Half-life: 8 years [6-10 years]	–	↘ Half-life: 18 years [14-27 years]
	γ-HCH (lindane)	FY2002 – 2017	↘ Half-life: 6 years [5-7 years]	↘ Half-life: 5 years [4-8 years]	↘ Half-life: 6 years [4-12 years]	↘ Half-life: 7 years [6-8 years]	↘ Half-life: 5 years [5-6 years]
	δ-HCH	FY2002 – 2017	– *	–	–	– *	x
Polybromodiphenyl ethers (Br_4 – Br_{10})	Tetrabromodiphenyl ethers	FY2009 – 2018	– **		– **	–	– **
	Pentabromodiphenyl ethers	FY2009 – 2018	⇘	⇘	– **	– *	– **
	Hexabromodiphenyl ethers	FY2009 – 2018	– **	– **	– **	– **	– **
	Heptabromodiphenyl ethers	FY2009 – 2018	– **	– **	– **	– **	– **
	Octabromodiphenyl ethers	FY2009 – 2018	– **	– **	– **	–	– **
	Nonabromodiphenyl ethers	FY2009 – 2018	– *	– *	– **	–	– **
	Decabromodiphenyl ethers	FY2009 – 2018	– *	– *	– **	–	– **
Perfluorooctane	PFOS	FY2009 –	–	–	↘	–	–

Substance groups	Substances	Period	Result of trend analysis (surface water)				
				River area	Lake area	River mouth area	Sea area
sulfonic acid (PFOS)		2018			Half-life: 10 years [6-22 years]		
Perfluorooctanoic acid (PFOA)	PFOA	FY2009 – 2018	–	–	–	↘ Half-life: 9 years [7-14 years]	–
Pentachlorobenzene (PeCBz)	PeCBz	FY2007 – 2018	–	–	–	–	–

Note 1: When the posteriori probability from AICs was more than 95%, the measurement results were deemed to be in agreement with the simple log-linear regression model.

Note 2: "↘" (arrow) means that "an inter-annual trend of decrease was found".
"┐└" means that "statistically significant differences between the first-half and second-half periods were found".
"–" means that "an inter-annual trend was not found".
"↘" (dotted arrow) means that "although the number of detections was small, the detection rate was decreased, it suggested a reduction tendency".
"x" means that "this analysis approach was regarded as unsuitable because 'measured concentrations of more than 50% of samples did not reach the detection limit (nd) in an FY or more,' or 'less number of monitoring sites' / 'measured concentrations did not show a normal distribution in an FY or more,' 'the number of samples was less than 11 in each FY,' or 'measured concentrations did not show a homoscedasticity in an FY or more.'"
"*" means that "in case of using the bootstrap methods, there was not a significant difference between the values of first-half and second-half periods".
"**" means that "the detection rate was not decreased, there was not a reduction tendency".

Note 3: The half-life describes the half-life in the environment based on the survey results when the decrease tendency continues for 3 years or more by the maximum likelihood estimation that does not assume parametric residual distribution. The results in [] indicate that the values in the 95% confidence interval.

I.2.1.1 12 initial POPs

(1) Aldrin

As results of the inter-annual trend analysis from FY 2002 to FY 2009 throughout the nation, statistically significant tendency in water was not observed for aldrin[1].

(2) Chlordane

In Japan, the inter-annual trend for chlordane (i.e. *cis*-chlordane, *trans*-chlordane, oxychlordane, *cis*-nonachlor and *trans*-nonachlor) was analyzed from FY2002 to FY2017 throughout the nation. For *cis*-chlordane, reduction tendencies in specimens from river areas, river mouth areas and sea areas were identified as statistically significant and reduction tendency in specimens from the overall areas in surface water was also identified as statistically significant1. For*trans*-nonachlor, reduction tendency in specimens from river areas was identified as statistically significant[1].

(3) DDT

In Japan, the inter-annual trend for DDTs (i.e., *p, p'*-DDT, *p, p'*-DDE, *p, p'*-DDD, *o, p'*-DDT, *o, p'*-DDE and *o, p'*-DDD) was analyzed from FY 2002 to FY 2014 throughout the nation. For *p, p'*-DDT, reduction tendency in specimens from lake areas was identified as statistically significant and reduction tendency in specimens from the overall areas was also identified as statistically significant. For *o, p'*-DDT, reduction tendency in specimens from river areas, lake areas, river mouth areas and sea areas was identified as statistically significant and reduction tendency in specimens from the overall areas was also identified as statistically significant. For *o, p'*-DDE, the concentrations in the second-half period were determined lower than the concentrations in the first-half period in specimens from sea areas as statistically significant, and same trend was seen for the specimens from the overall areas[1].

