24 September 1999
Regarding the Results of the Urgent Simultaneous Nationwide Survey of Dioxins (Conducted in 1998)

Attached File
Survey results

Information source: Environment Agency press release

Regarding the Results of the Urgent Simultaneous Nationwide Dioxin Survey (Conducted in 1998)

In order to determine the status of dioxin (Note 1) pollution throughout Japan, in 1998, in a cooperative effort by the Health Division of the Environment Agency, air quality control stations, and water quality control stations, the Environment Agency carried out the Urgent Simultaneous Nationwide Dioxin Survey to determine the current status of pollution of environmental media, including air, water, soil and bottom sediment, etc., by using uniform methods nationwide.

The text of this attachment summarizes the results based on the evaluation of the Comprehensive Dioxin Monitoring Survey Committee (Chair: Masayuki Ikeda, Professor Emeritus, Kyoto University).

1. At approximately 400 sites throughout Japan (the number varied according to the medium studied), including the vicinity of generation sources, large cities, medium/small cities, and background, the concentration of dioxins (co-planar PCBs were measured at some sites) was measured in air (measured 4 times, in summer, autumn, winter, and spring), soot/dust (measured twice, in summer and winter), public waters (measured once, in summer, except around generation sources, where it was measured twice, in summer and winter), groundwater (measured once, in summer), bottom sediment of public waters (measured once, in summer), soil (measured once, in summer), and aquatic organisms (measured once, in autumn).

   The results are summarized in the table below.

(The figures on the top line for each medium are the data for PCDDs and PCDFs, and the figures on the bottom line are for dioxins).

Environmental medium	Mean values (Note 2)	Median values (Note 3)	Range Detected
Air (4-season means)			
n=387	0.22 pg-TEQ/m^3	0.15 pg-TEQ/m^3	0-1.8 pg-TEQ/m^3
n=100	0.23 pg-TEQ/m^3	0.17 pg-TEQ/m^3	0.0017-0.70 pg-TEQ/m^3
Soot and dust (2-season means)			
n=205	21 pg-TEQ/m^2/day	17 pg-TEQ/m^2/day	0.20-170 pg-TEQ/m^2day
n=103	21 pg-TEQ/m^2/day	18 pg-TEQ/m^2/day	0.34-66 pg-TEQ/m^2/day
Public Waters			
n=204	0.36 pg-TEQ/L	0.089 pg-TEQ/L	0-12 pg-TEQ/L
n=204	0.40 pg-TEQ/L	0.11 pg-TEQ/L	0.0014-13 pg-TEQ/L
Groundwater			
n=243	0.086 pg-TEQ/L	0.0073 pg-TEQ/L	0-5.3 pg-TEQ/L
n=188	0.081 pg-TEQ/L	0.011 pg-TEQ/L	0-5.4 pg-TEQ/L
Bottom sediment of public waters			
n=205	6.8 pg-TEQ/g dry weight	0.23 pg-TEQ/g dry weight	0-230 pg-TEQ/g dry weight
n=205	7.7 pg-TEQ/g dry weight	0.41 pg-TEQ/g dry weight	0-260 pg-TEQ/g dry weight

Soil

n=344	6.2 pg-TEQ/g	2.3 pg-TEQ/g	0.00067-110 pg-TEQ/g
n=286	6.5 pg-TEQ/g	2.7 pg-TEQ/g	0.0015-61 pg-TEQ/g

Aquatic organisms

n=368	0.64 pg-TEQ/g wet weight	0.32 pg-TEQ/g wet weight	0-11 pg-TEQ/g wet weight
n=368	2.1 pg-TEQ/g wet weight	1.1 pg-TEQ/g wet weight	0.0022-30 pg-TEQ/g wet weight

2. Comparisons between dioxin concentration levels in different site categories (around generation sources [including priority regions], large cities, medium/small cities, and background) showed that the concentrations in air, soot/dust, etc., tended to decrease in the following order: around generation sources, large cities, medium/small cities, and background, and that the values in the background tended to be lower than in the other site categories.
   On the whole the levels in groundwater were low, and hardly any differences in concentration levels were observed between the site categories.

3. Co-planar PCBs accounted for no more than 10 to 30% of the total TEQ values, at more than about 80% of the sites, in almost all environmental media.
   In aquatic organisms co-planar PCBs accounted for 50% or more of the total TEQ values at more than 70% of the sites.

4. Analysis of the relationships between the environmental media showed some degree of correlation between air and soot/dust, but the data for the other media were fairly widely dispersed, and no clear correlations were observed. To evaluate the relationships between the media more precisely, it will be necessary to collect much more scientific information, such as on dioxins' behavior in the environment, their properties in different media, etc., and related data.

5. Quality control consisted of prior inspection of the quality control plans, close inspection by specialists of the organizations that conducted measurements, detailed assessments of the results of the measurements, and measurements of the same samples. The results showed that there were no problematic organizations in terms of their ability to conduct the analyses.
   In the future, based on the results of these assessments, the Environment Agency will set environmental standards, conduct studies on the behavior of dioxins in the environment and to determine the state of environmental pollution by dioxins nationwide, and promote dioxin control measures.

Notes

1) Here "dioxins" means polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). The term includes co-planar polychlorinated biphenyls (co-planar PCBs).
2) Here "mean values" signify arithmetic means.
3) The "median values" are the values in the exact middle when data are listed according to magnitude.

Results of an Urgent Simultaneous Nationwide Survey of Dioxins (Conducted in 1998)

24 September 1999
Environment Agency of Japan

1. Nature of the Survey

1) Objectives of the survey

Objectives of this survey were to conduct a survey by uniform methods nationwide, building on technical considerations of the "Comprehensive pilot survey of dioxins" conducted in 1997, to determine the actual status of dioxin pollution throughout Japan in 1998, and to determine the actual status of pollution in environmental media such as air, water, soil, and bottom sediment.

The survey results were summarized based on the evaluation of the Comprehensive Dioxin Monitoring Survey Committee (Chair: Masayuki Ikeda, Professor Emeritus, Kyoto University).

2) Survey regions and sites (refer to Attachment 1 and Table 1)

(1) Regions: 47 prefectures and 12 government ordinance-designated cities

(2) Site categories and numbers of sites:

Selection by each local government of two sites each of (a) the vicinity of dioxin sources, (b) large cities, and (c) small/medium cities . Total: 354 sites

Priority regions from throughout the country (selected from among those in the vicinity of sources of dioxin). Total: 20 sites

Background Total: 7 sites

Three sites along roads and 3 sites a distance away from roads. Total: 6 sites

Grand total: 387 sites

3) Survey media

Air, soot and dust, public waters, groundwater, bottom sediment of public waters, soil, and aquatic organisms (selected, as appropriate, from freshwater: fishes (Pale chub, Japanese dace, carp, Crucian carps, Large mouth bass, Japanese trident goby, Japanese fat minnow, Bluegill sunfish, Tilapia, Plecostomus, Far eastern Catfish,), crustaceans (Red swamp crawfish, River shrimp, Shore swimming crab), shellfishes (Marsh snail, Corbicula); or from salt water: fishes (Spotted gizzard shad, Striped mullet, Japanese sea perch, Common blackish goby, Marbled sole, File fish, Bastard halibut, Black rockfish, White croaker, Black sea bream), crustaceans, (Swimming crab, Edible mantis shrimp), seashells (Blue mussel, Giant pacific oyster, Short-necked clam), etc.

4) Survey period and frequency

Air: measured a total of 4 times a year, once during each season. Soot and dust: measured twice a year, in the summer and in the winter. Public waters, groundwater, bottom sediment of public waters, and soil: measured once, in the summer (however, public waters in the vicinity of sources were measured twice a year, in summer and in winter). Aquatic organisms: measured once, in the fall.

5) Survey methods

Conducted according to the manual prepared by the Environment Agency.

6) Survey target substances

The isomers of the dioxins (PCDDs, PCDFs, and co-planar CBs [only in some regions]) shown in Table 2.

7) Toxic equivalent factors (TEF)

The toxicity equivalency quantity (TEQ) values for dioxins appearing throughout the report have been converted using the toxic equivalency factors (TEFs) from the World Health Organization, Programme on Chemical Safety (WHO/IPCS) 1997.

8) Treatment of values below the lower limit of determination (N.D.)

Values below the lower limit of determination are treated as zero throughout the text of the report, but they have also been converted to one-half or equal to the lower limit of determination for reference.

Values for public waters, groundwater, bottom sediment of public waters, and aquatic organisms whose values below the lower limit of detection have been converted to one-half the lower limit of detection have been included for reference (Table 3).

2. Results of the survey

The results of the measurements are shown in Table 4.

(1) Air

Outline of the survey results

① PCDD and PCDF concentrations

The mean value of PCDD and PCDF concentrations for all four seasons at all sites (n=387) was 0.22 pg-TEQ/m^3, and the median value was 0.15 pg-TEQ/m^3 (detection range: 0-1.8 pg-TEQ/m3) (minimum value in one season: 0 pg-TEQ/m3, maximum value: 3.0 pg-TEQ/m^3).

According to site category:

1) In the vicinity of dioxin sources (n=138), including priority regions, the mean value was 0.25 pg-TEQ/m^3 and the median value was 0.17 pg-TEQ/m^3 (detection range: 0.00030-1.8 pg-TEQ/m3; 1-season minimum value: 0 pg-TEQ/m^3, maximum value: 2.9 pg-TEQ/m^3);
2) In large city regions (n=118), the mean value was 0.22 pg-TEQ/m^3, and the median value was 0.15 pg-TEQ/m^3 (detection range: 0.00050-1.1 pg-TEQ/m^3, 1-season minimum value: 0 pg-TEQ/m^3, maximum value: 3.0 pg-TEQ/m^3);
3) In small/medium cities (n=118), the mean value was 0.18 pg-TEQ/m^3, and the median value was 0.13 pg-TEQ/m^3 (detection range: 0-0.86 pg-TEQ/m^3; 1-season minimum value: 0 pg-TEQ/m^3, maximum value: 2.5 pg-TEQ/m^3);
4) For background levels (n=7), the mean value was 0.013 pg-TEQ/m^3, and the median value was 0.0062 pg-TEQ/m^3 (detection range: 0-0.067 pg-TEQ/m^3; 1-season minimum value: 0 pg-TEQ/m3, maximum value: 0.12 pg-TEQ/m^3);
5) Along roads (n=3), the mean value was 0.44 pg-TEQ/m^3, and the median value was 0.60 pg-TEQ/m^3 (detection range: 0.00093-0.72 pg-TEQ/m^3; 1-season minimum value: 0 pg-TEQ/m^3, maximum value: 1.4 pg-TEQ/m^3);
6) A distance away from roads (n=3), the mean value was 0.44 pg-TEQ/m^3, and the median value was 0.61 pg-TEQ/m^3 (detection range: 0.014-0.70 pg-TEQ/m^3; 1-season minimum value: 0.0010 pg-TEQ/m^3, maximum value: 1.6 pg-TEQ/m^3).

While it is impossible to make simple comparisons between the values, overall they were lower than the results of the Environment Agency surveys in 1990-97 and the results of the survey of local governments in 1997 (n=328, 0-3.3 pg-TEQ/m^3, mean value: 0.50 pg-TEQ/m^3, median value: 0.38 pg-TEQ/m^3).

The values exceeded the ambient air quality standard (0.8 pg-TEQ/m^3) at 5 of the 387 sites (2 sites in the vicinity of sources, 2 large city sites, and 1 small/medium city sites).

② Dioxin concentrations

The mean value of dioxin concentrations for all four seasons at all sites (n=100) was 0.23 pg-TEQ/m^3, and the median value was 0.17 pg-TEQ/m^3 (detection range: 0.0017-0.70 pg-TEQ/m^3) (1-season minimum value: 0.000024 pg-TEQ/m^3, maximum value: 1.7 pg-TEQ/m^3).

According to site category:

1) In the vicinity of sources (n=64), including priority sites, the mean value was 0.25 pg-TEQ/m^3 and the median value was 0.19 pg-TEQ/m^3 (detection range: 0.015-0.70 pg-TEQ/m^3; 1-season minimum value: 0.000024 pg-TEQ/m^3, maximum value: 1.7 pg-TEQ/m^3);
2) In the large city regions (n=26), the mean value was 0.21 pg-TEQ/m^3, and the median value was 0.18 pg-TEQ/m^3 (detection range: 0.0050-0.53 pg-TEQ/m^3; 1-season minimum value: 0.000075 pg-TEQ/m^3, maximum value: 1.1 pg-TEQ/m^3);
3) In small/medium cities (n=6), the mean value was 0.20 pg-TEQ/m^3, and the median value was 0.15 pg-TEQ/m^3 (detection range: 0.0017-0.66 pg-TEQ/m^3; 1-season minimum value: 0.000047 pg-TEQ/m^3, maximum value: 0.95 pg-TEQ/m^3);
4) For background levels (n=4), the mean value was 0.021 pg-TEQ/m^3 and the median value was 0.0058 pg-TEQ/m^3 (detection range: 0.0018-0.071 pg-TEQ/m^3; 1-season minimum value: 0.00023 pg-TEQ/m^3, maximum value: 0.13 pg-TEQ/m^3).

Graph 1. Comparison of the results of the 1998 dioxin survey and past surveys (air [mean value for the 4 seasons])

Evaluation of the survey results

It is impossible to make simple comparisons, but, overall, the concentration levels were lower than the results of earlier surveys conducted in Japan.

The seasonal changes in the dioxin concentrations in air in this survey showed an overall tendency to be higher in winter (mean value: 0.30 pg-TEQ/m^3, median value: 0.19 pg-TEQ/m^3, n=100; for reference, values for PCDDs and PCDFs were mean value: 0.27 pg-TEQ/m^3, median value: 0.14 pg-TEQ/m^3, n=387) and lower in summer (mean value: 0.17 pg-TEQ/m^3, median value 0.12 pg-TEQ/m^3, n=100; for reference, values for PCDDs and PCDFs were mean value: 0.16 pg-TEQ/m^3, median value: 0.086 pg-TEQ/m^3, n=387), and they were similar to the general changes in the concentration of suspended particulate matter in air.

Comparisons of the site categories showed that the mean value and the median value of concentration levels in the background were lower than in other categories. However, the differences in these values were not statistically significant, probably due to the small number of sites (n=7).

Co-planar PCBs accounted for 5.7% of the total TEQ value when overall mean values were compared, and for 6.5% when median values were compared.

At more than 80% of the sites, co-planar PCBs accounted for no more than 10% of the total TEQ value.

(2) Soot and Dust

Outline of the survey results

① PCDD and PCDF Concentrations

The mean value of PCDD and PCDF concentrations for two seasons at all sites (n=205) was 21 pg-TEQ/m^2/day, and the median value was 17 pg-TEQ/m^2/day (detection range: 0.20-170 pg-TEQ/m^2/day; 1-season minimum value: 0.0032 pg-TEQ/m^2/day, maximum value: 210 pg-TEQ/m^2/day).

According to site category:

1) In the vicinity of sources (n=79), including priority sites, the mean value was 25 pg-TEQ/m^2/day, and the median value was 21 pg-TEQ/m^2/day (detection range: 0.40-170 pg-TEQ/m^2/day; 1-season minimum value: 0.047 pg-TEQ/m^2/day, maximum value: 210 pg-TEQ/m^2/day);
2) In the large city regions (n=59), the mean value was 19 pg-TEQ/m^2/day, and the median value was 16 pg-TEQ/m^2/day (detection range: 0.22-50 pg-TEQ/m^2/day; 1-season minimum value: 0.048 pg-TEQ/m^2/day, maximum value: 75 pg-TEQ/m^2/day);
3) In small/medium cities (n=59), the mean value was 18 pg-TEQ/m^2/day, and the median value was 14 pg-TEQ/m^2/day (detection range: 0.29-62 pg-TEQ/m^2/day; 1-season minimum value: 0.0032 pg-TEQ/m^2/day, maximum value: 96 pg-TEQ/m^2/day);
4) For background levels (n=7), the mean value was 4.1 pg-TEQ/m^2/day, and the median value was 3.8 pg-TEQ/m^2/day (detection range: 0.20-8.6 pg-TEQ/m^2/day; 1-season minimum

value: 0.10 pg-TEQ/m^2/day, maximum value: 16 pg-TEQ/m^2/day);

5) Along roads (n=1), the mean value was 23 pg-TEQ/m^2/day and the median value was pg-TEQ/m^2/day (summer: 5.4 pg-TEQ/m^2/day; winter: 42 pg-TEQ/m^2/day).

Graph 2 Comparison of the results of the 1998 dioxin survey and the results of earlier surveys (soot and dust [mean value for the 2 seasons])

② Dioxin concentrations

The mean value of dioxin concentrations at all sites (n=103) was 21 pg-TEQ/m^2/day, and the median value was 18 pg-TEQ/m^2/day (detection range: 0.34-66 pg-TEQ/m^2/day; 1-season minimum value: 0.099 pg-TEQ/m^2/day, maximum value: 77 pg-TEQ/m^2/day).

According to site categories:

1) In the vicinity of sources (n=48), including priority sites, the mean value was 23 pg-TEQ/m^2/day, and the median value was 21 pg-TEQ/m^2/day (detection range: 1.9-54 pg-TEQ/m^2/day; 1-season minimum value: 1.2 pg-TEQ/m^2/day, maximum value: 71 pg-TEQ/m^2/day);
2) In the large city regions (n=28), the mean value was 23 pg-TEQ/m^2/day, and the median value was 23 pg-TEQ/m^2/day (detection range: 0.82-53 pg-TEQ/m^2/day; 1-season minimum value: 0.099 pg-TEQ/m^2/day, maximum value: 77 pg-TEQ/m^2/day);
3) In small/medium cities (n=20), the mean value was 19 pg-TEQ/m^2/day, and the median value was 11 pg-TEQ/m^2/day (detection range: 0.92-66 pg-TEQ/m^2/day; 1-season minimum value:0.44 pg-TEQ/m^2/day, maximum value: 67 pg-TEQ/m^2/day);
4) For background levels (n=7), the mean value was 4.4 pg-TEQ/m^2/day, and the median value was 3.8 pg-TEQ/m^2/day (detection range: 0.34-8.6 pg-TEQ/m^2/day; 1-season minimum value: 0.24 pg-TEQ/m^2/day, maximum value: 16 pg-TEQ/m^2/day).

<u>Evaluation of the survey results</u>

Based on the results of a comprehensive pilot survey carried out in 1997, the method of measuring soot and dust was partially revised in the present survey, and the measurements were made by using methods that took into account the effects of ultraviolet radiation and dispersion of the matter collected. As a result, if the measurements were made under identical conditions, they should be higher in the present survey than in earlier surveys because of the improvement in collection efficiency. Thus, it is impossible to make simple comparisons between the values obtained in the present survey and those in toxic air pollutant monitoring survey or the comprehensive pilot survey of dioxins conducted by the Environment Agency in 1997.

