Short Paper

A Recent Decrease in the Mercury Content of Copepods (Crustacea) in Minamata Bay, Southwestern Kyushu

Reiichi Hirota,*¹ Shizuko Tajima,** and Motoo Fujiki**

(Received December 17, 1992)

In Minamata Bay off the southwestern coast of Kyushu, methyl mercury was discharged from the chemical industry about thirty years ago. Consequently, a large amount of methyl mercury was accumulated in fish from sea water directly through the gills.^{*3} The pollution of commercial fish caused the so-called Minamata Disease in the local people. The sea water in Minamata Bay has also been polluted by mercury for a long time, because the discharged mercury has remained in the bottom sediments. Removal of the polluted sediment was attempted from 1983 to 1987 in order to decrease the pollution. To confirm the results of removal of these sediments, we have been monitoring the mercury content of copepods, which are the main constituents of marine zooplankton in the bay. Dissolved mercury in sea water is known to be accumulated rapidly by copepods.¹⁾

Samples were collected at one fixed station in Minamata Bay, a secondary inlet of the Yatsushiro Sea, southwestern Kyushu, from 1983 to 1990. The method of sampling copepods and the method of analyzing the total mercury content of copepods have been described elsewhere.^{1,2)}

The total mercury content (dry weight basis) of copepods is as shown in Table 1. Before 1985, when the dredging of bottom sediments was in progress, the total mercury content of copepods was at a high level (maximum values were 3.8 ppm in 1983 and 8.2 ppm in 1984), and varied widely from sample to sample. After 1986, when the dredging of bottom sediments stopped, the value became low (less than 0.51 ppm). These results suggest that the amount of mercury dissolved in the sea water in Minamata Bay has decreased due to the removal of polluted sediment.

The mean value (0.19 ppm) of mercury content measured after 1986 was slightly lower than those in Elefsis Bay in the Mediterranean Sea (0.29 ppm)³⁾ and in the Antarctic Sea (0.30 ppm).⁴⁾ But it was

Table 1. Mercury content of copepods collected in Minamata Bay (ppm, dry weight basis)

Date	Total mercury	Date	Total mercury
1983 Feb. 9	3.8	1987 Feb. 13	0.51
Apr. 27	0.63	Apr. 14	0.12
June 28	1.2	June 11	0.17
Aug. 2	2.7	Aug. 11	0.18
Oct. 12	0.48	Oct. 13	0.30
Dec. 13	0.88	Dec. 8	0.30
1984 Feb. 14	1.1	1988 Feb. 8	0.11
Apr. 27	2.5	Apr. 26	0.043
June 20	8.2	May 26	0.050
Aug. 27	0.52	June 2	0.20
Oct. 8	0.55	Aug. 18	0.46
Dec. 20	0.27	Oct. 3	0.17
1985 Feb. 20	0.31	Oct. 25	0.022
Aug. 27	0.72	Dec. 6	0.062
Oct. 24	0.15	Dec. 13	0.081
Dec. 17	0.35	1989 Feb. 2	0.20
1986 Feb. 13	0.34	Apr. 27	0.12
Apr. 22	0.11	Sept. 11	0.42
Aug. 21	0.17	Oct. 24	0.16
Oct. 16	0.030	Dec. 12	0.30
Dec. 9	0.18	1990 Feb. 8	0.089
		Oct. 15	0.14

slightly higher than those in the Yatsushiro Sea (0.114 ppm), the Ariake Sea (0.085 ppm), and the Seto Inland Sea (0.055 ppm) in Japanese waters,²⁾ Monterey Bay (0.11 ppm) off California,³⁾ and the Atlantic Ocean (0.12 ppm) off northwest Africa.⁶⁾ Furthermore, the maximum value (0.51 ppm) in Minamata Bay after 1986 was lower than that in the Antarctic Sea (1.223 ppm),⁴⁾ and about the same as that in the Mediterranean Sea (0.44 ppm),³⁾ though it was slightly higher than those in the other Japanese waters (0.250 ppm)²⁾ and Monterey Bay off California (0.16 ppm).³⁾ These results seem to suggest that Minamata Bay, once polluted by mercury, has been recovering since 1986.

The authors wish to thank Kumamoto Prefectural Authorities for the cooperation in sampling the materials.

References

- 1) R. Hirota, J. Asada, S. Tajima, and M. Fujiki: *Nippon Suisan Gakkaishi*, **49**, 1249-1251 (1983).
- 2) R. Hirota, J. Asada, S. Tajima, Y. Hirano, and M. Fujiki: *Nippon Suisan Gakkaishi*, **49**, 1245-1247 (1983).
- 3) D. Zafiroopoulos and A. P. Grimanis: *Mar. Poll. Bull.*, **8**, 79-81 (1977).
- 4) R. Hirota, Y. Fukuda, J. Chiba, S. Tajima, and M. Fujiki: *Proc. NIPR Symp. Polar Biol.*, No. 2, 65-70 (1989).
- 5) J. H. Martin and G. A. Knauer: *Geochim. Cosmochim. Acta*, **37**, 1639-1653 (1973).
- 6) T. M. Leatherland, J. D. Burton, F. Culkin, M. J. McCartney, and R. J. Morris: *Deep-Sea Res.*, **20**, 679-685 (1973).

*¹ Department of Biological Science, Faculty of Science, Kumamoto University, Kurokami, Kumamoto 860, Japan (弘田禮一郎: 熊本大学理学部生物科学科).

**² Institute of Community Medicine, University of Tsukuba, Tsukuba 305, Japan (田島静子, 藤木素士: 筑波大学社会医学系).

*³ M. Fujiki *et al.*: *Proc. 3rd U.S.-Japan Experts' Meeting "Management of Bottom Sediments Containing Toxic Substances"*, 87-94 (1978).