(4) Dieldrin

In Japan, as results of the inter-annual trend analysis from FY 2002 to FY 2014 throughout the nation, statistically significant tendency was not observed in water for dieldrin[1].

(5) Endrin

In Japan, as results of the inter-annual trend analysis from FY 2002 to FY 2014 throughout the nation, reduction tendencies in specimens from lake and sea areas were identified as statistically significant for endrin[1].

(6) Heptachlor

In Japan, the inter-annual trend for heptachlors (i.e., heptachlor, *cis*-heptachlor epoxide, *trans*-heptachlor epoxide) was analyzed from FY2002 to FY2017 throughout the nation. For heptachlor, although the number of detections was small, the detection rate of the sea areas was decreased, it suggested a reduction tendency of the concentrations. For *cis*-heptachlor, reduction tendencies in specimens from river areas were identified as statistically significant and reduction tendencies in specimens from the overall areas in surface water were also identified as statistically significant[1].

(7) HCB

In Japan, as results of the inter-annual trend analysis from FY 2002 to FY 2018 throughout the nation, reduction tendencies in specimens from river areas and river mouth areas were identified as statistically significant, and the concentrations in last 6-year period were determined lower than the concentrations in first 6-year period in specimens from sea areas as statistically significant. Furthermore, reduction tendencies in specimens from the overall areas in surface water were also identified as statistically significant for HCB[1].

(8) Mirex

In Japan, as results of the inter-annual trend analysis from FY 2003 to FY 2018 throughout the nation, statistically significant tendency in water was not observed for mirex[1].

(9) Toxaphene

In Japan, as results of the inter-annual trend analysis from FY 2003 to FY 2018 throughout the nation, statistically significant tendency in water was not observed for toxaphenes (i.e., Parlar-26, Parlar-50 and Parlar-62)[1].

(10) PCBs

In Japan, as results of the inter-annual trend analysis from FY2002 to FY2018 throughout the nation, reduction tendencies in specimens from river areas, lake areas and river mouth areas were identified as statistically significant and reduction tendency in specimens from the overall areas in surface water was also identified as statistically significant for PCBs[1].

(11) PCDD/PCDFs and *dl*-PCBs

In Japan, concentrations of dioxins in public waters have almost halved from FY2000 to FY2018.However in recent years, reduction tendency has become moderate for concentrations of dioxins in public waters[1].

I.2.1.2New POPs listed after COP4

(1) HCHs

Inter-annual trend was analyzed from FY 2003 to FY 2017 throughout the nation for HCHs (i.e., α-HCH, β-HCH and lindane) in water. For α-HCH, reduction tendencies were identified as statistically significant in coastal and overall water areas. For β-HCH, reduction tendencies were identified as statistically significant in lake, coastal and overall areas. For lindane, reduction tendencies in specimens from river, lake, river mouth and sea areas were identified as statistically significant, and reduction tendencies in specimens from the overall areas were identified as statistically significant[1].

(2) PBDEs

In Japan, as results of the inter-annual trend analysis from FY2009 to FY2018, although the number of detections was small, the detection rates of river area and all areas in surface water were decreased, it suggested a reduction tendency of the concentrations for PBDE congeners with 5 bromines (pentaBDEs). On the other hand, statistically significant tendency in water was not observed for other BDEs[1].

(3) PeCBz

In Japan, as results of the inter-annual trend analysis from FY 2007 to FY 2018 throughout the nation, statistically significant tendency in water was not observed for PeCBz[1].

I.2.2 Bottom sediment in water

Table I.2–2 Result of trend analysis for Japanese national POPs monitoring program (sediment)[1]

Substance groups	Substances	Period	Result of trend analysis (sediment)				
				River area	Lake area	River mouth area	Sea area
PCBs	Total PCBs	FY2002 – 2018	↘ Half-life: 17 years [12-30 years]	↘ Half-life: 11 years [9-17 years]	–	–	↘ Half-life: 22 years [15-43 years]
HCB	HCB	FY2002 – 2018	↘ Half-life: 17 years [11-33 years]	↘	–	–	–
Aldrin	Aldrin	FY2002 – 2018	↘	– *	–	–	↘