However, for the sake of reference, both the mean value and the median value in the present survey were lower than in the results of the surveys on PCDDs and PCDFs conducted by the Environment Agency in the past (n=26, 0.67-100 pg-TEQ/m^2/day, mean: 40 pg-TEQ/m^2/day, median value 32 pg-TEQ/m^2/day).

Furthermore, both the mean values and median values for the concentration levels were lower for background than for other site categories.

Co-planar PCBs accounted for 8.3% of the total TEQ value when compared in terms of overall mean values, and 7.4% when the median values were compared.

At more than 80% of the sites, the proportion of the total TEQ values accounted for by co-planar PCBs was no more than 20%.

(3) Public waters

<u>Outline of the survey results</u>

① PCDD and PCDF concentrations

The mean value of PCDD and PCDF concentrations at all sites (n=204; in the vicinity of sources, including priority sites: 2-season mean value) was 0.36 pg-TEQ/L , and the median

value was 0.089 pg-TEQ/L (detection range: 0-12 pg-TEQ/m^2/day; 1-season minimum value: 0 pg-TEQ/L, maximum value: 22 pg-TEQ/L).

According to site category:

1) In the vicinity of sources (n=79), including priority sites, the mean value was 0.47 pg-TEQ/L, and the median value was 0.11 pg-TEQ/L (detection range: 0.00038-12 pg-TEQ/L; 1-season minimum value: 0 pg-TEQ/L, maximum value: 22 pg-TEQ/L);
2) In the large city regions (n=59), the mean value was 0.35 pg-TEQ/L, and the median value was 0.11 pg-TEQ/L (detection range: 0-3.7 pg-TEQ/L);
3) In the small/medium cities (n=59), the mean value was 0.25 pg-TEQ/L, and the median value was 0.065 pg-TEQ/L (detection range: 0.00015-3.5 pg-TEQ/L);
4) For background levels (n=7), the mean value was 0.041 pg-TEQ/L and the median value was 0.011 pg-TEQ/L (detection range: 0.000065-0.13 pg-TEQ/L).

While it is impossible to make simple comparisons, these values were within the range of the results of the earlier surveys conducted by the Environment Agency and local governments (n=315, 0-19 pg-TEQ/L, mean value: 0.33 pg-TEQ/L, median value: 0.014 pg-TEQ/L).

② Dioxin concentrations

The mean value of dioxin concentrations at all sites (n=204) was 0.40 pg-TEQ/L and the median value was 0.11 pg-TEQ/L (detection range: 0.0014-13 pg-TEQ/L; 1-season minimum value: 0.000040 pg-TEQ/L, maximum value: 25 pg-TEQ/L).

According to site category:

1) In the vicinity of sources (n=79), including priority sites, the mean value was 0.54 pg-TEQ/L, and the median value was 0.13 pg-TEQ/L (detection range: 0.0052-13 pg-TEQ/L; 1-season minimum value: 0.000040 pg-TEQ/L, maximum value: 25 pg-TEQ/L);
2) In the large city regions (n=59), the mean value was 0.38 pg-TEQ/L, and the median value was 0.14 pg-TEQ/L (detection range: 0.0044-3.8 pg-TEQ/L);
3) In small/medium cities (n=59), the mean value was 0.29 pg-TEQ/L, and the median value was 0.080 pg-TEQ/L (detection range: 0.0061-3.5 pg-TEQ/L);
4) For background levels (n=7), the mean value was 0.047 pg-TEQ/L, and the median value was 0.014 pg-TEQ/L (detection range: 0.0014-0.14 pg-TEQ/L).

While it is impossible to make simple comparisons, these values were within the range of the results of the earlier surveys conducted by the Environment Agency and local governments (n=7, 0.47-19 pg-TEQ/L, mean value 6.8 pg-TEQ/L, median value 6.4 pg-TEQ/L).

Graph 3. Comparison of the results of the 1998 dioxin survey and the results of earlier surveys (public waters [2-season mean value in the vicinity of the sources and the priority regions])

Evaluation of the survey results

The concentration levels were generally highest in the vicinity of the sources, followed by the large urban areas, and then the small/medium cities, and both the mean values and the median values for the concentration levels were lower for background than for the other site categories.

Moreover, because water quality appeared to be highly dependent on flow volume, etc., at the time of sample collection, in the future it will be necessary to assess the relationship between the required survey frequency, river flow volume, etc., and dioxin concentrations.

Co-planar PCBs accounted for 12% of the total TEQ value when compared according to overall mean values, and 5.3% when compared according to median values.

At approximately 80% of the sites, co-planar PCBs accounted for no more than 30% of the total TEQ value.

(4) Groundwater quality

Outline of the survey results

① PCDD and PCDF concentrations

The mean value of PCDD and PCDF concentrations at all sites (n=243) was 0.086 pg-TEQ/L, and the median value was 0.0073 pg-TEQ/L (detection range: 0-5.3 pg-TEQ/L).

According to site category:

1) In the vicinity of sources (n=118), including priority sites, the mean value was 0.088 pg-TEQ/L and the median value was 0.0068 pg-TEQ/L (detection range: 0-4.0 pg-TEQ/L);
2) In the large city regions (n=59), the mean value was 0.036 pg-TEQ/L and the median value was 0.0082 pg-TEQ/L (detection range: 0-0.45 pg-TEQ/L);
3) In small/medium cities (n=59), the mean value was 0.14 pg-TEQ/L, and the median value was 0.0088 pg-TEQ/L (detection range: 0-5.3 pg-TEQ/L);
4) For background levels (n=7), the mean value was 0.032 pg-TEQ/L, and the median value was 0.00015 pg-TEQ/L (detection range: 0-0.12 pg-TEQ/L).

While it is impossible to make simple comparisons, on the whole these values tended to be lower than the range of the results of the earlier surveys conducted by the Environment Agency and local governments (n=62, 0-3.9 pg-TEQ/L, mean value: 0.12 pg-TEQ/L, median value: 0.011 pg-TEQ/L).

② Dioxin concentrations

The mean value of dioxin concentrations at all sites (n=188) was 0.081 pg-TEQ/L, and the median value was 0.011 pg-TEQ/L (detection range: 0-5.4 pg-TEQ/L).

According to site category:

1) In the vicinity of sources (n=64), including priority sites, the mean value was 0.056 pg-TEQ/L, and the median value was 0.0092 pg-TEQ/L (detection range: 0.00015-0.59 pg-TEQ/L);
2) In the large city regions (n=59), the mean value was 0.048 pg-TEQ/L, and the median value was 0.013 pg-TEQ/L (detection range: 0.00031-0.47 pg-TEQ/L);
3) In small/medium cities (n=59), the mean value was 0.14 pg-TEQ/L, and the median value was 0.012 pg-TEQ/L (detection range: 0-5.4 pg-TEQ/L);
4) For background levels (n=6), the mean value was 0.041 pg-TEQ/L, and the median value was 0.015 pg-TEQ/L (detection range: 0.00092-0.13 pg-TEQ/L).

Graph 4. Comparison of the results of the 1998 dioxin survey with the results of earlier surveys (groundwater quality)

Evaluation of the survey results

On the whole the concentration levels were low, and no particular differences in the mean values or median values of concentration levels were observed between the site categories.

The values at sites where they were relatively high were thought to be attributable to the effects of suspended solids (SS). They were all wells that were not used to supply drinking water, and the analytical samples clearly had high levels of suspended solids that made the water unsuitable for drinking.

Co-planar PCBs accounted for 10% of the total TEQ values when compared according to overall mean values, and 12% when compared according to median values.

At the greatest number of sites, approximately 40%, co-planar PCBs accounted for no more than 10% of the total TEQ value.

(5) Bottom sediment of public waters

Outline of the survey results

① PCDD and PCDF concentrations

The mean value of PCDD and PCDF concentrations at all sites (n=205) was 6.8 pg-TEQ/g dry weight, and the median value was 0.23 pg-TEQ/g dry weight (detection range: 0-230 pg-TEQ/g dry weight).

According to site category:

1) In the vicinity of sources (n=79), including priority sites, the mean value was 7.4 pg-TEQ/g

dry weight, and the median value was 0.21 pg-TEQ/g (detection range: 0.00037-230 pg-TEQ/g dry weight);

2) In the large city regions (n=60), the mean value was 8.5 pg-TEQ/g dry weight, and the median value was 0.79 pg-TEQ/g dry weight (detection range: 0.00035-190 pg-TEQ/g dry weight);
3) In small/medium cities (n=59), the mean value was 5.0 pg-TEQ/g dry weight, and the median value was 0.19 pg-TEQ/g dry weight (detection range: 0-150 pg-TEQ/g dry weight);
4) For background levels (n=7), the mean value was 0.75 pg-TEQ/g dry weight, and the median value was 0.028 pg-TEQ/g dry weight (detection range: 0-4.9 pg-TEQ/g dry weight).

While it is impossible to make simple comparisons, on the whole these values were lower than the results of the earlier surveys conducted by the Environment Agency and local governments (n=571, 0-180 pg-TEQ/g dry weight, mean value: 13 pg-TEQ/g dry weight, median value: 6.6 pg-TEQ/L).

② Dioxin concentrations

The mean value of dioxin concentrations at all sites (n=205) was 7.7 pg-TEQ/g dry weight, and the median value was 0.41 pg-TEQ/g (detection range: 0-260 pg-TEQ/g dry weight).

According to site category:

1) In the vicinity of sources (n=79), including priority sites, the mean value was 8.5 pg-TEQ/g, and the median value was 0.38 pg-TEQ/g (detection range: 0.00087-260 pg-TEQ/g dry weight);
2) In the large city regions (n=60), the mean value was 9.6 pg-TEQ/g dry weight, and the median value was 0.90 pg-TEQ/g dry weight (detection range: 0.0014-200 pg-TEQ/g dry weight);
3) In small/medium cities (n=59), the mean value was 5.5 pg-TEQ/g dry weight, and the median value was 0.39 pg-TEQ/g dry weight (detection range: 0.0013-160 pg-TEQ/g dry weight);
4) For background levels (n=7), the mean value was 0.75 pg-TEQ/g dry weight, and the median value was 0.033 pg-TEQ/g dry weight (detection range: 0-4.9 pg-TEQ/g dry weight).

While it is impossible to make simple comparisons, with the exception of 3 sites (urban rivers), these values fell within the range of the results of the earlier surveys conducted by the Environment Agency and local governments (n=32, 0.089-160 pg-TEQ/g dry weight, mean value: 31 pg-TEQ/g dry weight, median value: 16 pg-TEQ/g dry weight).

Graph 5. Comparison of the results of the 1998 dioxin survey and the results of earlier surveys (bottom sediment)

Evaluation of the survey results

The 3 sites that showed relatively high values did not share the same tendencies in terms of homologue patterns, and the reason for this will have to be investigated in the future.

Both the mean values and median values for background concentration levels were lower than at the other sites.

Co-planar PCBs accounted for 11% of the total TEQ value when compared according to overall mean values, and 5.9% when compared according to median values.

At approximately 80% of the sites co-planar PCBs accounted for no more than 30% of the total TEQ value.

(6) Soil

Outline of the survey results

① PCDD and PCDF concentrations

The mean value of PCDD and PCDF concentrations at all sites (n=344) was 6.2 pg-TEQ/g, and the median value was 2.3 pg-TEQ/g (detection range: 0.00067-110 pg-TEQ/g).

According to site category:

1) In the vicinity of sources (n=219), including priority sites, the mean value was 6.8 pg-TEQ/g, and the median value was 2.6 pg-TEQ/g (detection range: 0.00067-110 pg-TEQ/g);
2) In the large city regions (n=59), the mean value was 5.4 pg-TEQ/g, and the median value was 2.7 pg-TEQ/g (detection range: 0.057-33 pg-TEQ/g);
3) In small/medium cities (n=59), the mean value was 5.6 pg-TEQ/g, and the median value was 1.5 pg-TEQ/g (detection range: 0.022-61 pg-TEQ/g);
4) For background levels (n=7), the mean value was 1.7 pg-TEQ/g, and the median value was 1.3 pg-TEQ/g (detection range: 0.13-5.6 pg-TEQ/g).

While it is impossible to make simple comparisons, all of these values were lower than the maximum values, mean values, and median values of the results of the surveys previously conducted by the Environment Agency and local governments (n=421, 0-2700 pg-TEQ/g dry weight, mean value: 27 pg-TEQ/g, median value: 9.2 pg-TEQ/g).

② Dioxin concentrations

The mean value of dioxin concentrations at all sites (n=286) was 6.5 pg-TEQ/g, and the median value was 2.7 pg-TEQ/g (detection range: 0.0015-61 pg-TEQ/g).

According to site category:

1) In the vicinity of sources (n=161), including priority sites, the mean value was 7.1 pg-TEQ/g, and the median value was 2.9 pg-TEQ/g (detection range: 0.0015-49 pg-TEQ/g);
2) In the large city regions (n=59), the mean value was 6.1 pg-TEQ/g, and the median value was 3.5 pg-TEQ/g (detection range: 0.063-35 pg-TEQ/g);
3) In small/medium cities (n=59), the mean value was 6.0 pg-TEQ/g, and the median value was 1.7 pg-TEQ/g (detection range: 0.024-61 pg-TEQ/g);
4) For background levels (n=7), the mean value was 1.8 pg-TEQ/g, and the median value was 1.8 pg-TEQ/g (detection range: 0.26-5.6 pg-TEQ/g).

Graph 6. Comparison of the results of the 1998 dioxin survey and the results of earlier surveys (soil)

Evaluation of the survey results

None of the sites measured in this survey exceeded the guideline value (1000 pg-TEQ/g) for residences, etc., in the First Report of the Committee on Dioxins in Soil published in July 1999.

Both the mean values and median values were lower for background than for any other site categories.

Co-planar PCBs accounted for 7.7% of the total TEQ value when compared according to overall mean values, and 8.2% when compared according to median values.

At more than 80% of the sites co-planar PCBs accounted for no more than 20% of the total TEQ value.

(7) Aquatic organisms

Outline of the survey results

① PCDD and PCDF concentrations

The mean value of PCDD and PCDF concentrations at all sites (n=368) was 0.64 pg-TEQ/g wet weight, and the median value was 0.32 pg-TEQ/g wet weight (detection range: 0-11 pg-TEQ/g wet weight).

According to site category:

1) In the vicinity of sources (n=118), including priority sites, the mean value was 0.82 pg-TEQ/g wet weight, and the median value was 0.39 pg-TEQ/g wet weight (detection range: 0-8.4 pg-TEQ/g wet weight);
2) In the large city regions (n=118), the mean value was 0.60 pg-TEQ/g wet weight, and the median value was 0.33 pg-TEQ/g wet weight (detection range: 0-11 pg-TEQ/g wet weight);
3) In small/medium cities (n=118), the mean value was 0.51 pg-TEQ/g wet weight, and the

median value was 0.26 pg-TEQ/g wet weight (detection range: 0-4.5 pg-TEQ/g wet weight);

4) For background levels (n=14), the mean value was 0.43 pg-TEQ/g wet weight, and the median value was 0.14 pg-TEQ/g wet weight (detection range: 0-3.4 pg-TEQ/g).

While it is impossible to make simple comparisons, and some of them are higher than the results of the earlier surveys conducted by the Environment Agency and local governments (n=436, 0-11 pg-TEQ/g wet weight dry weight, mean value: 0.68 pg-TEQ/g wet weight, median value: 0.17 pg-TEQ/g wet weight), on the whole they are almost the same.

② Dioxin concentrations

The mean value of dioxin concentrations at all sites (n=368) was 2.1 pg-TEQ/g wet weight, and the median value was 1.1 pg-TEQ/g wet weight (detection range: 0.0022-30 pg-TEQ/g wet weight).

According to site category:

1) In the vicinity of sources (n=118), including priority sites, the mean value was 2.3 pg-TEQ/g wet weight, and the median value was 1.3 pg-TEQ/g wet weight (detection range: 0.065-12 pg-TEQ/g wet weight);
2) In the large city regions (n=118), the mean value was 2.5 pg-TEQ/g wet weight, and the median value was 1.4 pg-TEQ/g wet weight (detection range: 0.032-30 pg-TEQ/g wet weight);
3) In the small/medium cities (n=118), the mean value was 1.7 pg-TEQ/g wet weight, and the median value was 1.0 pg-TEQ/g wet weight (detection range: 0.0061-12 pg-TEQ/g wet weight);
4) For background levels (n=14), the mean value was 0.73 pg-TEQ/g wet weight, and the median value was 0.44 pg-TEQ/g wet weight (detection range: 0.0022-4.1 pg-TEQ/g wet weight).

While it is impossible to make simple comparisons, with the exception of 2 specimens (urban rivers), these values were within the same range as the results of the earlier surveys conducted by the Environment Agency and local governments (n=8, 0.29-16 pg-TEQ/g wet weight, mean value: 3.1 pg-TEQ/g wet weight, median value: 1.4 pg-TEQ/g wet weight).

Graph 7. Comparison of the results of the 1998 dioxin survey and the results of earlier surveys (aquatic organisms (wet weight))

Evaluation of the survey results

Co-planar PCBs accounted for 70% of the total TEQ value when compared according to overall mean values, and 68% when compared according to median values.

At approximately 70% of the sites, co-planar PCBs accounted for 50% or more of the total TEQ value, displaying a tendency different from the other media.

In this survey the majority of specimens was collected in the vicinity of the sources and in urban areas, and the aquatic organisms were selected based on the species that could be collected at the survey sites. Accordingly, it may be inappropriate to use these values when considering the dioxin concentration levels in aquatic organisms used for food.

3. Relationships between the media

The relationships between the media were also analyzed in this survey to contribute to the establishment of future control measures.

The results showed a certain degree of correlation between air and soot/dust, but the data for the other media were fairly well dispersed. Thus it will be necessary to gather more scientific information on dioxins' behavior in the environment, the properties of dioxins in each medium, and related data, in order to evaluate the relationships between the media more precisely.

4. Implementation of quality control

Dioxin measurement requires sophisticated technology, and quality control of the measurement results is an important task in dioxin surveys, including the systems used by

organizations conducting the measurements.

However, since methodology for carrying out adequate quality control has not been decided upon, in this survey the Environment Agency and the Japan Environmental Sanitation Center used the following approaches for quality control regarding the organizations conducting measurements.

(1) Prior inspection of the plans that each of the organizations making the measurements had drawn up to carry out quality control at each step, i.e., sample collection, pre-treatment, and analysis.
(2) Inspections by specialists, Japan Environmental Sanitation Center and Environment Agency personnel of the organizations making the measurements, and whenever necessary, careful examination of the analysis procedure, charts, etc.
(3) Measurement of the same soil and sediment samples by organizations making the measurements.

As a result of the above approaches, none of the organizations were problematic in terms of ability to perform the analyses.

In the future, together with related ministries and agencies, it will be necessary to continue assessing the best way to ensure the reliability of the organizations taking measurements and the results of the surveys, including the methods of quality control used in this survey

5. Overall conclusions

This survey involved approximately 400 sites in 59 prefectures and ordinance-designated cities throughout Japan and was the largest scale comprehensive measurement of multiple environmental media ever undertaken in the country.

