Current state of mercury pollution in Minamata Bay

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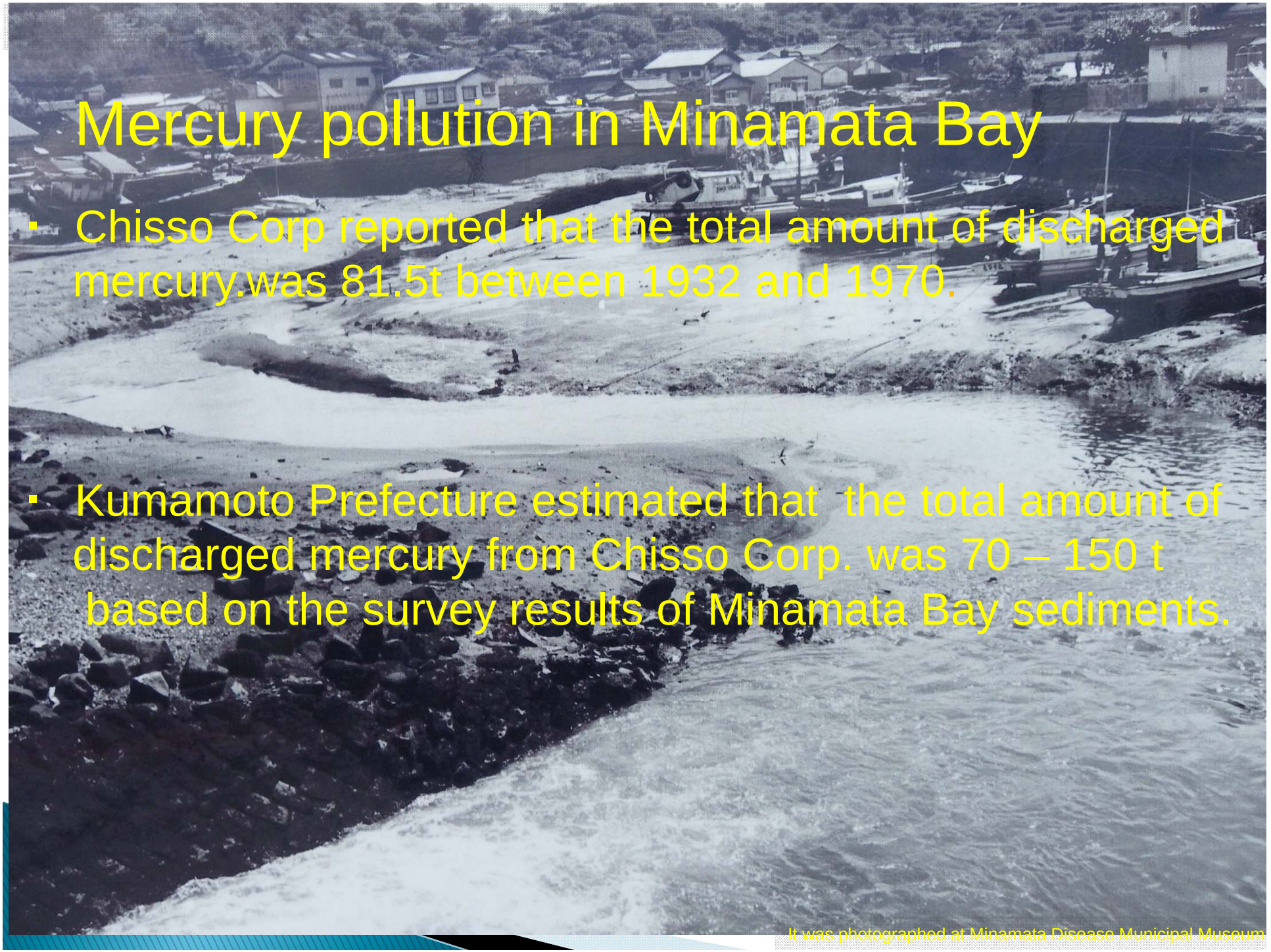
Mercury pollution in Minamata Bay

- Chisso Corp reported that the total amount of discharged mercury.was 81.5t between 1932 and 1970.

- Kumamoto Prefecture estimated that the total amount of discharged mercury from Chisso Corp. was 70 – 150 t based on the survey results of Minamata Bay sediments.