Substance groups	Substances	Period	Result of trend analysis (sediment)				
				River area	Lake area	River mouth area	Sea area
Dieldrin	Dieldrin	FY2002 – 2018	↘	↘	–	–	–
Endrin	Endrin	FY2002 – 2018	–	– **	–	–	–
DDTs	*p, p'*-DDT	FY2002 – 2014	–	–	–	–	–
	p, p'-DDE	FY2002 – 2014	–	–	–	–	–
	p, p'-DDD	FY2002 – 2014	–	–	–	–	–
	o, p'-DDT	FY2002 – 2014	–	–	–	↘	–
	o, p'-DDE	FY2002 – 2014	–	–	–	–	–
	o, p'-DDD	FY2002 – 2014	–	–	–	–	–
Chlordanes	*cis*-chlordane	FY2002 – 2017	↘ Half-life: 8 years [7-12 years]	↘ Half-life: 7 years [5-10 years]	–	↘ Half-life: 7 years [5-12 years]	↘ Half-life: 7 years [5-10 years]
	trans-chlordane	FY2002 – 2017	–	–	–	–	–
	Oxychlordane	FY2002 – 2017	‾|_	–	x	–	x
	cis-nonachlor	FY2002 – 2017	↘	↘ Half-life: 10 years [8-15 years]	–	↘	↘ Half-life: 15 years [13-20 years]
	trans-nonachlor	FY2002 – 2017	↘ Half-life: 12 years [9-19 years]	↘	–	↘ Half-life: 10 years [7-15 years]	↘ Half-life: 12 years [9-17 years]
Heptachlors	Heptachlor	FY2002 – 2017	⇘	⇘	x	‾|_	x
	cis-heptachlor epoxide	FY2002 – 2017	‾|_	‾|_	– *	–	x
	trans-heptachlor epoxide	FY2002 – 2017	x	x	x	x	x
Toxaphenes	Parlar-26	FY2002 – 2018	– **	– **	– **	– **	– **
	Parlar-50	FY2002 – 2018	– **	– **	– **	– **	– **
	Parlar-62	FY2002 – 2018	– **	– **	– **	– **	– **
Mirex	Mirex	FY2002 – 2018	– **	– **	– **	– **	– **
HCHs	*α*-HCH	FY2002 – 2017	↘	↘	–	–	–
	β-HCH	FY2002 – 2017	–	–	–	↘ Half-life: 11 years [8-18 years]	–
	γ-HCH (lindane)	FY2002 – 2017	↘	↘	–	–	↘

Substance groups	Substances	Period	Result of trend analysis (sediment)				
				River area	Lake area	River mouth area	Sea area
	δ-HCH	FY2002 – 2017	↘	–	–	↘	↘
Polybromodiphenyl ethers (Br_4 – Br_{10})	Tetrabromodiphenyl ethers	FY2009 – 2018	– *	⇘	–	– *	–
	Pentabromodiphenyl ethers	FY2009 – 2018	– *	⇘	–	–	–
	Hexabromodiphenyl ethers	FY2009 – 2018	– *	– **	–	–	–
	Heptabromodiphenyl ethers	FY2009 – 2018	┐└	– **	– *	–	– *
	Octabromodiphenyl ethers	FY2009 – 2018	– *	– **	–	–	–
	Nonabromodiphenyl ethers	FY2009 – 2018	–	– *	–	–	–
	Decabromodiphenyl ethers	FY2009 – 2018	–	–	–	–	↘
Perfluorooctane sulfonic acid (PFOS)	PFOS	FY2009 – 2018	–	–	–	–	↘
Perfluorooctanoic acid (PFOA)	PFOA	FY2009 – 2018	–	↘ Half-life: 21 years [12-75 years]	–	↘	–
Pentachlorobenzene (PeCBz)	PeCBz	FY2007 – 2018	–	–	–	–	–

Note 1: When the posteriori probability from AICs was more than 95%, the measurement results were deemed to be in agreement with the simple log-linear regression model.

Note 2: "↘" (arrow) means that "an inter-annual trend of decrease was found".
"┐└" means that "statistically significant differences between the first-half and second-half periods were found".
"–" means that "an inter-annual trend was not found".
"⇘" (dotted arrow) means that "although the number of detections was small, the detection rate was decreased, it suggested a reduction tendency".
"x" means that "this analysis approach was regarded as unsuitable because 'measured concentrations of more than 50% of samples did not reach the detection limit (nd) in an FY or more,' or 'less number of monitoring sites' / 'measured concentrations did not show a normal distribution in an FY or more,' 'the number of samples was less than 11 in each FY,' or 'measured concentrations did not show a homoscedasticity in an FY or more.'"
"*" means that "in case of using the bootstrap methods, there was not a significant difference between the values of first-half and second-half periods".
"**" means that "the detection rate was not decreased, there was not a reduction tendency".

Note 3: The half-life describes the half-life in the environment based on the survey results when the decrease tendency continues for 3 years or more by the maximum likelihood estimation that does not assume parametric residual distribution. The results in [] indicate that the values in the 95% confidence interval.

I.2.2.1 The 12 initial POPs

(1) Aldrin

In Japan, as results of the inter-annual trend analysis from FY 2002 to FY 2018 throughout the nation, reduction tendency in specimens from sea areas was identified as statistically significant, and reduction tendency in specimens from the overall areas in sediment was also identified as statistically significant for aldrin[1].