While it is impossible to make simple comparisons, on the whole the values obtained in this survey were lower than in the results of earlier surveys. Higher concentration levels were also obtained, but only at some sites, and next it will be necessary to determine the actual conditions and to press forward with more detailed survey studies, including the behavior of dioxins in the environment.

Co-planar PCBs were only measured in some of the regions in this survey and the number of measurements was not on the same scale as for PCDDs and PCDFs. However, as co-planar PCBs have been categorized as dioxins by the Law Concerning Special Measures Against Dioxins enacted in September 1999, it will be important to try to improve our knowledge of the amounts of co-planar PCBs distributed in the environment and the relationships between media, similar to what has been done regarding PCDDs and PCDFs.

Moreover, in regard to quality control, because of the increase in demand for measurements/analyses by regular surveillance, etc., based on the Law Concerning Special Measures Against Dioxins, and the need to improve accuracy because of stricter regulation of exhaust gases, etc., more specific and universal quality control is being sought, and it will be necessary to discuss this topic further, using the results of this survey as a basis.

The results of other surveys will be considered in combination with detailed assessments for each medium in the present survey when setting the environmental standards for air, water, and soil, which are currently under discussion., In addition, it has been decided to proceed with detailed assessments of relationships between the individual media, through research now being conducted by the Health Division of the Environment Agency into the behavior of dioxins in the environment, also making use of existing information.

In order to judge the efficacy of control measures based on the Law Concerning Special Measures Against Dioxins, the Environment Agency considers it is necessary to continue carrying out comprehensive monitoring surveys, including surveillance surveys, in accordance with that law. To do so, it intends to conduct more appropriate fact-finding surveys based on these survey results and experiences relating to quality control methods, etc., and to make efforts to evaluate the control measures and implement policies.

Attachments

- Attachment 1. Note about survey sites
- Attachment 2. (Table 1) Chart of survey sites
- Attachment 3. (Table 2) Chart of isomers measured
- Attachment 4. (Table 3) Survey results
- Attachment 5. (Table 4) Measurement results

Reference materials

Chart of the results of the 1998 Urgent Simultaneous Nationwide Survey of Dioxins according to site

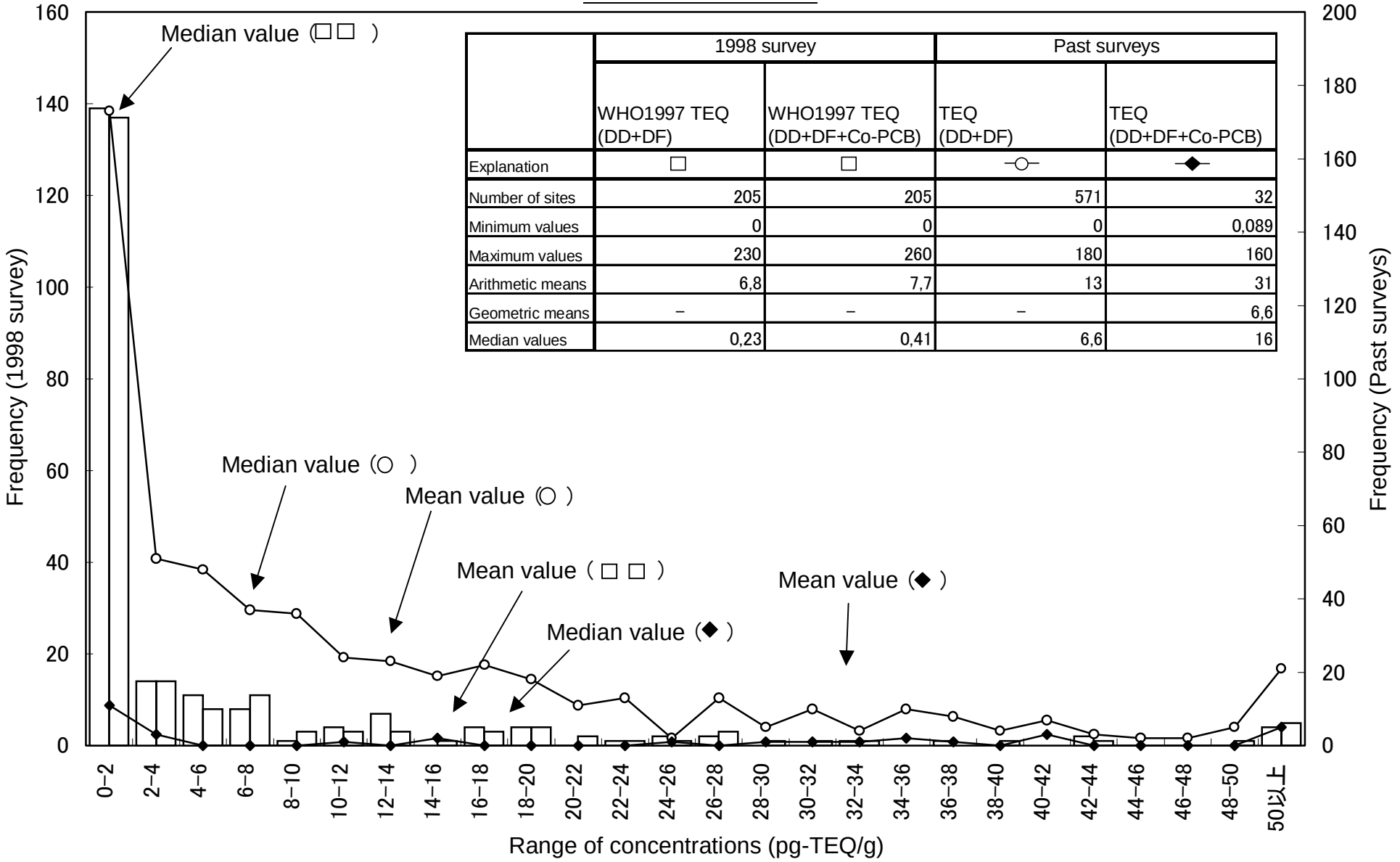
File 1
Hokkaido, Sapporo City, Aomori Prefecture, Iwate Prefecture, Miyagi Prefecture, Sendai City, Akita Prefecture, Yamagata Prefecture, Fukushima Prefecture, Ibaragi Prefecture, Tochigi Prefecture, Gunma Prefecture, Saitama Prefecture, Chiba Prefecture, Chiba City, Tokyo, Kanagawa Prefecture, Yokohama City, Kawasaki City

File 2
Niigata Prefecture, Toyama Prefecture, Ishikawa Prefecture, Fukui Prefecture, Yamanashi Prefecture, Nagano Prefecture, Gifu Prefecture, Shizuoka Prefecture, Aichi Prefecture, Nagoya City, Mie Prefecture, Shiga Prefecture, Kyoto Prefecture, Kyoto City, Osaka Prefecture, Osaka City, Hyogo Prefecture, Kobe City, Nara Prefecture

File 3
Wakayama Prefecture, Tottori Prefecture, Shimane Prefecture, Okayama Prefecture, Hiroshima Prefecture, Hiroshima City, Yamaguchi Prefecture, Tokushima Prefecture, Kagawa Prefecture, Ehime Prefecture, Kochi Prefecture, Fukuoka Prefecture, Kitakyushu City, Fukuoka City, Saga Prefecture, Nagasaki Prefecture, Kumamoto Prefecture, Oita Prefecture, Miyazaki Prefecture, Kagoshima Prefecture, Okinawa Prefecture

Comparison of the Results of the 1998 Dioxin Survey and Past Surveys

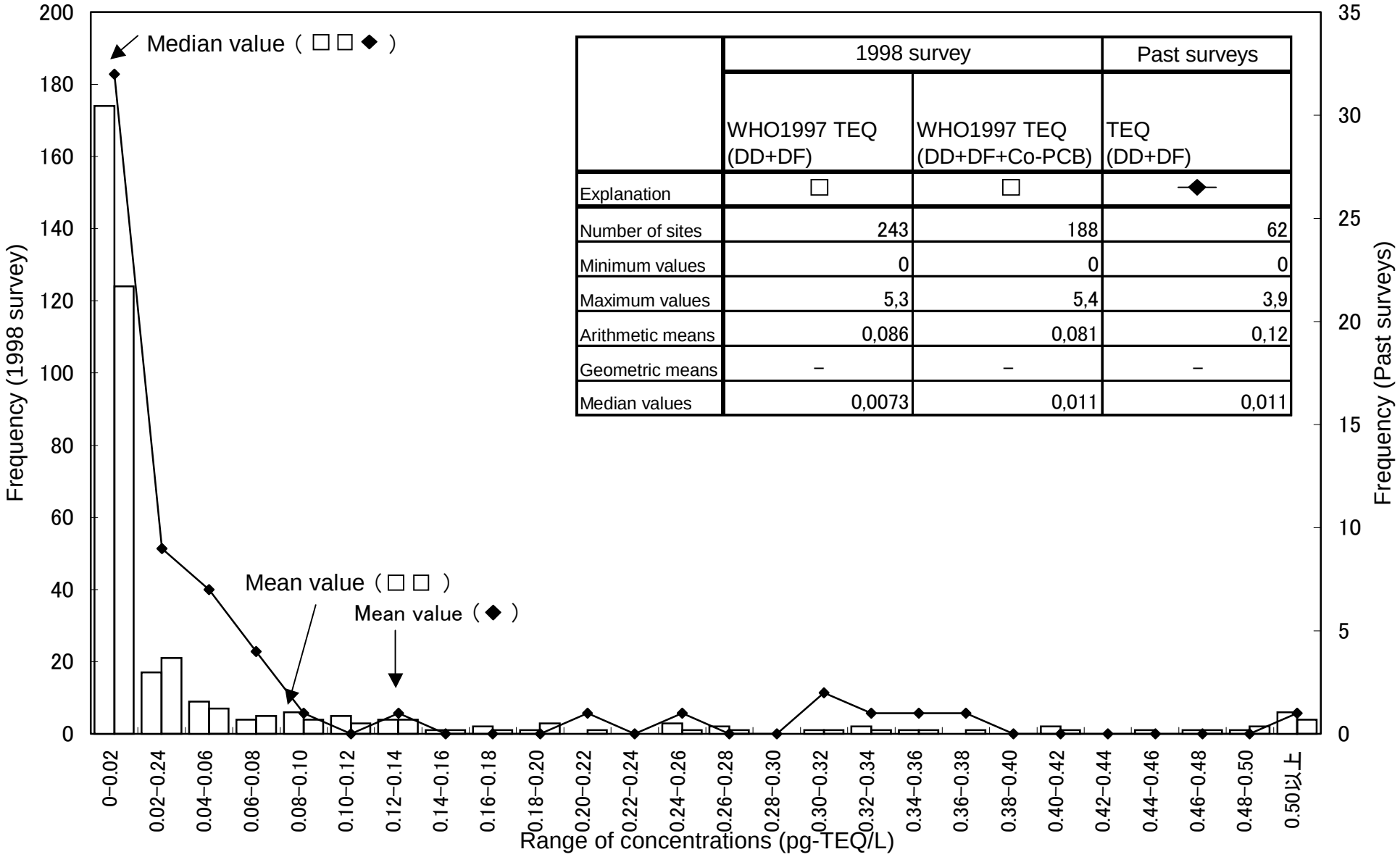
Bottom sediment



	1998 survey		Past surveys	
	WHO1997 TEQ (DD+DF)	WHO1997 TEQ (DD+DF+Co-PCB)	TEQ (DD+DF)	TEQ (DD+DF+Co-PCB)
Explanation	□	□	—○—	—◆—
Number of sites	205	205	571	32
Minimum values	0	0	0	0,089
Maximum values	230	260	180	160
Arithmetic means	6,8	7,7	13	31
Geometric means	–	–	–	6,6
Median values	0,23	0,41	6,6	16

Comparison of the Results of the 1998 Dioxin Survey and Past Surveys

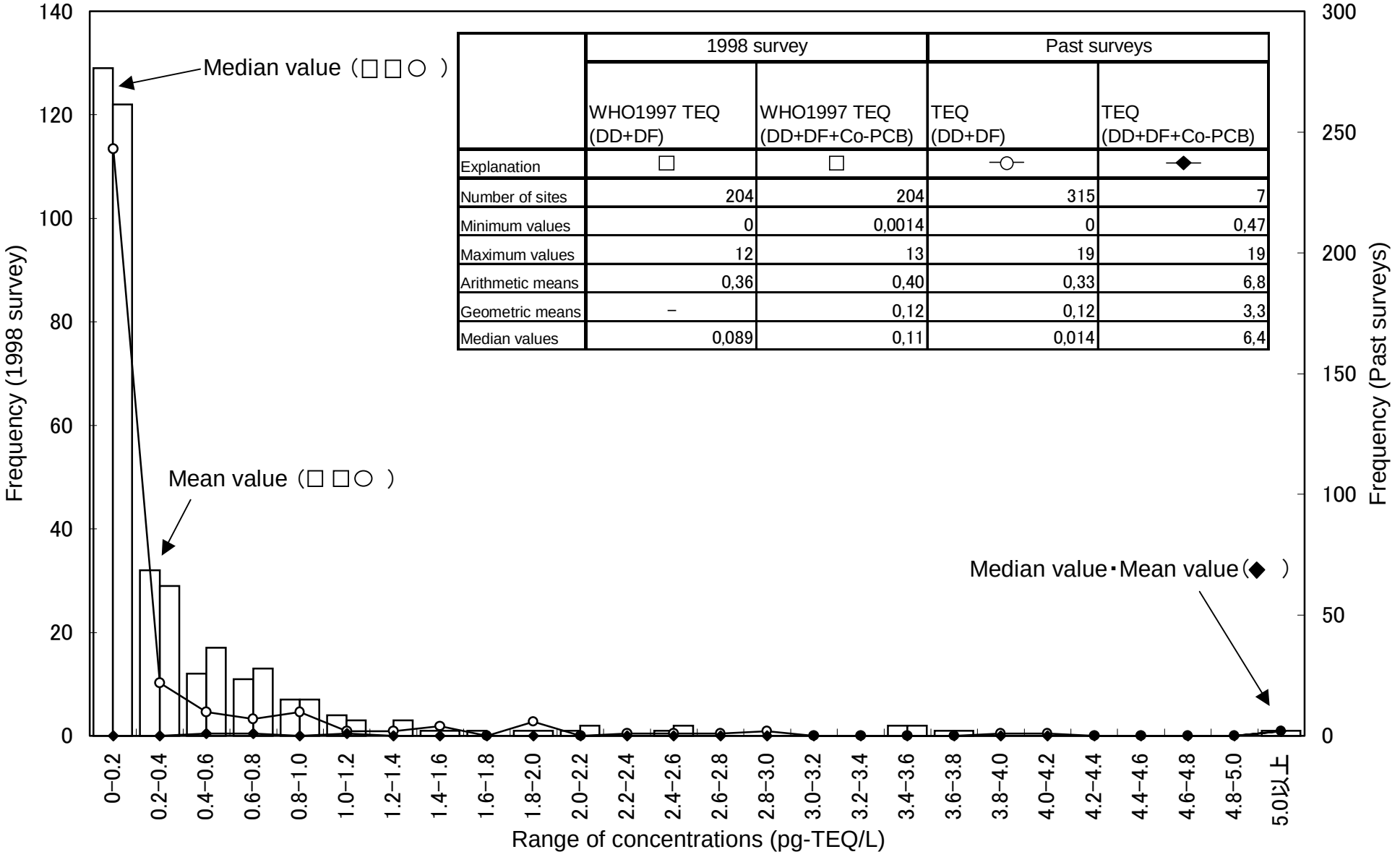
Groundwater quality



	1998 survey		Past surveys
	WHO1997 TEQ (DD+DF)	WHO1997 TEQ (DD+DF+Co-PCB)	TEQ (DD+DF)
Explanation	□	□	◆
Number of sites	243	188	62
Minimum values	0	0	0
Maximum values	5,3	5,4	3,9
Arithmetic means	0,086	0,081	0,12
Geometric means	–	–	–
Median values	0,0073	0,011	0,011

Comparison of the Results of the 1998 Dioxin Survey and Past Surveys

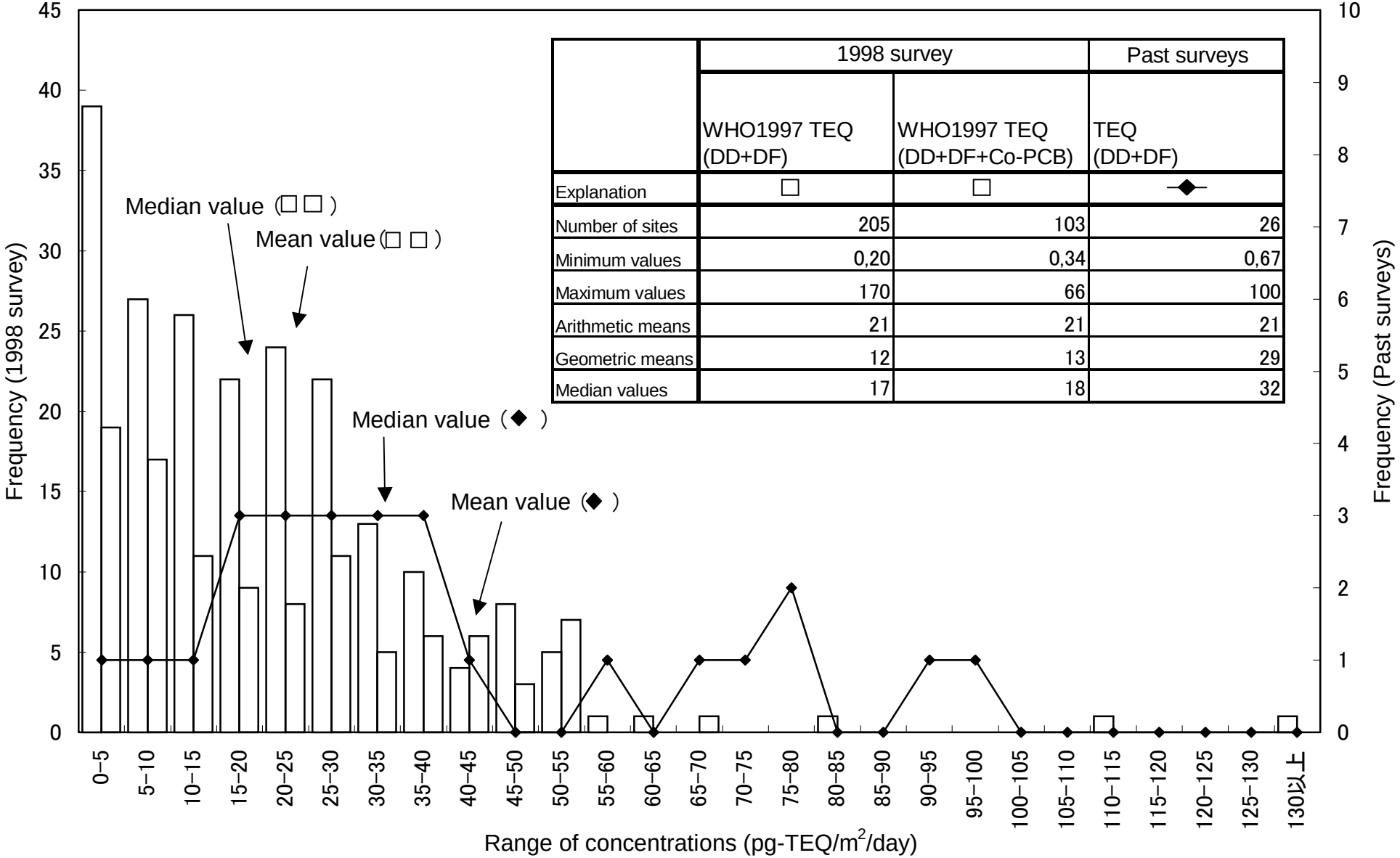
Public waters (2-seasons mean value in the vicinity of the sources and the priority regions