It was photographed at Minamata Disease Municipal Museum

Chronologically Change of the survey of Minamata Bay sediment that was performed by Kumamoto Prefecture

1973

- In order to prepare the dredging project-plan of Minamata Bay, mercury-pollution-map was produced by Kumamoto Prefecture
- The number of sampling points was 356 points. (only surface sediment)
- Maximum total mercury concentration was **558.6 ppm** dry weight basis

1985

- Before Minamata Bay-dredging project, the survey was performed as for accumulated sediments in Minanata Bay.
- The number of sampling points was 610 points that contained vertical layer.
- Maximum total mercury concentration was **553ppm** dry weight basis

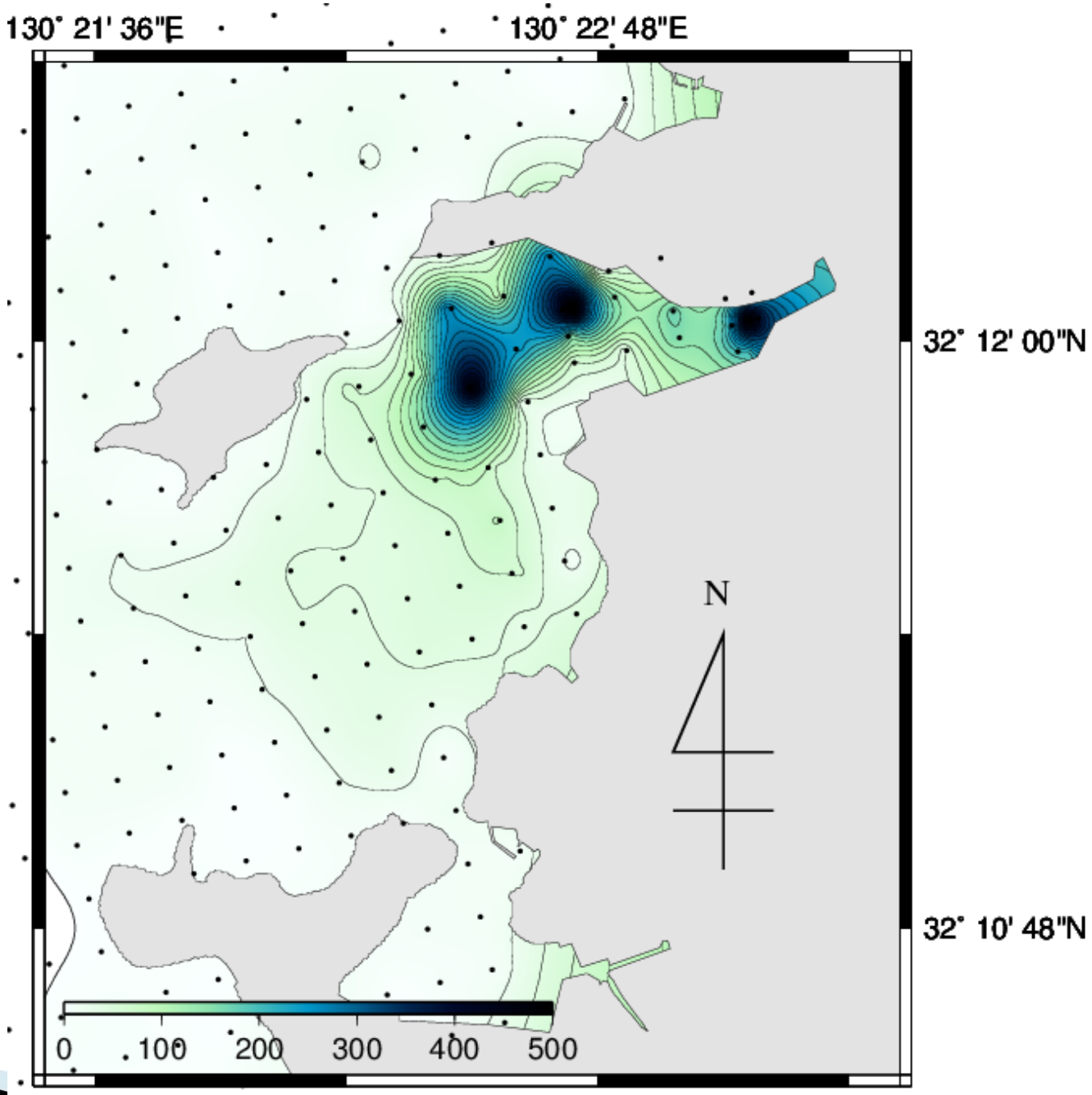
1987

- After Minamata Bay-dredging project, the survey was performed as for bottom sediments in Minanata Bay (only surface sediment).
- The number of sampling points was 84 points
- The average value of total mercury concentration of surface sediments was 4.7 ppm dry weight basis