(2) Chlordane

In Japan, the inter-annual trend for chlordane (i.e., *cis*-chlordane, *trans*-chlordane, oxychlordane, *cis*-nonachlor and *trans*-nonachlor) was analyzed from FY2002 to FY2017 throughout the nation.

For *cis*-chlordane, *trans*-chlordane, *cis*-nonachlor and *trans*-nonachlor, reduction tendencies in specimens from river areas, river mouth areas and sea areas were identified as statistically significant, and reduction tendency in specimens from the overall areas was also identified as statistically significant. For oxychlordane, the concentrations in last 5 year period were determined lower than the concentrations in first 5 year period in specimens from the overall areas in sediment as statistically significant[1].

(3) DDT

In Japan, the inter-annual trend for DDTs (i.e., *p, p'*-DDT, *p, p'*-DDE, *p, p'*-DDD, *o, p'*-DDT, *o, p'*-DDE and *o, p'*-DDD) was analyzed from FY 2002 to FY 2014 throughout the nation. For *o, p'*-DDT, reduction tendency in specimens from river mouth areas was identified as statistically significant[1].

(4) Dieldrin

In Japan, as results of the inter-annual trend analysis from FY 2002 to FY 2018 throughout the nation, reduction tendency in specimens from river areas was identified as statistically significant, and reduction tendency in specimens from the overall areas in sediment was also identified as statistically significant for dieldrin[1].

(5) Endrin

In Japan, as results of the inter-annual trend analysis from FY 2002 to FY 2018 throughout the nation, statistically significant tendency in sediment was not observed for endrin[1].

(6) Heptachlor

In Japan, the inter-annual trend for heptachlors (i.e., heptachlor, *cis*-heptachlor epoxide, *trans*-heptachlor epoxide) was analyzed from FY2003 to FY2017 throughout the nation. For heptachlor, reduction tendency in specimens from river areas was identified as statistically significant, and reduction tendency in specimens from the overall areas in sediment was also identified as statistically significant. In addition, the concentrations in last 5 years period were determined lower than the concentrations in first 5 years period in specimens from river mouth areas in sediment as statistically significant. For *cis*-heptachlor epoxide, the concentrations in last 5 years period were determined lower than the concentrations in first 5-year period in specimens from river areas and overall areas in sediment as statistically significant[1].

(7) HCB

In Japan, as results of the inter-annual trend analysis from FY 2002 to FY 2018 throughout the nation, reduction tendency in specimens from river areas was identified as statistically significant and reduction tendency in specimens from the overall areas in sediment was also identified as statistically significant for HCB[1].

(8) Mirex

In Japan, as results of the inter-annual trend analysis from FY 2003 to FY 2018 throughout the nation, statistically significant tendency in sediment was not observed for mirex[1].

(9) Toxaphene

In Japan, as results of the inter-annual trend analysis from FY 2003 to FY 2018 throughout the nation, statistically significant tendency in sediment was not observed for toxaphene (i.e., Parlar-26, Parlar-50 and Parlar-62)[1].

(10) PCBs

For PCB concentration in marine sediment surrounding Japan, relatively high value was observed in the 1970s and significant reduction tendency was observed from then to the 1980s. However, the reduction trend slowed after the 1990s. The significant reduction in concentration of pollution substance represents certain effect to improvement of enclosed coastal marine environment by regulations established in Japan since the 1970s. In recent years, as results of the inter-annual trend analysis from FY2002 to FY2018 throughout Japan, reduction tendency in specimens from river areas and sea areas were identified as statistically significant and reduction tendency in specimens from the overall areas was also identified as statistically significant for PCBs[1].

In addition, based on the result of Marine Environmental Monitoring Survey beginning in 1998 and the former surveys from 1975 to 1997 in Japan, the linear regression analysis of chronological changes in the concentrations of PCBs in the sediment showed decrease trend at many survey points. Focusing on traverse line extending from Tokyo Bay to the offshore (traverse line B), significant decrease in the concentration was found at the opening of the bay, while no significant decrease was found at the backside of the bay.