	1998 survey		Past surveys	
	WHO1997 TEQ (DD+DF)	WHO1997 TEQ (DD+DF+Co-PCB)	TEQ (DD+DF)	TEQ (DD+DF+Co-PCB)
Explanation	□	□	—○—	—◆—
Number of sites	204	204	315	7
Minimum values	0	0,0014	0	0,47
Maximum values	12	13	19	19
Arithmetic means	0,36	0,40	0,33	6,8
Geometric means	–	0,12	0,12	3,3
Median values	0,089	0,11	0,014	6,4

Comparison of the Results of the 1998 Dioxin Survey and Past Surveys

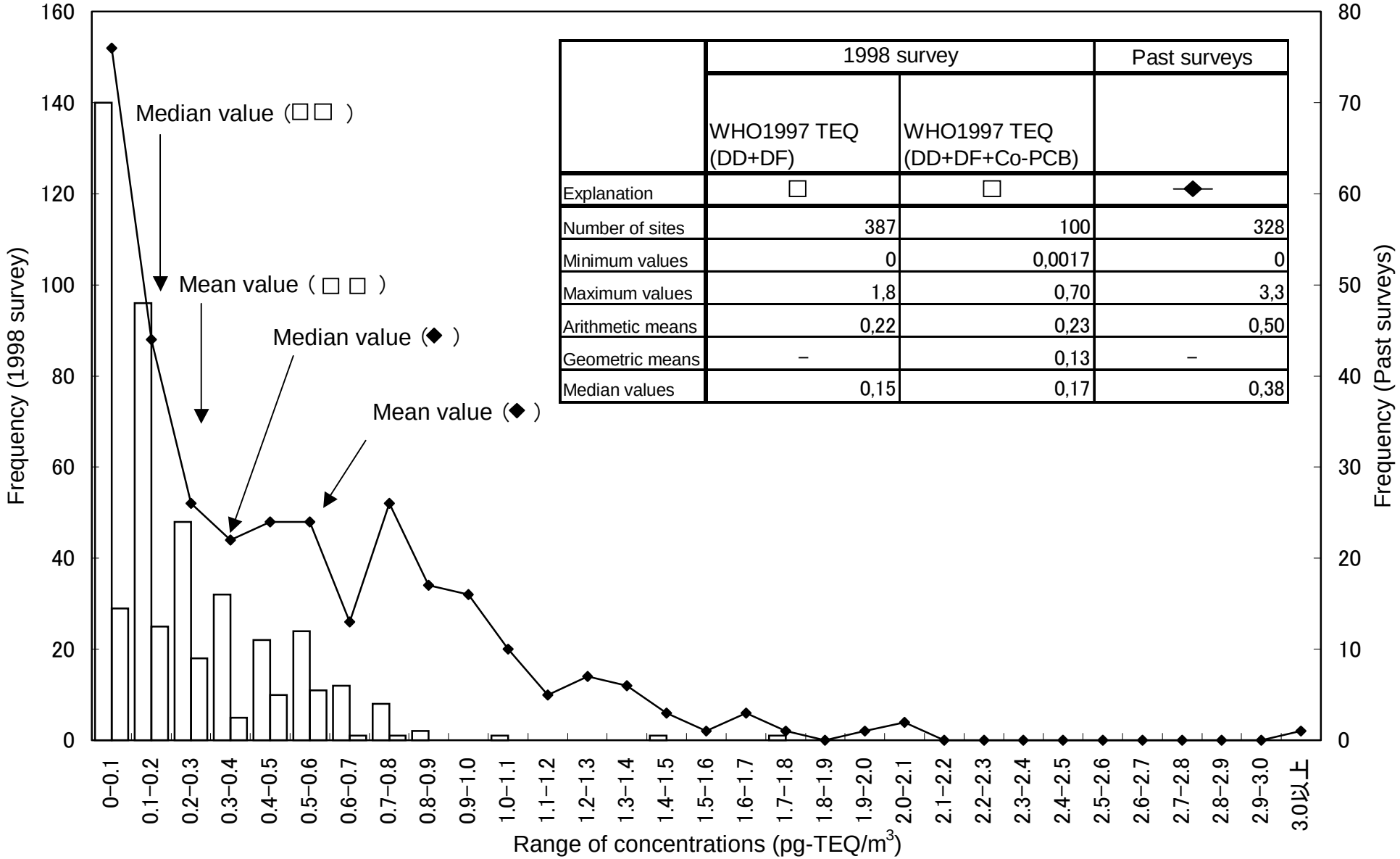
Soot and dust (mean value for the 2 seasons)



	1998 survey		Past surveys
	WHO1997 TEQ (DD+DF)	WHO1997 TEQ (DD+DF+Co-PCB)	TEQ (DD+DF)
Explanation	□	□	◆
Number of sites	205	103	26
Minimum values	0,20	0,34	0,67
Maximum values	170	66	100
Arithmetic means	21	21	21
Geometric means	12	13	29
Median values	17	18	32

Comparison of the Results of the 1998 Dioxin Survey and Past Surveys

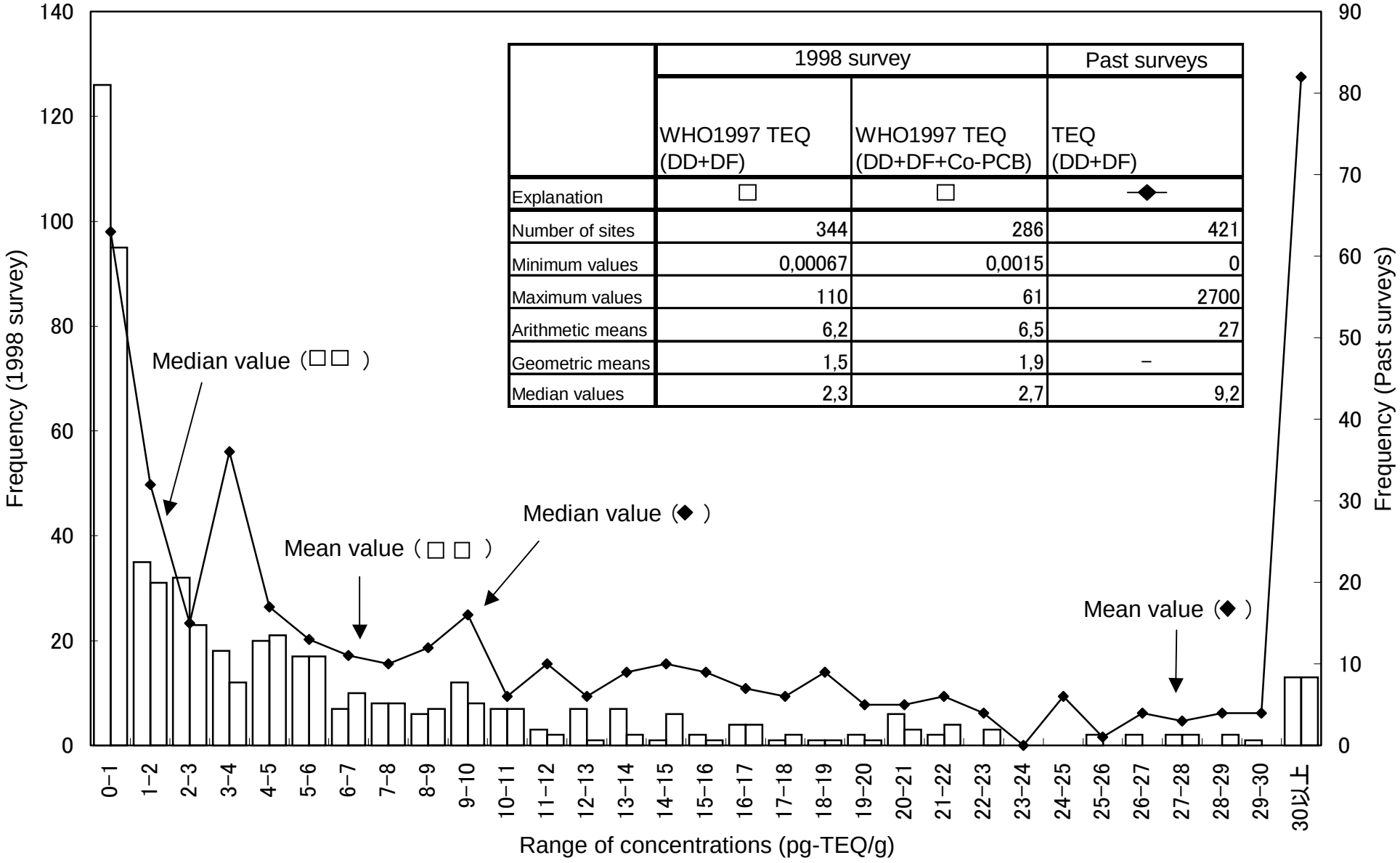
Air (mean value for the 4 seasons)



	1998 survey		Past surveys
	WHO1997 TEQ (DD+DF)	WHO1997 TEQ (DD+DF+Co-PCB)	
Explanation	□	□	◆
Number of sites	387	100	328
Minimum values	0	0,0017	0
Maximum values	1,8	0,70	3,3
Arithmetic means	0,22	0,23	0,50
Geometric means	–	0,13	–
Median values	0,15	0,17	0,38

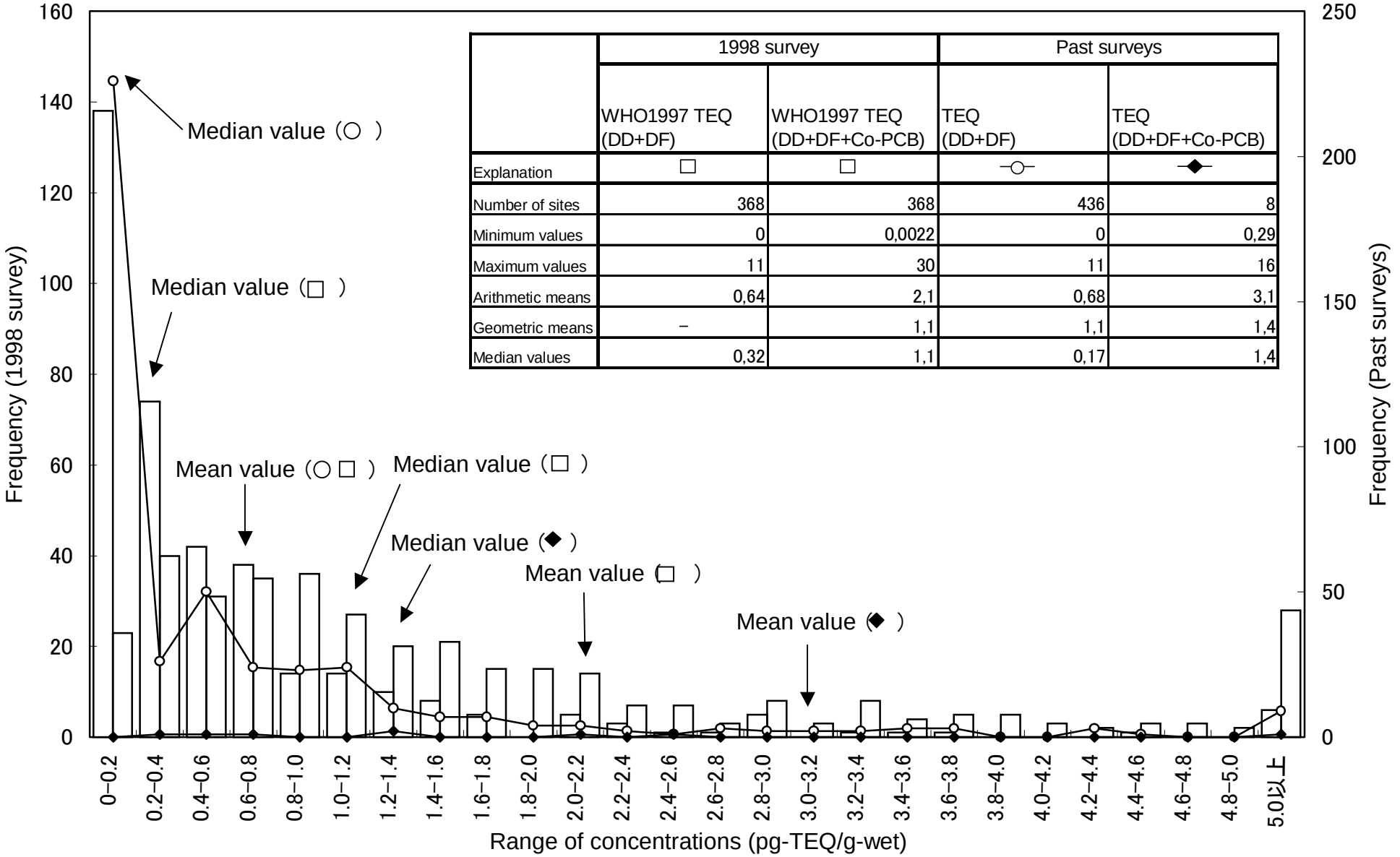
Comparison of the Results of the 1998 Dioxin Survey and Past Surveys

Soil



	1998 survey		Past surveys
	WHO1997 TEQ (DD+DF)	WHO1997 TEQ (DD+DF+Co-PCB)	TEQ (DD+DF)
Explanation	□	□	◆
Number of sites	344	286	421
Minimum values	0,00067	0,0015	0
Maximum values	110	61	2700
Arithmetic means	6,2	6,5	27
Geometric means	1,5	1,9	–
Median values	2,3	2,7	9,2

Comparison of the Results of the 1998 Dioxin Survey and Past Surveys
Aquatic organisms (wet weight)



	1998 survey		Past surveys	
	WHO1997 TEQ (DD+DF)	WHO1997 TEQ (DD+DF+Co-PCB)	TEQ (DD+DF)	TEQ (DD+DF+Co-PCB)
Explanation	□	□	—○—	—◆—
Number of sites	368	368	436	8
Minimum values	0	0,0022	0	0,29
Maximum values	11	30	11	16
Arithmetic means	0,64	2,1	0,68	3,1
Geometric means	−	1,1	1,1	1,4
Median values	0,32	1,1	0,17	1,4

Note about Survey Sites

1. Vicinity of dioxin sources, large cities, small/medium cities

Survey sites were selected from 47 prefectures and 12 government ordinance-designated cities throughout the country, based on the criteria described below. (The government ordinance-designated cities in Japan include 12 relatively large cities such as Kyoto City and Osaka City.)

1) Around sources

Sites selected were in the vicinity of facilities that are considered major sources of dioxin, such as waste incinerators, etc.

2) Large cities (densely populated regions)

Within representative cities in the prefectures, such as those which are the seat of the prefectural government, sites selected were in areas other than (a) strictly industrial zones, (b) areas in the vicinity of dioxin sources in item 1) above, and (c) areas within ordinance-designated cities under the jurisdiction of the prefecture.

Within ordinance-designated cities, sites selected were in densely populated areas, other than (a) strictly industrial zones and (b) areas around sources defined in 1) above.

3) Small/medium cities (regions with an average population)

In the prefectures, municipalities with an average size population, sites selected were in areas other than strictly industrial zones and areas around sources defined in 1) above.

In ordinance-designated cities, sites selected were in areas with an average population, other than (a) strictly industrial zones and (b) areas defined in 1) above.

2. Background level measurements

Seven sites were selected in areas throughout the country where environmental pollution from dioxins is thought to be very low.

3. Notes on environmental media

1) Air

Measurements were made at 2 sites each in the vicinity of dioxin sources, in large cities, and in small/medium cities, in order to determine the dispersion within the area.

In the vicinity of sources, measurements were taken at one location upwind and one downwind (considering prevailing winds) at distances where, or as close as possible to, the maximum concentrations fall to the surface. For background levels, one measurement was taken at each site. For roadside measurements, three regions were selected nationwide , and measurements were taken alongside roads and a distance away from roads.

2) Soot and dust

Around each dioxin source, in large cities, and in small/medium cities, and for background levels, measurements were taken at one site each, at the same site as for the air measurements.

Along roads, one region was selected nationwide, and measurements were taken along the road at the same site as for the air measurements.

3) Other media

In the vicinity of dioxin sources (for groundwater, 2 sites each), in large cities, in small/medium cities, and for background levels, measurements were taken at one site each, adjacent to the air measurement sites.

Measurements of water quality were taken at the nearest environmental standard site or auxiliary site.

Soils were surveyed adjacent to the air measurement sites; to ensure the samples were representative of the area, in principle samples were collected from 5 places, combined in equal measure (5-site mixture method) and then analysed.

4. Priority areas

More intensive surveys were conducted in 20 areas selected at random from the vicinity of dioxin sources of 59 areas nationwide. The number of measurement sites used for some media were greater in the priority areas.

One additional site was added for each measurement of air, soot and dust, public waters, and sediment of public waters; and 8 sites were added for soil measurements.