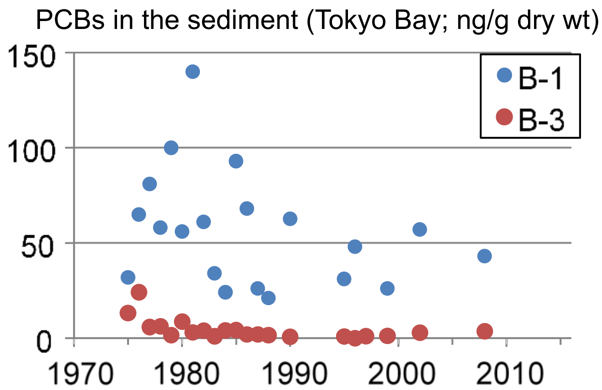


Figure I.2–1 Chronological change of the concentration of PCBs in marine sediment in Tokyo Bay (B-1: backside of the bay; B-3: opening of the bay)

I.2.2.2 New POPs listed after COP4

(1) HCHs

In Japan, the inter-annual trend was analyzed from FY 2003 to FY 2017 throughout the nation for HCHs (i.e., α-HCH, β-HCH and lindane) in bottom sediment. For α-HCH and lindane, reduction tendency in specimens from overall areas was identified as statistically significant. For β-HCH, reduction tendency in specimens from river mouth areas were identified as statistically significant[1].

(2) PBDEs

In Japan, as results of the inter-annual trend analysis from FY2009 to FY2018, although the number of detections was small, the detection rates of river area in sediment were decreased, it suggested a reduction tendency of the concentrations for PBDE congeners with 4 and 5 bromines (i.e., tetraBDEs and pentaBDEs). Furthermore, the last 6 years period was indicated lower concentration than the period before the last 6 years in specimens from the overall areas in sediment as statistically significant for PBDE congeners with 7 bromines (i.e., heptaBDEs). On the other hand, statistically significant tendency in sediment was not observed for other BDEs[1].

(3) PeCBz

In Japan, as results of the inter-annual trend analysis from FY 2007 to FY 2018 throughout the nation, statistically significant tendency in sediment was not observed for PeCBz[1].

(4) PFOS

In Japan, as results of the inter-annual trend analysis from FY2009 to FY2018 throughout the nation, reduction tendency in specimens from sea areas was identified as statistically significant for PFOS[1].

(5) PFOA

In Japan, as results of the inter-annual trend analysis from FY2009 to FY2018 throughout the nation, reduction tendencies in specimens from river areas and river mouth areas were identified as statistically significant for PFOA[1].

Annex J
Information on long range transport

J.1 Trajectory analysis

(1) Trajectory analysis for Environmental Monitoring of Persistent Organic Pollutants in East Asian Countries

The trajectory analyses during the sampling of background air at Cambodia, Malaysia, Lao PDR and Thailand under the Environmental Persistent Organic Pollutants Monitoring Project in East Asian Countries were performed.

The trajectory analyses were conducted by Air Resource Laboratory Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT) Model by Air Resource Laboratory. The results of analyses were shown in Figure J.1–1 – Figure J.1–4.

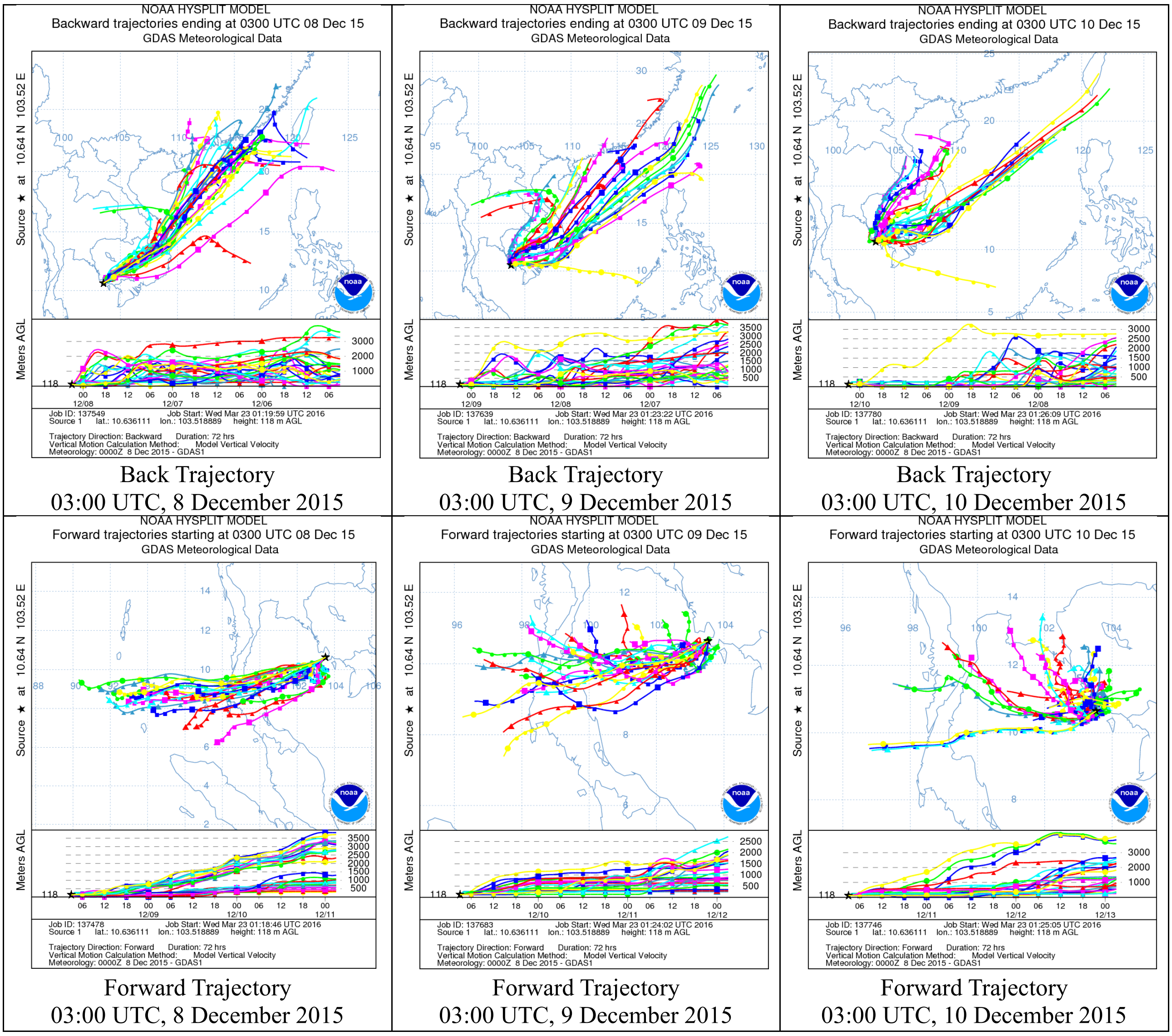
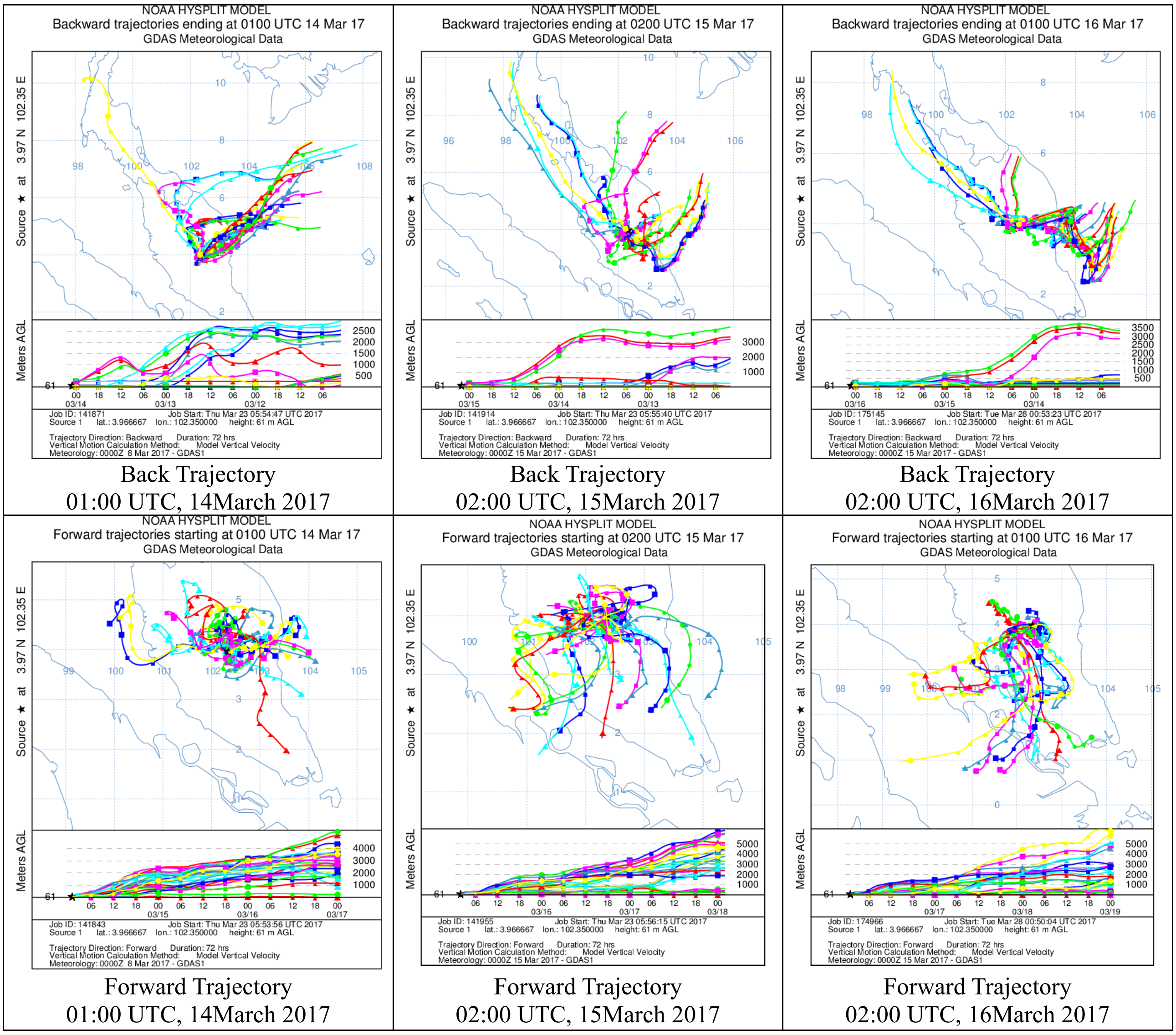