Local government name	Site category	Air	Soot & dust	Soil	Groundwater quality	Public waters, public waters bottom sediment, and aquatic organisms	Aquatic organism category		Notes
							Organism 1	Organism 2	
Hokkai-dou	Vicinity of source	Otaru-shi	Otaru-shi	Otaru-shi	Otaru-shi	Katsunaigawa Takasagobashi	Edible mantis shrinp	Sand flounder	Aquatic organism survey site was Otaru sea area St-5
	Large city regions	Asahikawa-shi	Asahikawa-shi	Asahikawa-shi	Asahikawa-shi	Ishikarigawa Inaiohhashi	Japanese dace	Ninespine stickleback	
	Small/medium cities	Muroran-shi	Muroran-shi	Muroran-shi	Muroran-shi	Muroran sea area (4) St-5	Fat greenling	Japanese mussel	
	Background levels	Shizunai-gun Shizunai-cho	Shizunai-gun Shizunai-cho	Shizunai-gun Shizunai-cho	Shizunai-gun Shizunai-cho	Shunbetsugawa ShunbetsugawaDam site	Japanese dace	Rainbow trout	
Sapporo-shi	Priority regions	Nishi-ku	Nishi-ku	Nishi-ku,Teine-ku		Shinkawa system Kotonihassamugawa Yakenbashi			
	Vicinity of source	Kita-ku,Teine-ku	Teine-ku		Kita-ku,Nishi-ku	Shinkawa Inetsumibashi	Carp	Redlip mullet	
	Large city regions	Shiroishi-ku,Minami-ku	Shiroishi-ku	Shiroishi-ku	Tyuou-ku	Toyohiragawa Azumabashi	Japanese dace	Crucian carp	
	Small/medium cities	Shiroishi-ku,Kitai-ku	Kita-ku	Kita-ku	Kita-ku	Souseigawa Baratokouhokubashi	Crucian carp	Topmouth gudgeon	
	Along roads	Kita-ku							
	Areas distant from roads	Kita-ku							
Aomori-ken	Vicinity of source	Hachinohe-shi	Hachinohe-shi	Hachinohe-shi	Hachinohe-shi	Hachinohe sea area No. 3 Industrial Port	Octopus	Bastard halibut	
	Large city regions	Aomori-shi	Aomori-shi	Aomori-shi	Aomori-shi	Nonaigawa Nonaibashi	Sweet smelt	Japanese dace, Japanese sculpin	
	Small/medium cities	Mutu-shi	Mutu-shi	Mutu-shi	Mutu-shi	Tanabegawa Shimokitabashi	Fat greenling,Black stripe gudgeon	Chum salmon, etc.	
Iwate-ken	Priority regions	Esashi-shi	Esashi-shi	Esashi-shi,Mizusawa-shi		Kitakamigawa(4) main stream Kotanikibashi			
	Vicinity of source	Esashi-shi,Mizusawa-shi	Esashi-shi	Esashi-shi	Esashi-shi	Hitokubigawa Kohunbashi	Steed barbel	Japanese dace	
	Large city regions	Morioka-shi	Morioka-shi	Morioka-shi	Morioka-shi	Nakatsugawa downstream area Uenohashi	Japanese dace	Pale chub	
	Small/medium cities	Ichinoseki-shi	Ichinoseki-shi	Ichinoseki-shi	Ichinoseki-shi	Iwaigawa midstream area Uenohashi	Japanese char,Masu trout	Masu trout	
Miyagi-ken	Vicinity of source	Tagajyou-shi,Miyagi-gun Rifu-cho	Miyagi-gun Rifu-cho	Miyagi-gun Rifu-cho	Tagajyou-shi,Miyagi-gun Rifu-cho	Sunaoshigawa upstream area Tagajo Dam	Carp	Crucian carp	
	Large city regions	Isinomaki-shi	Isinomaki-shi	Isinomaki-shi	Isinomaki-shi	Ishimakichizaki sea area (A－1) Nagahama sea area (N－2)	Fat greenling	Bastard halibut	
	Small/medium cities	Shiroishi-shi	Shiroishi-shi	Shiroishi-shi	Shiroishi-shi	Saigawa Itsubobashi	Pale chub,Carp	Japanese dace	
	Background levels	Tooda-gun Wakuya-cho	Tooda-gun Wakuya-cho	Tooda-gun Wakuya-cho	Tooda-gun Wakuya-cho	Tarumisawa Drainage Canal Tarumibashi	Pale chub	Crucian carp	
Sendai-shi	Vicinity of source	Wakabayashi-ku,Taihaku-ku	Wakabayashi-ku	Wakabayashi-ku	Taihaku-ku	Natorigawa Hinobe area	Japanese dace	Striped mullet	
	Large city regions	Aoba-ku,Wakabayasi-ku	Aoba-ku	Aoba-ku	Aoba-ku	Hirosegawa Nakanosebashi	Japanese dace	Sweet smelt	
	Small/medium cities	Taihaku-ku,Izumi-ku	Taihaku-ku	Taihaku-ku	Taihaku-ku	Natorigawa Kurikibashi	Japanese dace	Sweet smelt	
Akita-ken	Priority regions	Oodate-shi	Oodate-shi	Oodate-shi		Nagakigawa downstream area Oodate Regional Environmental Center vicinity			
	Vicinity of source	Oodate-shi	Oodate-shi		Oodate-shi	Nagakigawa downstream area Mochidabashi	Japanese dace	Crucian carp	
	Large city regions	Akita-shi	Akita-shi	Akita-shi	Akita-shi	Taiheigawaga downstream area Ushijimabashi	Carp	Japanese dace,Crucian carp	
	Small/medium cities	Noshiro-shi	Noshiro-shi	Noshiro-shi	Noshiro-shi	Yoneshirogawa downstream area Noudaibashi	Japanese dace	Crucian carp	
Yamagata-ken	Vicinity of source	Kaminoyama-shi,Yamagata-shi	Yamagata-shi	Yamagata-shi	Kaminoyama-shi,Yamagata-shi	Matsuogawa kangoubashi	Japanese fatminnow	Masu trout	
	Large city regions	Yamagata-shi	Yamagata-shi	Yamagata-shi	Yamagata-shi	Umamigasakigawa Sirakawabashi	Japanese dace	Crucian carp	
	Small/medium cities	Turuoka-shi	Turuoka-shi	Turuoka-shi	Turuoka-shi	Sekikawa Shinkawabashi	Japanese dace, etc.	Crucian carp	
Fukushima-ken	Priority regions	Higashishirakawa-gun Tanagura-machi		Higashishirakawa-gun Hanawa-machi, Higashishirakawa-gun Tanagura-machi		Kujigawa Kujigawabashi	Edible mantis shrinp		
	Vicinity of source	Higashishirakawa-gun Hanawa-machi	Higashishirakawa-gun Hanawa-machi		Higashishirakawa-gun Hanawa-machi	Kujigawa Matsuokabashi	Crucian carp, etc.	Japanese dace	
	Large city regions	Fukushima-shi	Fukushima-shi	Fukushima-shi	Fukushima-shi	Abukumagawa Taishobashi	Steed barbel	Japanese dace	
	Small/medium cities	Kitakata-shi	Kitakata-shi	Kitakata-shi	Kitakata-shi	Tatsukigawa Shinodabashi	Crucian carp, etc.	Japanese dace	
Ibaraki-ken	Priority regions	Ryuugasaki-shi		Inashiki-gun Edosaki-machi,Ryuugasaki-shi, Inashiki-gun Shintone-machi		Onogawa Koushinbashi			
	Vicinity of source	Inashiki-gun Shintone-machi,Ryuugasaki-shi	Inashiki-gun Shintone-machi,Ryuugasaki-shi		Ryuugasaki-shi	Onogawa Takadabashi	Crucian carp	Lakeweed chub	
	Large city regions	Mito-shi	Mito-shi	Mito-shi	Mito-shi	Sakuragawa Sawadogawashobashi	Japanese dace	Steed barbel	
	Small/medium cities	Tukuba-shi	Tukuba-shi	Tukuba-shi	Tukuba-shi	Sakuragawa Eiribashi	Crucian carp	Carp	
Tochigi-ken	Priority regions	Oyama-shi	Oyama-shi	Oyama-shi		Omoigawa Manakabashi			
	Vicinity of source	Oyama-shi	Oyama-shi		Oyama-shi	Omoigawa Otomeohhashi	Japanese dace	Crucian carp	
	Large city regions	Utunomiya-shi	Utunomiya-shi	Utunomiya-shi	Utunomiya-shi	Tagawa Tetsudoubashi	Japanese dace	Crucian carp	
	Small/medium cities	Kuroiso-shi	Kuroiso-shi	Kuroiso-shi	Kuroiso-shi	Nakagawa Kamiguroiso	Japanese dace	Pale chub	
Gunma-ken	Vicinity of source	Takasaki-shi,gunma-gun Haruna-machi	Takasaki-shi	Takasaki-shi,Gunma-gun Haruna-machi	Takasaki-shi,Gunma-gun Haruna-machi	Karasugawa downstream area Harunamachi boundary area	Japanese dace	Crucian carp	
	Large city regions	Maebashi-shi	Maebashi-shi	Maebashi-shi	Maebashi-shi	Tonegawa upstream area 3 Gunmaohhasi	Japanese dace	Carp	
	Small/medium cities	Tomioka-shi	Tomioka-shi	Tomioka-shi	Tomioka-shi	Kaburagawa Kiribuchibashi	Japanese dace	Crucian carp	
Saitama-ken	Vicinity of source	Kumagaya-shi,Fukaya-shi	Kumagaya-shi	Kumagaya-shi	Kumagaya-shi	Arakawa midstream area Kugebashi	Japanese fatminnow	Pale chub	
	Large city regions	Urawa-shi	Urawa-shi	Urawa-shi	Urawa-shi	Fujiemongawa Yanagibashi	Striped mullet	Red swamp crawfish	
	Small/medium cities	Tokorozawa-shi	Tokorozawa-shi	Tokorozawa-shi	Tokorozawa-shi	Yanagisegawa Niryubashi	Carp	Red swamp crawfish	
Chiba-ken	Vicinity of source	Inzai-shi	Inzai-shi	Inzai-shi	Inzai-shi	Kanzakigawa Kanzakibashi	Black bass	Bluegill sunfish	
	Large city regions	Matudo-shi	Matudo-shi	Matudo-shi	Matudo-shi	Sakagawa Bentenbashi	Striped mullet	Carp	
	Small/medium cities	Mobara-shi	Mobara-shi	Mobara-shi	Mobara-shi	Ichimiyagawa upstream area Showabashi	Striped mullet	Carp	
Chiba-shi	Priority regions	Wakaba-ku	Wakaba-ku	Wakaba-ku		Kashimagawa Shimoizumibashi			
	Vicinity of source	Wakaba-ku	Wakaba-ku		Wakaba-ku	Miyakogawa Seiryubashi	Striped mullet	Carp	
	Large city regions	Hanamigawa-ku,chuou-ku	chuou-ku	chuou-ku	chuou-ku	Miyakogawa Miyakobashi	Striped mullet	Blue mussel	
	Small/medium cities	Wakaba-ku,Inage-ku	Inage-ku	Hanamigawa-ku,Inage-ku	Inage-ku	Hanamigawa Shinhanamigawa	Striped mullet	Lakeweed chub	
Tokyo-to	Priority regions	Minato-ku	Minato-ku	Shinagawa-ku,Oota-ku,Minato-ku, Shibuya-ku,Meguro-ku		Nomikawa Meotobashi			
	Vicinity of source	Shinagawa-ku,Shibuya-ku	Shinagawa-ku		Shinagawa-ku	Megurogawa Taikobashi	Japanese dace	Blue mussel	
	Large city regions	Chiyoda-ku,Shinjuku-ku	Shinjuku-ku	Shinjuku-ku	Shinjuku-ku	Kandagawa Yanagibashi	Carp	Common brackish goby	
	Small/medium cities	Kodaira-shi,Fuchuu-shi	Kodaira-shi	Kodaira-shi	Kodaira-shi	Tamagawa Tamagawabashi	Carp	Pale chub	
	Along roads	Adachi-ku							
	Areas distant from roads	Adachi-ku							
Kanagawa-ken	Vicinity of source	Fujisawa-shi	Fujisawa-shi	Fujisawa-shi	Fujisawa-shi	Hikichikawa Fujimibashi	Carp	Crucian carp	
	Large city regions	Yokosuka-shi	Yokosuka-shi	Yokosuka-shi	Yokosuka-shi	Hirasakugawa Meotobashi	Oyster	Striped mullet	
	Small/medium cities	Zama-shi	Zama-shi	Zama-shi	Zama-shi	Mekujirigawa Kamikuriharabashi	Carp	Pale chub	
Yokohama-shi	Vicinity of source	Sakae-ku,Kounan-ku	Sakae-ku	Sakae-ku	Isogo-ku,kanazawa-ku	Sakaigawa system Itachigawabashi	Carp	Pale chub	
	Large city regions	Kouhoku-ku,Hodogaya-ku	Hodogaya-ku	Hodogaya-ku	Hodogaya-ku	Ohokagawa Simizubashi	Periwinkle	Goby	
	Small/medium cities	Totuka-ku,Midori-ku	Midori-ku	Midori-ku	Midori-ku	Ondagawa Miyakobashi	Carp	Pale chub	
Kawasaki-shi	Vicinity of source	Kawasaki-ku	Kawasaki-ku	Kawasaki-ku	Kawasaki-ku	Tokyowan Senjimabashi	Japanese sea perch	White croaker	
	Large city regions	Kawasaki-ku,Saiwai-ku	Kawasaki-ku	Saiwai-ku	Saiwai-ku	Tamagawa Rokugoubashi	Crucian carp	Far Eastern dace	
	Small/medium cities	Asao-ku,Miyamae-ku	Asao-ku	Asao-ku	Asao-ku	Asougawa Asoubashi	Carp	Pike gudgeon	
Niigata-ken	Priority regions	Minamikanbara-gun Nakanoshima-machi	Minamikanbara-gun Nakanoshima-machi	Santou-gun Teradomari-machi,Nishikanbara-gun Yahiko-mura,Nishikanbara-gun bunsui-machi, Minamikanbara-gun Nakanoshima-machi		Sinanogawa midstream area Manseibashi			
	Vicinity of source	Minamikanbara-gun Nakanoshima-machi, Nishikanbara-gun bunsui-machi	Nishikanbara-gun bunsui-machi		Minamikanbara-gun Nakanoshima-machi, Nishikanbara-gun bunsui-machi	Sinanogawa midstream area Zuiunbashi	Japanese dace	Crucian carp	
	Large city regions	Niigata-shi	Niigata-shi	Niigata-shi	Niigata-shi	Sinanogawa downstream Heiseohhashi	Japanese dace	Crucian carp	
	Small/medium cities	Arai-shi	Arai-shi	Arai-shi	Arai-shi	Sekikawa downstream Inadabashi	Japanese dace	Crucian carp	
	Background levels	Sado-gun Aikawa-machi	Sado-gun Aikawa-machi	Sado-gun Aikawa-machi	Sado-gun Aikawa-machi	Aikawa-machi sea area Tassha sea area	Fat greenling	Blue mussel	
Toyama-ken	Vicinity of source	Takaoka-shi	Takaoka-shi	Takaoka-shi	Takaoka-shi	Koyabegawa Jhokojibashi	Japanese dace	Crucian carp	
	Large city regions	Toyama-shi	Toyama-shi	Toyama-shi	Toyama-shi	Jintsugawa Hagiurabashi	Japanese dace	Crucian carp	