Figure J.1–1 Trajectory results at Sihanoukville, Cambodia



Back Trajectory 01:00 UTC, 14March 2017

Back Trajectory 02:00 UTC, 15March 2017

Back Trajectory 02:00 UTC, 16March 2017

Forward Trajectory 01:00 UTC, 14March 2017

Forward Trajectory 02:00 UTC, 15March 2017

Forward Trajectory 02:00 UTC, 16March 2017

Figure J.1–2 Trajectory results at Batu Embun, Malaysia

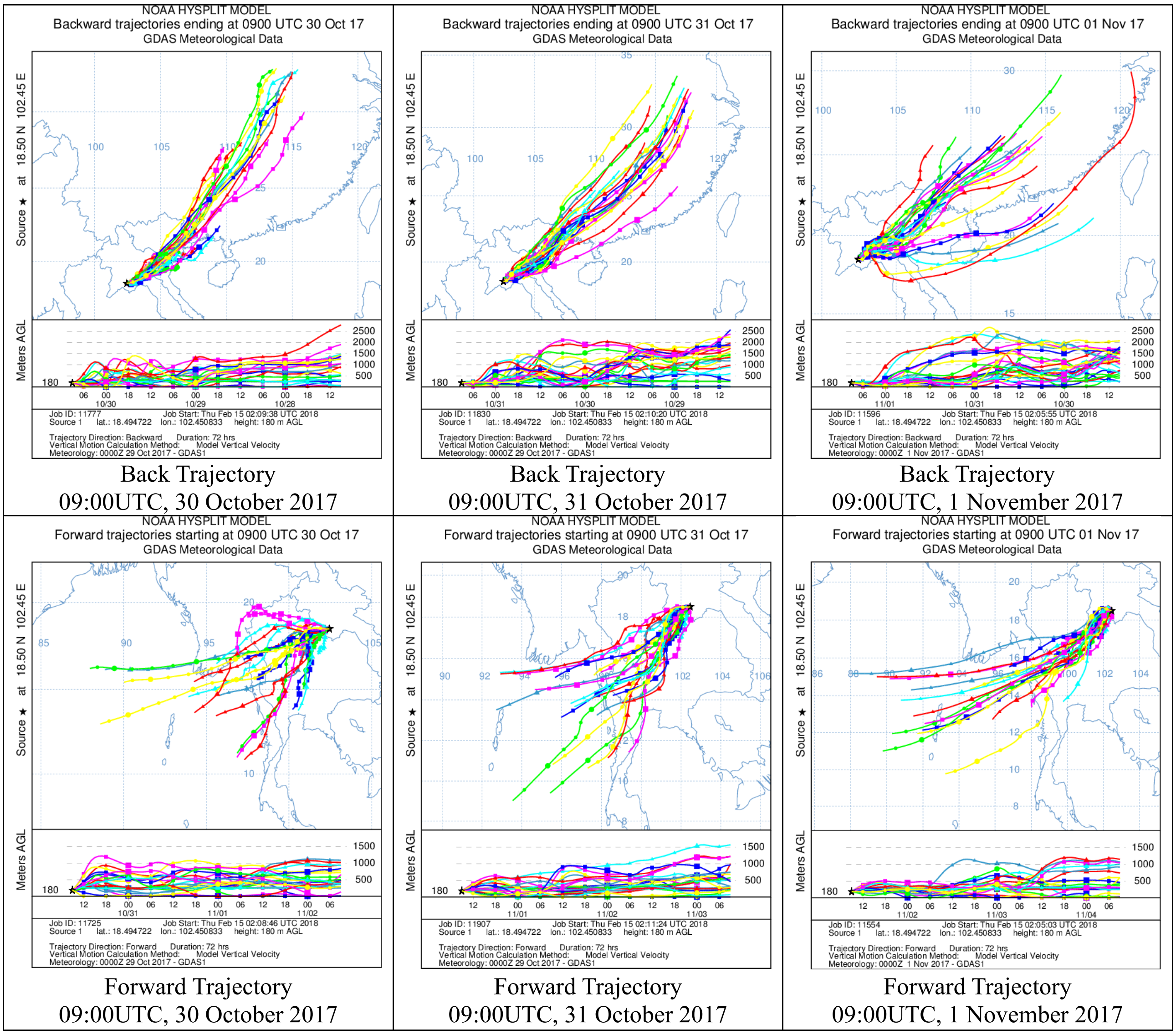


Figure J.1–3 Trajectory results at Na Long Koun Meteorological Station, Lao PDR

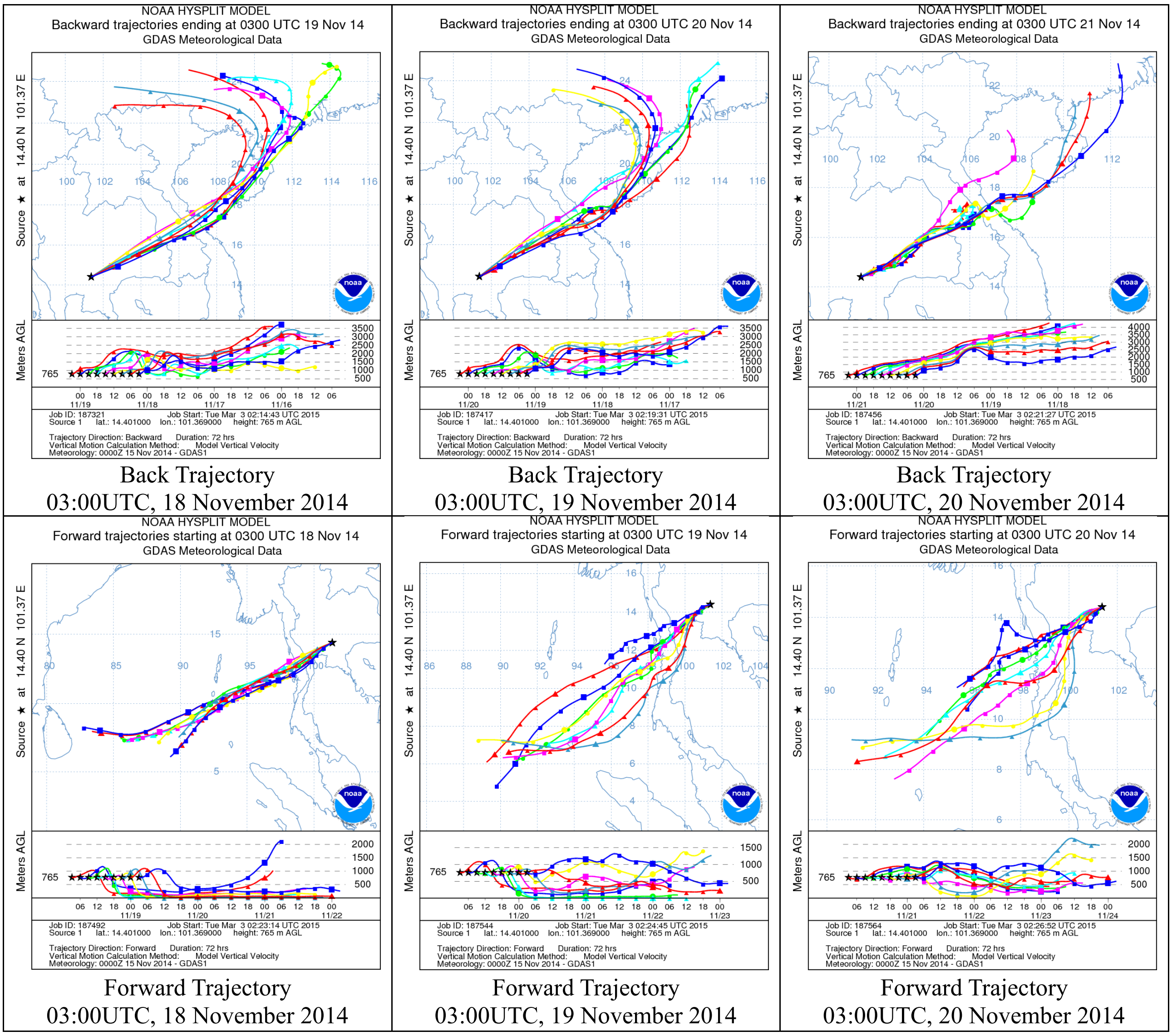


Figure J.1–4 Trajectory results at Khao Yai National Park, Thailand

Annex K
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