	Small/medium cities	Tonami-shi	Tonami-shi	Tonami-shi	Tonami-shi	Shogawa Daimonohhashi	Japanese dace	Crucian carp	
Ishikawa-ken	Vicinity of source	Kashima-gun Taturuhama-machi	Kashima-gun Taturuhama-machi	Kashima-gun Taturuhama-machi	Kashima-gun Taturuhama-machi	Ninomiyagawa Nishisimobashi	Japanese dace	Crucian carp	
	Large city regions	Kanazawa-shi	Kanazawa-shi	Kanazawa-shi	Kanazawa-shi	Saigawa Futatsuderabashi	Japanese dace	Crucian carp	
	Small/medium cities	Kaga-shi	Kaga-shi	Kaga-shi	Kaga-shi	Daiseijigawa Mitsubashi	Japanese dace	Crucian carp	
Fukui-ken	Vicinity of source	Fukui-shi,Yoshida-gun Matuoka-cho	Yoshida-gun Matuoka-cho	Yoshida-gun Matuoka-cho,Fukui-shi	Yoshida-gun Matuoka-cho	Arakawa upstream area Higashiimaizumibashi	Japanese dace	Crucian carp	
	Large city regions	Fukui-shi	Fukui-shi	Fukui-shi	Fukui-shi	Asuwagawa downstream area Mizukoshibashi	Japanese dace	Crucian carp	
	Small/medium cities	Turuga-shi	Turuga-shi	Turuga-shi	Turuga-shi	Shounokawa Mishimabashi	Japanese dace	Piscivorous chub	
Yamanasi-ken	Priority regions	Higashiyatushiro-gun Isawa-cho	Higashiyatushiro-gun Isawa-cho	Higashiyatushiro-gun Isawa-cho,Koufu-shi		Nigorigawa Shinyugawabashi	Japanese dace		
	Vicinity of source	Koufu-shi,Higashiyatushiro-gun Isawa-cho	Higashiyatushiro-gun Isawa-cho		Koufu-shi	Nigorigawa Nigoribashi	Japanese dace	Crucian carp	
	Large city regions	Koufu-shi	Koufu-shi	Koufu-shi	Koufu-shi	Arakawa Futakawabashi	Japanese dace	Carp	
	Small/medium cities	Fujiyoshida-shi	Fujiyoshida-shi	Fujiyoshida-shi	Fujiyoshida-shi	Miyakawa Showabashi	Japanese dace	Rainbow trout	
Nagano-ken	Vicinity of source	Nagano-shi	Nagano-shi	Nagano-shi	Nagano-shi	Shinanogawa upstream area(3) Kanzakibashi	Japanese dace	Crucian carp	
	Large city regions	Nagano-shi	Nagano-shi	Nagano-shi	Nagano-shi	Shinanogawa upstream area(3) Yashimabashi	Japanese dace	Crucian carp	
	Small/medium cities	Matumoto-shi	Matumoto-shi	Matumoto-shi	Matumoto-shi	Tagawa Shindenbashi	Japanese dace	Pale chub	
Gifu-ken	Priority regions	Oogaki-shi	Oogaki-shi	Oogaki-shi		Miyako Drainage Canal Fukagawabashi			
	Vicinity of source	Oogaki-shi	Oogaki-shi		Oogaki-shi	Ibigawa Fukuoka Ohhashi	Japanese dace	Corbicula	
	Large city regions	Gifu-shi	Gifu-shi	Gifu-shi	Gifu-shi	Nagaragawa Aikawabashi	Steed barbel	Crucian carp	
	Small/medium cities	Mashita-gun Hagiwara-cho	Mashita-gun Hagiwara-cho	Mashita-gun Hagiwara-cho	Mashita-gun Hagiwara-cho	Hidagawa Higashiueda	Steed barbel	Japanese dace	
Shizuoka-ken	Vicinity of source	Fuji-shi	Fuji-shi	Fuji-shi	Fuji-shi	Junseigawa Tomitakabashi	Japanese fatminnow	Japanese dace	
	Large city regions	Shizuoka-shi	Shizuoka-shi	Shizuoka-shi	Shizuoka-shi	Okusurugawan tomoegawa Shisakaitomoegawabashi	Crucian carp	Pale chub	
	Small/medium cities	Iwata-shi	Iwata-shi	Iwata-shi	Iwata-shi	Imanouragawa Fukubashi	Carp	Striped mullet	
	Along roads	Mishima-shi	Mishima-shi						
	Areas distant from roads	Mishima-shi							
Aichi-ken	Vicinity of source	Okazaki-shi	Okazaki-shi	Okazaki-shi	Okazaki-shi	Otsugawa downstream area Senbe Water System Intake	Crucian carp	Carp	
	Large city regions	Toyohashi-shi	Toyohashi-shi	Toyohashi-shi	Toyohashi-shi	Umedagawa Mikuriyabashi	Pale chub	Carp	
	Small/medium cities	Handa-shi	Handa-shi	Handa-shi	Handa-shi	Kinuurawan Kinuura Bay southern area	Japanese sea perch	Striped mullet	
Nagoya-shi	Vicinity of source	Midori-ku,Minami-ku	Midori-ku	Midori-ku	Midori-ku,Minami-ku	Tenpakugawa Tenpakubashi	Crucian carp	Striped mullet	
	Large city regions	Chikusa-ku	Chikusa-ku	Chikusa-ku	Chikusa-ku	Yatagirigawa upstream area Ohmoribashi	Pale chub	Carp	
	Small/medium cities	Minato-ku,Nakagawa-ku	Minato-ku	Minato-ku	Minato-ku	Shinkawa downstream area Hinodebashi	Crucian carp	Carp	
Mie-ken	Priority regions	Hisai-shi	Hisai-shi	Hisai-shi,Tu-shi		Aikawa Mumeibashi			
	Vicinity of source	Hisai-shi,Tu-shi	Tu-shi			Iwatagawa Kannonbashi	Striped mullet	Ginant pacific oyster	
	Large city regions	Tu-shi	Tu-shi	Tu-shi	Tu-shi	Anougawa Gosanso	Carp	Pale chub	
	Small/medium cities	Inabe-gun Touin-cho	Inabe-gun Touin-cho	Inabe-gun Touin-cho	Inabe-gun Touin-cho	Inabegawa Kuwabebashi	Marsh snail	Pale chub	
Shiga-ken	Priority regions	Gamou-gun Azuchi-cho	Gamou-gun Azuchi-cho	Oumihachiman-shi,Gamou-gun Azuchi-cho		Biwakokitako Chomyoji sea area	Large mouth bass	Bluegill sunfish	＊Aquatic organisms could not be collected in the vicinity of the source, so they were collected in priority regions.
	Vicinity of source	Oumihachiman-shi	Oumihachiman-shi		Oumihachiman-shi	Biwakokitako Aichigawa sea area			
	Large city regions	Ootu-shi	Ootu-shi	Ootu-shi	Ootu-shi	Biwakomimamiko Hamaohtsu sea area	Large mouth bass	Bluegill sunfish	
	Small/medium cities	Kurita-gun Rittou-cho	Kurita-gun Rittou-cho	Kurita-gun Rittou-cho	Kurita-gun Rittou-cho	Hayamagawa Hikone prefectural road Ohmihachiman Otsu Line	Large mouth bass	Bluegill sunfish	
Kyoto-fu	Vicinity of source	Miyazu-shi	Miyazu-shi	Miyazu-shi	Miyazu-shi	Kamikogawa Asahibashi	Striped mullet	Japanese dace	＊Aquatic organism survey site was Taizen Bridge on the Taizen River.
	Large city regions	Uji-shi,Hachiman-shi	Uji-shi	Uji-shi	Uji-shi	Ujigawa Ujibashi	Large mouth bass	Pale chub	
	Small/medium cities	Kameoka-shi,maizuru-shi	Kameoka-shi	Kameoka-shi	Kameoka-shi	Katsuragawa Hozuohhashi	Crucian carp	Pale chub	
	Background levels	Kitakuwada-gun Miyama-cho	Kitakuwada-gun Miyama-cho	Kitakuwada-gun Miyama-cho	Kitakuwada-gun Miyama-cho	Hijiyagawa Ichinosebashi	Dark chub	Japanese dace	＊Aquatic organism survey site was Miyamoto Bridge on the Haratani River.
Kyoto-shi	Vicinity of source	Fushimi-ku,Minami-ku	Fushimi-ku	Fushimi-ku,Minami-ku	Minami-ku	Kamogawa River system Toribaneohhashi	Steed barbel	Pale chub	
	Large city regions	Nakagyou-ku,Kamigyou-ku	Nakagyou-ku	Kamigyou-ku,Kita-ku	Kamigyou-ku	Kamogawa River system Sanjyoohhashi	Steed barbel	Pale chub	
	Small/medium cities	Sakyou-ku,Nishikyou-ku	Nishikyou-ku	Sakyou-ku	Sakyou-ku	Tkanogawa River system Miyakebashi	Dark chub	Japanese dace	
Oosaka-fu	Priority regions	Izumiootu-shi	Izumiootu-shi	Takaishi-shi,Sakai-shi,Izumiootu-shi,Izumi-shi,		Imagawa(Ohjigawa river system) Toriishi 4 chome			
	Vicinity of source	Takaishi-shi,Sakai-shi	Takaishi-shi		Takaishi-shi,Sakai-shi	Otsugawa upstream area Takatsu Water-intake	Pale chub	Carp	
	Large city regions	Sakai-shi,Yao-shi	Yao-shi	Yao-shi	Yao-shi	Onchigawa Fukueibashi downstream area 100m	Crucian carp	Carp	
	Small/medium cities	Ibaraki-shi,Hirakata-shi	Ibaraki-shi	Ibaraki-shi	Ibaraki-shi	Anigawa Chitosebashi	Crucian carp	Pale chub	
Oosaka-shi	Vicinity of source	Suminoe-ku,Nishi-ku	Nishi-ku	Nishi-ku	Nishi-ku,Chuou-ku	Osaka in the city Kawachigawa Tenpozan-watashi	Japanese sea perch	Swimming crab	
	Large city regions	Higashinari-ku,Higashiyodogawa-ku	Higashinari-ku	Higashinari-ku	Jotou-ku	Osaaka bay Area outside Osaka Port breakwater	Striped mullet	Swimming crab	
	Small/medium cities	Konohana-ku,Sumiyoshi-ku	Sumiyoshi-ku	Sumiyoshi-ku	Sumiyoshi-ku	Osaka bay Mid-region of Yodogawa River mouth	Japanese sea perch	Swimming crab	
Hyougo-ken	Vicinity of source	Amagasaki-shi	Amagasaki-shi	Amagasaki-shi	Amagasaki-shi	Osaka bay (1) Amagasaki sea area	Japanese sea perch	Blue mussel	
	Large city regions	Himeji-shi	Himeji-shi	Himeji-shi	Himeji-shi	Ichikawa downstream area Abobashi	Steed barbel	Crucian carp	
	Small/medium cities	Ono-shi	Ono-shi	Ono-shi	Ono-shi	Toujuogawa Furukawabashi	Steed barbel	Crucian carp	
Koube-shi	Vicinity of source	Chuou-ku	Chuou-ku	Chuou-ku	Chuou-ku	Osaka bay(1) Mid-region of Kobe Port	Japanese sea perch	Blue mussel	
	Large city regions	Higashinada-ku,Suma-ku	Suma-ku	Suma-ku	Suma-ku	Seibutoshikaken Fukudagawa Fukudabashi	Crucian carp	Carp	
	Small/medium cities	Suma-ku,Kita-ku	Kita-ku	Kita-ku	Kita-ku	Kakogawa Shijimigawa Sakamotobashi	Pale chub	Dark chub	
Nara-ken	Priority regions	Nara-shi	Nara-shi	Nara-shi		Akishinogawa Nishikibashi			
	Vicinity of source	Nara-shi	Nara-shi		Nara-shi	Sahogawa Sanjotakahashi	Crucian carp	Pale chub	
	Large city regions	Kashihara-shi	Kashihara-shi	Kashihara-shi	Kashihara-shi	Sogagawa Sogagawabashi	Carp	Crucian carp	
	Small/medium cities	Yoshino-gun Ooyodo-cho	Yoshino-gun Ooyodo-cho	Yoshino-gun Ooyodo-cho	Yoshino-gun Ooyodo-cho	Kinogawa Sengokubashi	Japanese dace	Steed barbel	
Wakayama-ken	Vicinity of source	Wakayama-shi	Wakayama-shi	Wakayama-shi	Wakayama-shi	Kinogawa Shinrokugai Dam	Carp	Large mouth bass	
	Large city regions	Tanabe-shi	Tanabe-shi	Tanabe-shi	Tanabe-shi	Hidariaizugawa Aizubashi	Striped mullet	Mojarra	
	Small/medium cities	Gobou-shi	Gobou-shi	Gobou-shi	Gobou-shi	Hidakagawa Noguchibashi	Sweet smelt	Pale chub	
Tottori-ken	Vicinity of source	Hino-gun Mizoguchi-cho	Hino-gun Mizoguchi-cho	Hino-gun Mizoguchi-cho	Hino-gun Mizoguchi-cho	Hinogawa Mizokuchi	Marsh snail	Japanese dace	
	Large city regions	Tottori-shi	Tottori-shi	Tottori-shi	Tottori-shi	Koyamaike No2Horikoshi sight frontage	Crucian carp	Carp	
	Small/medium cities	Sakaiminato-shi	Sakaiminato-shi	Sakaiminato-shi	Sakaiminato-shi	Miho bay No2Fukusadacho sight frontage	Japanese sea perch	Bastard halibut	
Shimane-ken	Vicinity of source	Masuda-shi	Masuda-shi	Masuda-shi	Masuda-shi	Masudagawa(2)Sesshubashi	Carp	Marsh snail	
	Large city regions	Matue-shi	Matue-shi	Matue-shi	Matue-shi	Shinji lake S－1	Japanese dace	Corbicula	
	Small/medium cities	Ooda-shi	Ooda-shi	Ooda-shi	Ooda-shi	Shizumagawa Shobarabashi	Japanese dace	Crucian carp	
	Background levels	Oki-gun Goka-mura	Oki-gun Goka-mura	Oki-gun Goka-mura	Oki-gun Goka-mura	Fukuura Seaside Resort Inside swimming area	File fish	Blue mussel	
Okayama-ken	Priority regions	Okayama-shi	Okayama-shi	Okayama-shi		Higashinagakawa Hamano 2 chome			
	Vicinity of source	Okayama-shi	Okayama-shi		Okayama-shi	Kojima bay mouth area Asahi gawa midstream area	Japanese sea perch	Blue mussel	
	Large city regions	Okayama-shi	Okayama-shi	Okayama-shi	Okayama-shi	Asahi River mouth area Otsuide Dam	Japanese dace	Marsh snail	
	Small/medium cities	Kurashilki-shi	Kurashilki-shi	Kurashilki-shi	Kurashilki-shi	Kurashikigawa Shimonadabashi	Crucian carp	Bluegill sunfish	
Hiroshima-ken	Vicinity of source	Aki-gun Fuchuu-cho	Aki-gun Fuchuu-cho	Aki-gun Fuchuu-cho	Aki-gun Fuchuu-cho	Fuchuohkawa Shinohsubashi	Striped mullet	Japanese sea perch	
	Large city regions	Fukuyama-shi	Fukuyama-shi	Fukuyama-shi	Fukuyama-shi	Ashidagawa Kominomibashi	Carp	Crucian carp	
	Small/medium cities	Mihara-shi	Mihara-shi	Mihara-shi	Mihara-shi	Numatagawa Tidal barrier	Marsh snail	Japanese dace	
Hiroshima-shi	Priority regions	Asakita-ku	Asakita-ku	Asakita-ku,Asaminami-ku		Neyagawa downstream area Nenoyabashi			
	Vicinity of source	Asakita-ku	Asakita-ku		Asakita-ku	Otagawa upstream area Yaguchigawa upstream area	Japanese dace	Marsh snail	
	Large city regions	Nishi-ku,Higashi-ku	Nishi-ku	Nishi-ku	Nishi-ku	Otagawa downstream area Koibashi	Striped mullet	Black sea bream	
	Small/medium cities	Asakita-ku,Saeki-ku	Saeki-ku	Saeki-ku	Saeki-ku	Yahatagawa upstream area Koribashi	Marsh snail	Dark chub	
Yamaguchi-ken	Vicinity of source	Shimonoseki-shi	Shimonoseki-shi	Shimonoseki-shi	Shimonoseki-shi	Ayarakigawa Ishiharabashi	Marsh snail	Crucian carp	
	Large city regions	Houfu-shi	Houfu-shi	Houfu-shi	Houfu-shi	Mitajiri bay Hofu sea area HD－2	Blue mussel	Japanese sea perch	
	Small/medium cities	Yanai-shi	Yanai-shi	Yanai-shi	Yanai-shi	Ynai・Osima sea area ND－9	Striped mullet	Blue mussel	
	Vicinity of source	Tokushima-shi	Tokushima-shi	Tokushima-shi	Tokushima-shi	Yoshinogawa downstream area Yoshinogawaohashi	Japanese sea perch	Ginant pacific oyster	

Tokushima-shi	Large city regions	Tokushima-shi	Tokushima-shi	Tokushima-shi	Tokushima-shi	Shinmachigawa Shinmachibashi	Japanese sea perch	Ginant pacific oyster	
	Small/medium cities	Anan-shi	Anan-shi	Anan-shi	Anan-shi	Nakagawa river mouth Nakagawa Railroad Bridge	Japanese sea perch	Striped mullet	
Kagawa-ken	Vicinity of source	Kagawa-gun Kagawa-cho,Takamatu-shi	Kagawa-gun Kagawa-cho	Kagawa-gun Kagawa-cho	Kagawa-gun Kagawa-cho	Koutougawa Koutougawabashi	Crucian carp	Pale chub	
	Large city regions	Takamatu-shi	Takamatu-shi	Takamatu-shi	Takamatu-shi	Shingawa Shingawabashi	Crucian carp	Pale chub	
	Small/medium cities	Zentuuji-shi	Zentuuji-shi	Zentuuji-shi	Zentuuji-shi	Kanakuragawa Yogitabashi	Crucian carp	Far Eastern catfish	
Ehime-ken	Vicinity of source	Iyomishima-shi	Iyomishima-shi	Iyomishima-shi	Iyomishima-shi	Iyomishima Kawanoe sea area	Japanese sea perch	Blue mussel	
	Large city regions	Matuyama-shi	Matuyama-shi	Matuyama-shi	Matuyama-shi	Matuyama sea area	Japanese sea perch	Blue mussel	
	Small/medium cities	Yawatahama-shi	Yawatahama-shi	Yawatahama-shi	Yawatahama-shi	Yawatahama Honai sea area	Black mullet	Blue mussel	
Kouchi-ken	Priority regions	Kouchi-shi	Kouchi-shi	Kouchi-shi,Agawa-gun haruno-cho		Ugadanigawa Setominamicho２			
	Vicinity of source	Kouchi-shi,Agawa-gun haruno-cho	Kouchi-shi		Kouchi-shi	Shinkawagawa Nakanobashi	Striped mullet	Goby	
	Large city regions	Kouchi-shi	Kouchi-shi	Kouchi-shi	Kouchi-shi	Kagamigawa downstream area Shioebashi	Japanese dace	Corbicula	
	Small/medium cities	Tosa-shi	Tosa-shi	Tosa-shi	Tosa-shi	Hagegawa downstream area Onobashi	Japanese dace	Crucian carp	
	Background levels	Tosa-gun Hongawa-mura	Tosa-gun Hongawa-mura	Tosa-gun Hongawa-mura	Tosa-gun Hongawa-mura	Yoshinogawa Echiuramon Elementary School vicinity	Japanese dace	Black bass	
Fukuoka－ken	Vicinity of source	Oomuta-shi	Oomuta-shi	Oomuta-shi	Oomuta-shi	Domengawa Miyukigaeribashi	Crucian carp	Pale chub	
	Large city regions	Kurume-shi	Kurume-shi	Kurume-shi	Kurume-shi	Takaragawa Takaragawa river mouth	Marsh snail	Pale chub	
	Small/medium cities	Yukuhashi-shi	Yukuhashi-shi	Yukuhashi-shi	Yukuhashi-shi	Nagasagawa Choonjibashi	Crucian carp	Carp	
Kitakyuusyuu-shi	Vicinity of source	Yahatanishi-ku	Yahatanishi-ku	Wakamatu-ku,Yahatanishi-ku	Yahatanishi-ku,Wakamatu-ku	Dokai bay Inner part of D－６	Swimming crab	Spotted gizzard Shad	
	Large city regions	Kokurakita-ku,Moji-ku	Kokurakita-ku	Tobata-ku,Kokurakita-ku	Tobata-ku	Dokaibay Entrance of D－２	Spotted gizzard Shad	Thomas's rapa whelk	
	Small/medium cities	Kokuraminami-ku,Yahatanishi-ku	Kokuraminami-ku	Kokuraminami-ku	Kokuraminami-ku	Murasakigawa SakurabashiR－３１	Crucian carp	Marsh snail	
Fukuoka－shi	Priority regions	Nishi-ku	Nishi-ku	Nishi-ku		Muromigawa Hasimotobashi			
	Vicinity of source	Nishi-ku	Nishi-ku		Nishi-ku	Jurogawa Ikibashi	Striped mullet	Common brackish goby	
	Large city regions	Chuuou-ku,Higashi-ku	Chuuou-ku	Chuuou-ku	Chuuou-ku	Nakagawa Nanotuohashi	Striped mullet	Common brackish goby	
	Small/medium cities	Jonan-ku	Jonan-ku	Jonan-ku	Jonan-ku	Hiikawa Kyuimagawabashi	Striped mullet	Japanese sea perch	
Saga-ken	Priority regions	Higashimatuura-gun Ouchi-cho	Higashimatuura-gun Ouchi-cho	Karatu-shi,Higashimatuura-gun Ouchi-cho, Higashimatuura-gun kyuuragi-machi, Higashimatuura-gun Kitahata-mura		Matuuragawa Kubobashi			
	Vicinity of source	Higashimatuura-gun Ouchi-cho, Higashimatuura-gun Kitahata-mura	Higashimatuura-gun Kitahata-mura		Higashimatuura-gun Ouchi-cho, Higashimatuura-gun Kitahata-mura	Matuuragawa Tidal barrier	Carp	Striped mullet	
	Large city regions	Saga-shi	Saga-shi	Saga-shi	Saga-shi	Tafusegawa Kounojosui Water-intake	Crucian carp	Marsh snail	
	Small/medium cities	Ogi-gun Ogi-machi	Ogi-gun Ogi-machi	Ogi-gun Ogi-machi	Ogi-gun Ogi-machi	Giongawa Hikosimabashi	Carp	Crucian carp	
Nagasaki-ken	Vicinity of source	Oomura-shi	Oomura-shi	Oomura-shi	Oomura-shi	Oomura bay Self-Defense Forces base sea area	Striped mullet	Shore swimming crab	
	Large city regions	Sasebo-shi	Sasebo-shi	Sasebo-shi	Sasebo-shi	Ainouragawa Ainourabashi	Crucian carp	Pale chub	
	Small/medium cities	Isahaya-shi	Isahaya-shi	Isahaya-shi	Isahaya-shi	Honmyogawa Teman Park stop	Pale chub	Crucian carp	
Kumamoto-ken	Vicinity of source	Kumamoto-shi	Kumamoto-shi	Kumamoto-shi	Kumamoto-shi	Sirakawa Kojimabashi	Crucian carp	Ginant pacific oyster	
	Large city regions	Kumamoto-shi	Kumamoto-shi	Kumamoto-shi	Kumamoto-shi	Sirakawa Yotugibashi	Carp	Crucian carp	
	Small/medium cities	Hondo-shi	Hondo-shi	Hondo-shi	Hondo-shi	Ariakekai St－１０	Spotted gizzard Shad	Blue mussel	
Ooita-ken	Vicinity of source	Beppu-shi,Hayami-gun Hiji-machi	Beppu-shi	Hayami-gun Hiji-machi	Hayami-gun Hiji-machi,Beppu-shi	Beppu Bay BSt－９	Spotted gizzard Shad	Blue mussel	
	Large city regions	Ooita-shi	Ooita-shi	Ooita-shi	Ooita-shi	Ooitagawa Bentenohashi	Japanese sea perch	Blue mussel	
	Small/medium cities	Usuki-shi	Usuki-shi	Usuki-shi	Usuki-shi	Usukigawa Banribashi	Striped mullet	Ginant pacific oyster	
Miyazaki-ken	Vicinity of source	Higashiusuki-gun Saigou-son	Higashiusuki-gun Saigou-son	Higashiusuki-gun Saigou-son	Higashiusuki-gun Saigou-son	Mimigawa Confluence of Tashiro River and Mimi River	Japanese dace	Crucian carp	
	Large city regions	Miyazaki-shi	Miyazaki-shi	Miyazaki-shi	Miyazaki-shi	Oyodogawa downstream area Aioibashi	Carp	Crucian carp	
	Small/medium cities	Kushima-shi	Kushima-shi	Kushima-shi	Kushima-shi	Fukusimagawa downstream area Kawakamibashi	Carp	Crucian carp	
Kagoshima-ken	Vicinity of source	Kushikino-shi,Hioki-gun Ichiki-cho	Kushikino-shi	Hioki-gun Ichiki-cho	Hioki-gun Ichiki-cho,Kushikino-shi	Yafusagawa Kawakamibashi	Crucian carp	Dark chub	
	Large city regions	Kagoshima-shi	Kagoshima-shi	Kagoshima-shi	Kagoshima-shi	Kototsubashi Matukatabashi	Crucian carp	Carp	
	Small/medium cities	Soo-gun Shibushi-cho	Soo-gun Shibushi-cho	Soo-gun Shibushi-cho	Soo-gun Shibushi-cho	Anrakugawa Anrakubashi	Crucian carp	Ginant pacific oyster	
	Background levels	Ooshima-gun Yamato-son	Ooshima-gun Yamato-son	Ooshima-gun Yamato-son	Ooshima-gun Yamato-son	Yamatogawa Nagarbashi	Crucian carp	Ginant pacific oyster	
Okinawa-ken	Vicinity of source	Urasoe-shi,Shimajiri-gun Haebaru-cho	Shimajiri-gun Haebaru-cho	Shimajiri-gun Haebaru-cho	Urasoe-shi,Shimajiri-gun Haebaru-cho	Kokubagawa Ichinichibashi	Tilapia	Plecostomus	
	Large city regions	Naha-shi	Naha-shi	Naha-shi	Naha-shi	Kumojigawa Izumizakibashi	Tilapia	Ginant pacific oyster	
	Small/medium cities	Okinawa-shi	Okinawa-shi	Okinawa-shi	Okinawa-shi	Hijagawa Showabashi	Tilapia	Carp	

Table 2. List of isomers measured

	Number of chlorines	Isomers	Toxic equivalent factors	
			I-TEF (1988) WHO/IPCS-TEF(1993) *	WHO-TEF1997
PCDDs	4	1,3,6,8-T4CDD	—	—
		1,3,7,9-T4CDD	—	—
		2,3,7,8-T4CDD	1	1
	5	1,2,3,7,8-P5CDD	0.5	1
	6	1,2,3,4,7,8-H6CDD	0.1	0.1
		1,2,3,6,7,8-H6CDD	0.1	0.1
		1,2,3,7,8,9-H6CDD	0.1	0.1
	7	1,2,3,4,6,7,8-H7CDD	0.01	0.01
	8	1,2,3,4,6,7,8,9-O8CD	0.001	0.0001
PCDFs	4	1,2,7,8-T4CDF	—	—
		2,3,7,8-T4CDF	0.1	0.1
	5	1,2,3,7,8-P5CDF	0.05	0.05
		2,3,4,7,8-P5CDF	0.5	0.5
	6	1,2,3,4,7,8-H6CDF	0.1	0.1
		1,2,3,6,7,8-H6CDF	0.1	0.1
		1,2,3,7,8,9- H6CDF	0.1	0.1
		2,3,4,6,7,8-H6CDF	0.1	0.1
	7	1,2,3,4,6,7,8-H7CDF	0.01	0.01
		1,2,3,4,7,8,9-H7CDF	0.01	0.01
	8	1,2,3,4,6,7,8,9-O8CD	0.001	0.0001
PCDDs	Non-ortho	3,4,4',5-T4CB	—	0.0001
		3,3',4,4'-T4CB	0.0005	0.0001
	Mono-ortho	3,3',4,4',5-P5CB	0.1	0.1
		3,3',4,4',5,5'-H6CB	0.01	0.01
		2',3,4,4',5-P5CB	0.0001	0.0001
		2,3',4,4',5-P5CB	0.0001	0.0001
		2,3,3',4,4'-P5CB	0.0001	0.0001
		2,3,4,4',5-P5CB	0.0005	0.0005
		2,3',4,4',5,5'-H6CB	0.00001	0.00001
		2,3,3',4,4',5-H6CB	0.0005	0.0005
		2,3,3',4,4',5'-H6CB	0.0005	0.0005
		2,3,3',4,4',5,5'-H7CB	0.0001	0.0001
	Di-ortho	2,2',3,4,4',5,5'-H7CB	0.00001	—
		2,2',3,3',4,4',5-H7CB	0.0001	—

* PCDDs and PCDFs are according to I-TEF (1988), and co-planar PCBs are according to WHO/IPCS-TEF (1993).

Table 3. Results of the survey

	Site categories	Survey target substances	*Note	Number of measurements	Mean value	Median value	Detection range	1-seasons range
Air 4-seasons means pg-TEQ/m^3	All sites	PCDDs+PCDFs	ND=0×QL	387	0.22	0.15	0～1.8	0～3.0
			ND=1/2×QL	387	0.24	0.16	0.021～1.8	0.021～3.0
			ND=1×QL	387	0.27	0.22	0.041～1.8	0.039～3.0
		PCDDs/DFs+CoPCBs	ND=0×QL	100	0.23	0.17	0.0017～0.70	0.000024～1.7
			ND=1/2×QL	100	0.26	0.20	0.023～0.71	0.022～1.7
			ND=1×QL	100	0.28	0.24	0.044～0.71	0.041～1.7
	The vicinity of dioxin sources	PCDDs+PCDFs	ND=0×QL	138	0.25	0.17	0.00030～1.8	0～2.9
			ND=1/2×QL	138	0.27	0.19	0.037～1.8	0.021～2.9
			ND=1×QL	138	0.29	0.23	0.052～1.8	0.039～2.9
		PCDDs/DFs+CoPCBs	ND=0×QL	64	0.25	0.19	0.015～0.70	0.000024～1.7
			ND=1/2×QL	64	0.28	0.21	0.043～0.71	0.027～1.7
			ND=1×QL	64	0.30	0.25	0.058～0.71	0.041～1.7
	Large city regions	PCDDs+PCDFs	ND=0×QL	118	0.22	0.15	0.00050～1.1	0～3.0
			ND=1/2×QL	118	0.25	0.17	0.044～1.1	0.021～3.0
			ND=1×QL	118	0.27	0.22	0.078～1.1	0.041～3.0
		PCDDs/DFs+CoPCBs	ND=0×QL	26	0.21	0.18	0.0050～0.53	0.000075～1.1
			ND=1/2×QL	26	0.23	0.20	0.046～0.55	0.033～1.1
			ND=1×QL	26	0.25	0.23	0.084～0.56	0.047～1.1
	Small/medium cities	PCDDs+PCDFs	ND=0×QL	118	0.18	0.13	0～0.86	0～2.5
			ND=1/2×QL	118	0.21	0.15	0.045～0.86	0.021～2.5
			ND=1×QL	118	0.24	0.20	0.061～0.86	0.041～2.5
		PCDDs/DFs+CoPCBs	ND=0×QL	6	0.20	0.15	0.0017～0.66	0.000047～0.95
			ND=1/2×QL	6	0.25	0.18	0.097～0.66	0.046～0.95
			ND=1×QL	6	0.30	0.24	0.13～0.66	0.088～0.95
	Background levels	PCDDs+PCDFs	ND=0×QL	7	0.013	0.0062	0～0.067	0～0.12
			ND=1/2×QL	7	0.060	0.041	0.021～0.15	0.021～0.20
			ND=1×QL	7	0.11	0.082	0.041～0.24	0.041～0.27
		PCDDs/DFs+CoPCBs	ND=0×QL	4	0.021	0.0058	0.0018～0.071	0.00023～0.13
			ND=1/2×QL	4	0.069	0.046	0.023～0.16	0.022～0.20
			ND=1×QL	4	0.12	0.087	0.044～0.25	0.043～0.28
	Along roads	PCDDs+PCDFs	ND=0×QL	3	0.44	0.60	0.00093～0.72	0～1.4
			ND=1/2×QL	3	0.48	0.60	0.11～0.72	0.10～1.4
			ND=1×QL	3	0.52	0.61	0.22～0.73	0.21～1.4
	A distance away	PCDDs+PCDFs	ND=0×QL	3	0.44	0.61	0.014～0.70	0.0010～1.6
			ND=1/2×QL	3	0.48	0.61	0.12～0.70	0.10～1.6
			ND=1×QL	3	0.51	0.61	0.22～0.71	0.21～1.6

*Note: ND=0 X QL: When values below the lower limit of determination (QL) are treated as zero.
ND=1/2 X QL: When values below the lower limit of determination (QL) are converted to one-half the lower limit of determination.
ND=1 X QL: When values below the lower limit of determination (QL) are converted to values equal to the lower limit of determination.

Soot and dust 2-seasons means pg-TEQ/m^2/day	All sites	PCDDs+PCDFs	ND=0×QL	205	21	17	0.20～170	0.0032～210
			ND=1/2×QL	205	22	19	1.8～170	1.7～210
			ND=1×QL	205	23	20	3.5～170	3.4～210
		PCDDs/DFs+CoPCBs	ND=0×QL	103	21	18	0.34～66	0.099～77
			ND=1/2×QL	103	22	18	2.0～66	1.9～77
			ND=1×QL	103	24	19	3.7～67	3.5～77
	The vicinity of dioxin sources	PCDDs+PCDFs	ND=0×QL	79	25	21	0.40～170	0.047～210
			ND=1/2×QL	79	27	23	2.5～170	1.7～210
			ND=1×QL	79	28	25	4.0～170	3.4～210
		PCDDs/DFs+CoPCBs	ND=0×QL	48	23	21	1.9～54	1.2～71
			ND=1/2×QL	48	25	23	3.4～55	2.9～71
			ND=1×QL	48	26	24	4.9～56	4.5～71
	Large city regions	PCDDs+PCDFs	ND=0×QL	59	19	16	0.22～50	0.048～75
			ND=1/2×QL	59	21	18	1.9～51	1.7～75
			ND=1×QL	59	22	19	3.5～52	3.4～75
		PCDDs/DFs+CoPCBs	ND=0×QL	28	23	23	0.82～53	0.099～77
			ND=1/2×QL	28	24	24	2.4～53	2.4～77
			ND=1×QL	28	26	25	4.1～54	4.0～77
	Small/medium cities	PCDDs+PCDFs	ND=0×QL	59	18	14	0.29～62	0.0032～96
			ND=1/2×QL	59	19	15	1.9～63	1.7～96
			ND=1×QL	59	21	17	3.6～63	3.4～96
		PCDDs/DFs+CoPCBs	ND=0×QL	20	19	11	0.92～66	0.44～67
			ND=1/2×QL	20	20	13	2.5～66	2.1～68
			ND=1×QL	20	22	15	4.0～67	3.8～69
	Background levels	PCDDs+PCDFs	ND=0×QL	7	4.1	3.8	0.20～8.6	0.10～16
			ND=1/2×QL	7	6.0	6.7	1.8～11	1.8～17
			ND=1×QL	7	7.9	8.2	3.5～14	3.4～19
		PCDDs/DFs+CoPCBs	ND=0×QL	7	4.4	3.8	0.34～8.6	0.24～16
			ND=1/2×QL	7	6.3	6.9	2.0～11	1.9～18
			ND=1×QL	7	8.3	8.6	3.7～14	3.5～19
	Along roads	PCDDs+PCDFs	ND=0×QL	1	23	23	23	5.4～42
			ND=1/2×QL	1	26	26	26	8.3～44
			ND=1×QL	1	29	29	29	11～47

*Note: ND=0 X QL: When values below the lower limit of determination (QL) are treated as zero.
ND=1/2 X QL: When values below the lower limit of determination (QL) are converted to one-half the lower limit of determination.
ND=1 X QL: When values below the lower limit of determination (QL) are converted to values equal to the lower limit of determination.

Public waters pg-TEQ/L * Sites in vicinity of dioxin sources only 2-seasons means	All sites	PCDDs+PCDFs	ND=0×QL	204	0.36	0.089	0～12	0～22
			ND=1/2×QL	204	0.52	0.28	0.18～12	0.18～22
			ND=1×QL	204	0.69	0.47	0.36～12	0.36～22
			ND=1/2×DL	204	0.45	0.22	0～12	0.035～22
		PCDDs/DFs+CoPCBs	ND=0×QL	204	0.40	0.11	0.0014～13	0.000040～25
			ND=1/2×QL	204	0.58	0.30	0.19～13	0.19～25
			ND=1×QL	204	0.75	0.50	0.39～13	0.39～25
			ND=1/2×DL	204	0.50	0.26	0.065～13	0.036～25
	The vicinity of dioxin sources	PCDDs+PCDFs	ND=0×QL	79	0.47	0.11	0.00038～12	0～22
			ND=1/2×QL	79	0.63	0.29	0.18～12	0.18～22
			ND=1×QL	79	0.80	0.47	0.36～12	0.36～22
			ND=1/2×DL	79	0.55	0.24	0.057～12	0.035～22
			ND=0×QL	79	0.54	0.13	0.0052～13	0.000040～25

	Site categories	Survey target substances	*Note	Number of measurements	Mean value	Median value	Detection range	1-seasons range
		PCDDs/DFs+CoPCBs	ND=1/2×QL	79	0.71	0.33	0.20～13	0.19～25
			ND=1×QL	79	0.88	0.52	0.39～13	0.39～25
			ND=1/2×DL	79	0.62	0.26	0.071～13	0.036～25
	Large city regions	PCDDs+PCDFs	ND=0×QL	59	0.35	0.11	0～3.7	
			ND=1/2×QL	59	0.51	0.29	0.18～3.7	
			ND=1×QL	59	0.67	0.47	0.36～3.7	
			ND=1/2×DL	59	0.44	0.25	0～3.8	
		PCDDs/DFs+CoPCBs	ND=0×QL	59	0.38	0.14	0.0044～3.8	
			ND=1/2×QL	59	0.54	0.33	0.19～3.8	
			ND=1×QL	59	0.71	0.51	0.39～3.8	
			ND=1/2×DL	59	0.48	0.30	0.065～3.8	
	Small/medium cities	PCDDs+PCDFs	ND=0×QL	59	0.25	0.065	0.00015～3.5	
			ND=1/2×QL	59	0.43	0.26	0.18～3.5	
			ND=1×QL	59	0.60	0.45	0.36～3.6	
			ND=1/2×DL	59	0.35	0.18	0.056～3.5	
		PCDDs/DFs+CoPCBs	ND=0×QL	59	0.29	0.080	0.0061～3.5	
			ND=1/2×QL	59	0.47	0.28	0.20～3.5	
			ND=1×QL	59	0.65	0.48	0.39～3.6	
			ND=1/2×DL	59	0.39	0.20	0.067～3.5	
	Background levels	PCDDs+PCDFs	ND=0×QL	7	0.041	0.011	0.000065～0.13	
			ND=1/2×QL	7	0.23	0.21	0.19～0.30	
			ND=1×QL	7	0.42	0.42	0.37～0.48	
			ND=1/2×DL	7	0.14	0.099	0.063～0.28	
		PCDDs/DFs+CoPCBs	ND=0×QL	7	0.047	0.014	0.0014～0.14	
			ND=1/2×QL	7	0.25	0.22	0.20～0.32	
			ND=1×QL	7	0.45	0.44	0.40～0.51	
			ND=1/2×DL	7	0.22	0.10	0.076～0.69	

*Note: ND=0 X QL: When values below the lower limit of determination (QL) are treated as zero.
ND=1/2 X QL: When values below the lower limit of determination (QL) are converted to one-half the lower limit of determination.
ND=1 X QL: When values below the lower limit of determination (QL) are converted to values equal to the lower limit of determination.
ND=1/2 X DL: When values below the lower limit of detection (DL) are converted to one-half the lower limit of detection

Groundwater quality pg-TEQ/L	All sites	PCDDs+PCDFs	ND=0×QL	243	0.086	0.0073	0～5.3	
			ND=1/2×QL	243	0.28	0.21	0.11～5.4	
			ND=1×QL	243	0.46	0.41	0.21～5.5	
			ND=1/2×DL	243	0.16	0.078	0.037～5.3	
		PCDDs/DFs+CoPCBs	ND=0×QL	188	0.081	0.011	0～5.4	
			ND=1/2×QL	188	0.28	0.22	0.11～5.5	
			ND=1×QL	188	0.48	0.44	0.22～5.5	
			ND=1/2×DL	188	0.17	0.093	0.046～5.5	
	The vicinity of dioxin sources	PCDDs+PCDFs	ND=0×QL	118	0.088	0.0068	0～4.0	
			ND=1/2×QL	118	0.28	0.21	0.11～4.2	
			ND=1×QL	118	0.46	0.41	0.21～4.3	
			ND=1/2×DL	118	0.17	0.076	0.037～4.0	
		PCDDs/DFs+CoPCBs	ND=0×QL	64	0.056	0.0092	0.00015～0.59	
			ND=1/2×QL	64	0.25	0.22	0.11～0.75	
			ND=1×QL	64	0.45	0.44	0.22～0.90	
			ND=1/2×DL	64	0.14	0.085	0.053～0.83	
	Large city regions	PCDDs+PCDFs	ND=0×QL	59	0.036	0.0082	0～0.45	
			ND=1/2×QL	59	0.23	0.21	0.18～0.60	
			ND=1×QL	59	0.42	0.41	0.36～0.75	
			ND=1/2×DL	59	0.12	0.082	0.037～0.49	
		PCDDs/DFs+CoPCBs	ND=0×QL	59	0.048	0.013	0.00031～0.47	
			ND=1/2×QL	59	0.25	0.22	0.19～0.63	
			ND=1×QL	59	0.46	0.44	0.37～0.80	
			ND=1/2×DL	59	0.14	0.10	0.046～0.52	
	Small/medium cities	PCDDs+PCDFs	ND=0×QL	59	0.14	0.0088	0～5.3	
			ND=1/2×QL	59	0.33	0.21	0.18～5.4	
			ND=1×QL	59	0.52	0.41	0.36～5.5	
			ND=1/2×DL	59	0.21	0.080	0.040～5.3	
		PCDDs/DFs+CoPCBs	ND=0×QL	59	0.14	0.012	0～5.4	
			ND=1/2×QL	59	0.34	0.22	0.18～5.5	
			ND=1×QL	59	0.54	0.44	0.36～5.5	
			ND=1/2×DL	59	0.23	0.093	0.051～5.5	
	Background levels	PCDDs+PCDFs	ND=0×QL	7	0.032	0.00015	0～0.12	
			ND=1/2×QL	7	0.22	0.21	0.18～0.29	
			ND=1×QL	7	0.41	0.41	0.36～0.46	
			ND=1/2×DL	7	0.11	0.067	0.056～0.24	
		PCDDs/DFs+CoPCBs	ND=0×QL	6	0.041	0.015	0.00092～0.13	
			ND=1/2×QL	6	0.24	0.22	0.19～0.30	
			ND=1×QL	6	0.44	0.44	0.37～0.48	
			ND=1/2×DL	6	0.13	0.088	0.068～0.24	

*Note: ND=0 X QL: When values below the lower limit of determination (QL) are treated as zero.
ND=1/2 X QL: When values below the lower limit of determination (QL) are converted to one-half the lower limit of determination.
ND=1 X QL: When values below the lower limit of determination (QL) are converted to values equal to the lower limit of determination.
ND=1/2 X DL: When values below the lower limit of detection (DL) are converted to one-half the lower limit of detection

Public waters pg-TEQ/g dry weight	All sites	PCDDs+PCDFs	ND=0×QL	205	6.8	0.23	0～230	
			ND=1/2×QL	205	8.2	2.2	0.42～230	
			ND=1×QL	205	9.6	4.2	0.83～230	
			ND=1/2×DL	205	7.4	1.3	0.10～230	
		PCDDs/DFs+CoPCBs	ND=0×QL	205	7.7	0.41	0～260	
			ND=1/2×QL	205	9.1	2.3	0.43～260	
			ND=1×QL	205	11	4.4	0.85～260	
			ND=1/2×DL	205	8.3	1.4	0.10～260	
	The vicinity of dioxin sources	PCDDs+PCDFs	ND=0×QL	79	7.4	0.21	0.00037～230	
			ND=1/2×QL	79	8.8	2.1	0.46～230	
			ND=1×QL	79	10	4.2	0.86～230	
			ND=1/2×DL	79	8.1	1.1	0.13～230	
		PCDDs/DFs+CoPCBs	ND=0×QL	79	8.5	0.38	0.00087～260	
			ND=1/2×QL	79	9.9	2.3	0.47～260	

	Site categories	Survey target substances	*Note	Number of measurements	Mean value	Median value	Detection range	1-seasons range
		PCDDs/DFs+CoPCBs	ND=1×QL	79	11	4.4	0.89～260	
			ND=1/2×DL	79	9.2	1.3	0.15～260	
	Large city regions	PCDDs+PCDFs	ND=0×QL	60	8.5	0.79	0.00035～190	
			ND=1/2×QL	60	9.8	2.4	0.52～190	
			ND=1×QL	60	11	4.3	0.90～190	
			ND=1/2×DL	60	9.2	2.1	0.16～190	
		PCDDs/DFs+CoPCBs	ND=0×QL	60	9.6	0.90	0.0014～200	
			ND=1/2×QL	60	11	2.6	0.59～200	
			ND=1×QL	60	12	4.5	0.97～200	
			ND=1/2×DL	60	10	2.3	0.17～200	
	Small/medium cities	PCDDs+PCDFs	ND=0×QL	59	5.0	0.19	0～150	
			ND=1/2×QL	59	6.4	2.2	0.42～150	
			ND=1×QL	59	7.9	4.2	0.83～150	
			ND=1/2×DL	59	5.6	1.3	0.11～150	
		PCDDs/DFs+CoPCBs	ND=0×QL	59	5.5	0.39	0.0013～160	
			ND=1/2×QL	59	7.0	2.3	0.43～160	
			ND=1×QL	59	8.5	4.4	0.85～160	
			ND=1/2×DL	59	6.2	1.3	0.12～160	
	Background levels	PCDDs+PCDFs	ND=0×QL	7	0.75	0.028	0～4.9	
			ND=1/2×QL	7	2.5	2.1	1.7～5.8	
			ND=1×QL	7	4.3	4.1	3.4～6.7	
			ND=1/2×DL	7	1.1	0.45	0.10～5.4	
		PCDDs/DFs+CoPCBs	ND=0×QL	7	0.75	0.033	0～4.9	
			ND=1/2×QL	7	2.6	2.2	1.7～5.9	
			ND=1×QL	7	4.5	4.3	3.4～6.9	
			ND=1/2×DL	7	1.2	0.48	0.10～5.6	

*Note: ND=0 X QL: When values below the lower limit of determination (QL) are treated as zero.
ND=1/2 X QL: When values below the lower limit of determination (QL) are converted to one-half the lower limit of determination.
ND=1 X QL: When values below the lower limit of determination (QL) are converted to values equal to the lower limit of determination.
ND=1/2 X DL: When values below the lower limit of detection (DL) are converted to one-half the lower limit of detection

Soil pg-TEQ/g	All sites	PCDDs+PCDFs	ND=0×QL	344	6.2	2.3	0.00067～110	
			ND=1/2×QL	344	7.4	3.6	0.42～110	
			ND=1×QL	344	8.6	5.0	0.83～110	
		PCDDs/DFs+CoPCBs	ND=0×QL	286	6.5	2.7	0.0015～61	
			ND=1/2×QL	286	7.7	4.0	0.43～62	
			ND=1×QL	286	8.9	5.4	0.85～63	
	The vicinity of dioxin sources	PCDDs+PCDFs	ND=0×QL	219	6.8	2.6	0.00067～110	
			ND=1/2×QL	219	7.9	3.7	0.42～110	
			ND=1×QL	219	9.0	5.1	0.83～110	
		PCDDs/DFs+CoPCBs	ND=0×QL	161	7.1	2.9	0.0015～49	
			ND=1/2×QL	161	8.2	4.3	0.43～49	
			ND=1×QL	161	9.3	5.6	0.85～49	
	Large city regions	PCDDs+PCDFs	ND=0×QL	59	5.4	2.7	0.057～33	
			ND=1/2×QL	59	6.6	3.8	0.51～33	
			ND=1×QL	59	7.7	5.2	0.92～33	
		PCDDs/DFs+CoPCBs	ND=0×QL	59	6.1	3.5	0.063～35	
			ND=1/2×QL	59	7.3	4.6	0.53～35	
			ND=1×QL	59	8.5	5.9	0.95～35	
	Small/medium cities	PCDDs+PCDFs	ND=0×QL	59	5.6	1.5	0.022～61	
			ND=1/2×QL	59	6.9	3.1	0.43～62	
			ND=1×QL	59	8.1	4.7	0.84～62	
		PCDDs/DFs+CoPCBs	ND=0×QL	59	6.0	1.7	0.024～61	
			ND=1/2×QL	59	7.3	3.4	0.45～62	
			ND=1×QL	59	8.6	5.1	0.87～63	
	Background levels	PCDDs+PCDFs	ND=0×QL	7	1.7	1.3	0.13～5.6	
			ND=1/2×QL	7	3.3	2.9	1.8～7.1	
			ND=1×QL	7	5.0	4.6	3.5～8.7	
		PCDDs/DFs+CoPCBs	ND=0×QL	7	1.8	1.8	0.26～5.6	
			ND=1/2×QL	7	3.5	3.4	1.9～7.2	
			ND=1×QL	7	5.2	4.8	3.6～8.9	

*Note: ND=0 X QL: When values below the lower limit of determination (QL) are treated as zero.
ND=1/2 X QL: When values below the lower limit of determination (QL) are converted to one-half the lower limit of determination.
ND=1 X QL: When values below the lower limit of determination (QL) are converted to values equal to the lower limit of determination.

Aquatic organisms pg-TEQ/g wet weight	All sites	PCDDs+PCDFs	ND=0×QL	368	0.64	0.32	0～11	
			ND=1/2×QL	368	0.72	0.39	0.037～11	
			ND=1×QL	368	0.79	0.46	0.075～11	
			ND=1/2×DL	368	0.70	0.38	0.021～11	
		PCDDs/DFs+CoPCBs	ND=0×QL	368	2.1	1.1	0.0022～30	
			ND=1/2×QL	368	2.2	1.2	0.11～30	
			ND=1×QL	368	2.3	1.3	0.19～30	
			ND=1/2×DL	368	2.2	1.2	0.048～30	
	The vicinity of dioxin sources	PCDDs+PCDFs	ND=0×QL	118	0.82	0.39	0～8.4	
			ND=1/2×QL	118	0.89	0.49	0.047～8.4	
			ND=1×QL	118	0.96	0.54	0.084～8.4	
			ND=1/2×DL	118	0.87	0.46	0.029～8.4	
		PCDDs/DFs+CoPCBs	ND=0×QL	118	2.3	1.3	0.065～12	
			ND=1/2×QL	118	2.4	1.4	0.17～12	
			ND=1×QL	118	2.4	1.4	0.24～12	
			ND=1/2×DL	118	2.4	1.4	0.095～12	
	Large city regions	PCDDs+PCDFs	ND=0×QL	118	0.60	0.33	0～11	
			ND=1/2×QL	118	0.68	0.39	0.073～11	
			ND=1×QL	118	0.75	0.46	0.11～11	
			ND=1/2×DL	118	0.66	0.37	0.031～11	
		PCDDs/DFs+CoPCBs	ND=0×QL	118	2.5	1.4	0.032～30	
			ND=1/2×QL	118	2.6	1.4	0.17～30	
			ND=1×QL	118	2.6	1.5	0.28～30	
			ND=1/2×DL	118	2.5	1.4	0.095～30	
	Small/medium cities		ND=0×QL	118	0.51	0.26	0～4.5	

	Site categories	Survey target substances	*Note	Number of measurements	Mean value	Median value	Detection range	1-seasons range
		PCDDs+PCDFs	ND=1/2×QL	118	0.61	0.35	0.037～4.5	
			ND=1×QL	118	0.70	0.45	0.075～4.5	
			ND=1/2×DL	118	0.59	0.34	0.031～4.5	
		PCDDs/DFs+CoPCBs	ND=0×QL	118	1.7	1.0	0.0061～12	
			ND=1/2×QL	118	1.8	1.1	0.11～13	
			ND=1×QL	118	1.9	1.2	0.19～13	
			ND=1/2×DL	118	1.8	1.1	0.056～13	
	Background levels	PCDDs+PCDFs	ND=0×QL	14	0.43	0.14	0～3.4	
			ND=1/2×QL	14	0.48	0.21	0.10～3.4	
			ND=1×QL	14	0.54	0.28	0.16～3.4	
			ND=1/2×DL	14	0.46	0.19	0.021～3.4	
		PCDDs/DFs+CoPCBs	ND=0×QL	14	0.73	0.44	0.0022～4.1	
			ND=1/2×QL	14	0.79	0.51	0.11～4.1	
			ND=1×QL	14	0.84	0.57	0.22～4.1	
			ND=1/2×DL	14	0.77	0.49	0.048～4.1	

*Note: ND=0 X QL: When values below the lower limit of determination (QL) are treated as zero.

ND=1/2 X QL: When values below the lower limit of determination (QL) are converted to one-half the lower limit of determination.

ND=1 X QL: When values below the lower limit of determination (QL) are converted to values equal to the lower limit of determination.

ND=1/2 X DL: When values below the lower limit of detection (DL) are converted to one-half the lower limit of detection

Table 4. Results of measurements

	Site categories		Number of measurements	Mean value	Median value	Range detected	1-season range
Air	All sites	PCDDs+PCDFs	387	0.22	0.15	0～1.8	0～3.0
4-seasons means		PCDDs/DFs+CoPCBs	100	0.23	0.17	0.0017～0.70	0.000024～1.7
pg-TEQ/m^3	The vicinity of dioxin sources	PCDDs+PCDFs	138	0.25	0.17	0.00030～1.8	0～2.9
		PCDDs/DFs+CoPCBs	64	0.25	0.19	0.015～0.70	0.000024～1.7
	Large city regions	PCDDs+PCDFs	118	0.22	0.15	0.00050～1.1	0～3.0
		PCDDs/DFs+CoPCBs	26	0.21	0.18	0.0050～0.53	0.000075～1.1
	Small/medium cities	PCDDs+PCDFs	118	0.18	0.13	0～0.86	0～2.5
		PCDDs/DFs+CoPCBs	6	0.20	0.15	0.0017～0.66	0.000047～0.95
	Background levels	PCDDs+PCDFs	7	0.013	0.0062	0～0.067	0～0.12
		PCDDs/DFs+CoPCBs	4	0.021	0.0058	0.0018～0.071	0.00023～0.13
	Along roads	PCDDs+PCDFs	3	0.44	0.60	0.00093～0.72	0～1.4
	Areas distant from roads	PCDDs+PCDFs	3	0.44	0.61	0.014～0.70	0.0010～1.6
Soot and dust	All sites	PCDDs+PCDFs	205	21	17	0.20～170	0.0032～210
2-seasons means		PCDDs/DFs+CoPCBs	103	21	18	0.34～66	0.099～77
pg-TEQ/m^2/day	The vicinity of dioxin sources	PCDDs+PCDFs	79	25	21	0.40～170	0.047～210
		PCDDs/DFs+CoPCBs	48	23	21	1.9～54	1.2～71
	Large city regions	PCDDs+PCDFs	59	19	16	0.22～50	0.048～75
		PCDDs/DFs+CoPCBs	28	23	23	0.82～53	0.099～77
	Small/medium cities	PCDDs+PCDFs	59	18	14	0.29～62	0.0032～96
		PCDDs/DFs+CoPCBs	20	19	11	0.92～66	0.44～67
	Background levels	PCDDs+PCDFs	7	4.1	3.8	0.20～8.6	0.10～16
		PCDDs/DFs+CoPCBs	7	4.4	3.8	0.34～8.6	0.24～16
	Along roads	PCDDs+PCDFs	1	23	23	23	5.4～42
Public waters	All sites	PCDDs+PCDFs	204	0.36	0.089	0～12	0～22
pg-TEQ/L		PCDDs/DFs+CoPCBs	204	0.40	0.11	0.0014～13	0.000040～25
* Sites in vicinity of dioxin sources only 2-seasons means	The vicinity of dioxin sources	PCDDs+PCDFs	79	0.47	0.11	0.00038～12	0～22
		PCDDs/DFs+CoPCBs	79	0.54	0.13	0.0052～13	0.000040～25
	Large city regions	PCDDs+PCDFs	59	0.35	0.11	0～3.7	
		PCDDs/DFs+CoPCBs	59	0.38	0.14	0.0044～3.8	
	Small/medium cities	PCDDs+PCDFs	59	0.25	0.065	0.00015～3.5	
		PCDDs/DFs+CoPCBs	59	0.29	0.080	0.0061～3.5	
	Background levels	PCDDs+PCDFs	7	0.041	0.011	0.000065～0.13	
		PCDDs/DFs+CoPCBs	7	0.047	0.014	0.0014～0.14	
Groundwater quality	All sites	PCDDs+PCDFs	243	0.086	0.0073	0～5.3	
pg-TEQ/L		PCDDs/DFs+CoPCBs	188	0.081	0.011	0～5.4	
	The vicinity of dioxin sources	PCDDs+PCDFs	118	0.088	0.0068	0～4.0	
		PCDDs/DFs+CoPCBs	64	0.056	0.0092	0.00015～0.59	
	Large city regions	PCDDs+PCDFs	59	0.036	0.0082	0～0.45	
		PCDDs/DFs+CoPCBs	59	0.048	0.013	0.00031～0.47	
	Small/medium cities	PCDDs+PCDFs	59	0.14	0.0088	0～5.3	
		PCDDs/DFs+CoPCBs	59	0.14	0.012	0～5.4	
	Background levels	PCDDs+PCDFs	7	0.032	0.00015	0～0.12	
		PCDDs/DFs+CoPCBs	6	0.041	0.015	0.00092～0.13	
Public waters	All sites	PCDDs+PCDFs	205	6.8	0.23	0～230	
pg-TEQ/g dry weight		PCDDs/DFs+CoPCBs	205	7.7	0.41	0～260	
	The vicinity of dioxin sources	PCDDs+PCDFs	79	7.4	0.21	0.00037～230	
		PCDDs/DFs+CoPCBs	79	8.5	0.38	0.00087～260	
	Large city regions	PCDDs+PCDFs	60	8.5	0.79	0.00035～190	
		PCDDs/DFs+CoPCBs	60	9.6	0.90	0.0014～200	
	Small/medium cities	PCDDs+PCDFs	59	5.0	0.19	0～150	
		PCDDs/DFs+CoPCBs	59	5.5	0.39	0.0013～160	
	Background levels	PCDDs+PCDFs	7	0.75	0.028	0～4.9	
		PCDDs/DFs+CoPCBs	7	0.75	0.033	0～4.9	
Soil	All sites	PCDDs+PCDFs	344	6.2	2.3	0.00067～110	
pg-TEQ/g		PCDDs/DFs+CoPCBs	286	6.5	2.7	0.0015～61	
	The vicinity of dioxin sources	PCDDs+PCDFs	219	6.8	2.6	0.00067～110	
		PCDDs/DFs+CoPCBs	161	7.1	2.9	0.0015～49	
	Large city regions	PCDDs+PCDFs	59	5.4	2.7	0.057～33	
		PCDDs/DFs+CoPCBs	59	6.1	3.5	0.063～35	
	Small/medium cities	PCDDs+PCDFs	59	5.6	1.5	0.022～61	
		PCDDs/DFs+CoPCBs	59	6.0	1.7	0.024～61	
	Background levels	PCDDs+PCDFs	7	1.7	1.3	0.13～5.6	
		PCDDs/DFs+CoPCBs	7	1.8	1.8	0.26～5.6	
Aquatic organisms	All sites	PCDDs+PCDFs	368	0.64	0.32	0～11	
pg-TEQ/g wet weight		PCDDs/DFs+CoPCBs	368	2.1	1.1	0.0022～30	
	The vicinity of dioxin sources	PCDDs+PCDFs	118	0.82	0.39	0～8.4	
		PCDDs/DFs+CoPCBs	118	2.3	1.3	0.065～12	
	Large city regions	PCDDs+PCDFs	118	0.60	0.33	0～11	
		PCDDs/DFs+CoPCBs	118	2.5	1.4	0.032～30	
	Small/medium cities	PCDDs+PCDFs	118	0.51	0.26	0～4.5	
		PCDDs/DFs+CoPCBs	118	1.7	1.0	0.0061～12	
	Background levels	PCDDs+PCDFs	14	0.43	0.14	0～3.4	
		PCDDs/DFs+CoPCBs	14	0.73	0.44	0.0022～4.1	