1）Before the dredging project
The first survey in 1973

- The number of the sampling points was 356
- Survey was performed only surface sediment
- Maximum total mercury concentration was 558.6 ppm dry basis

1973
Before dredging
Only surface sediments

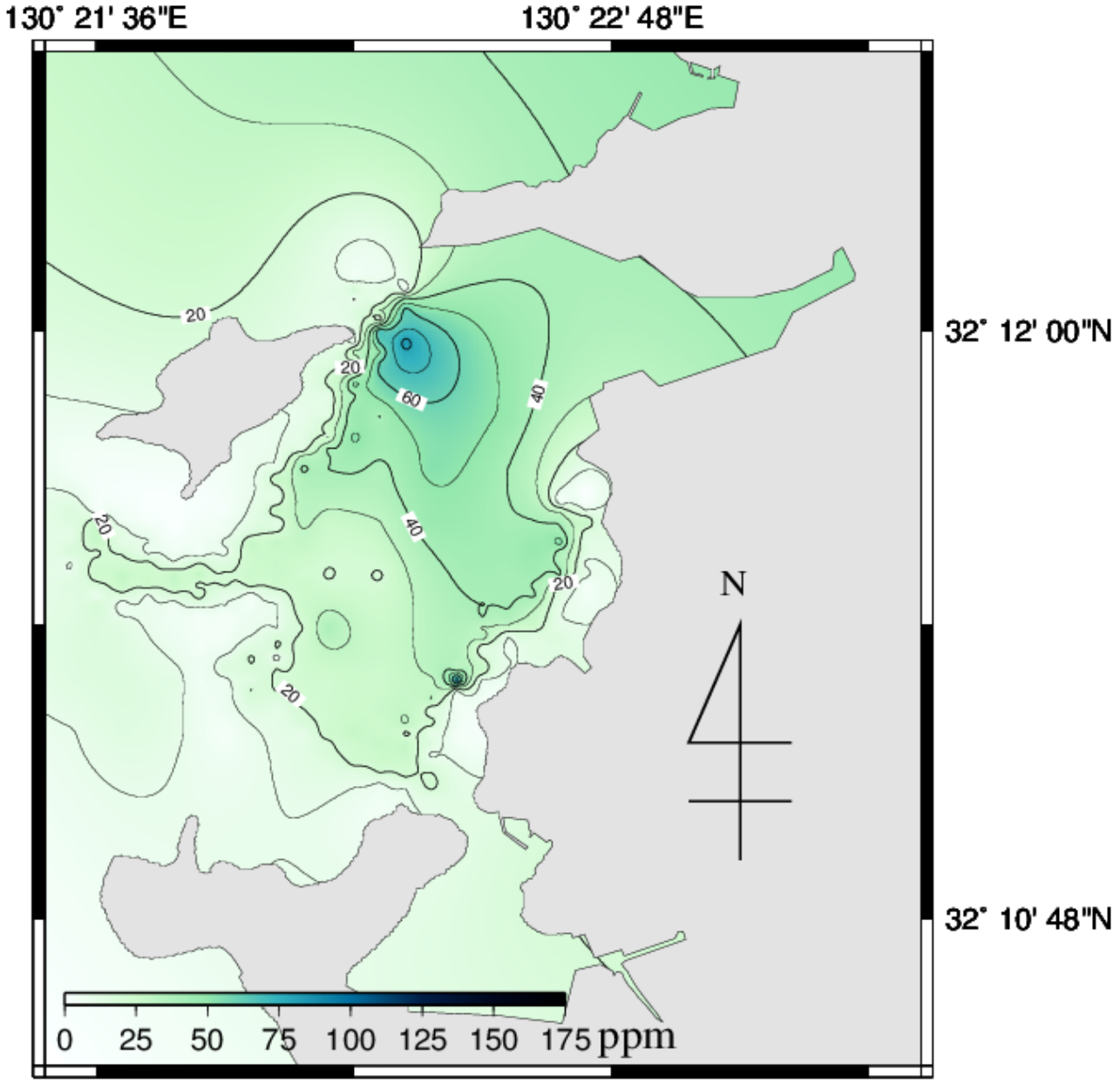


Distance between points is 200m

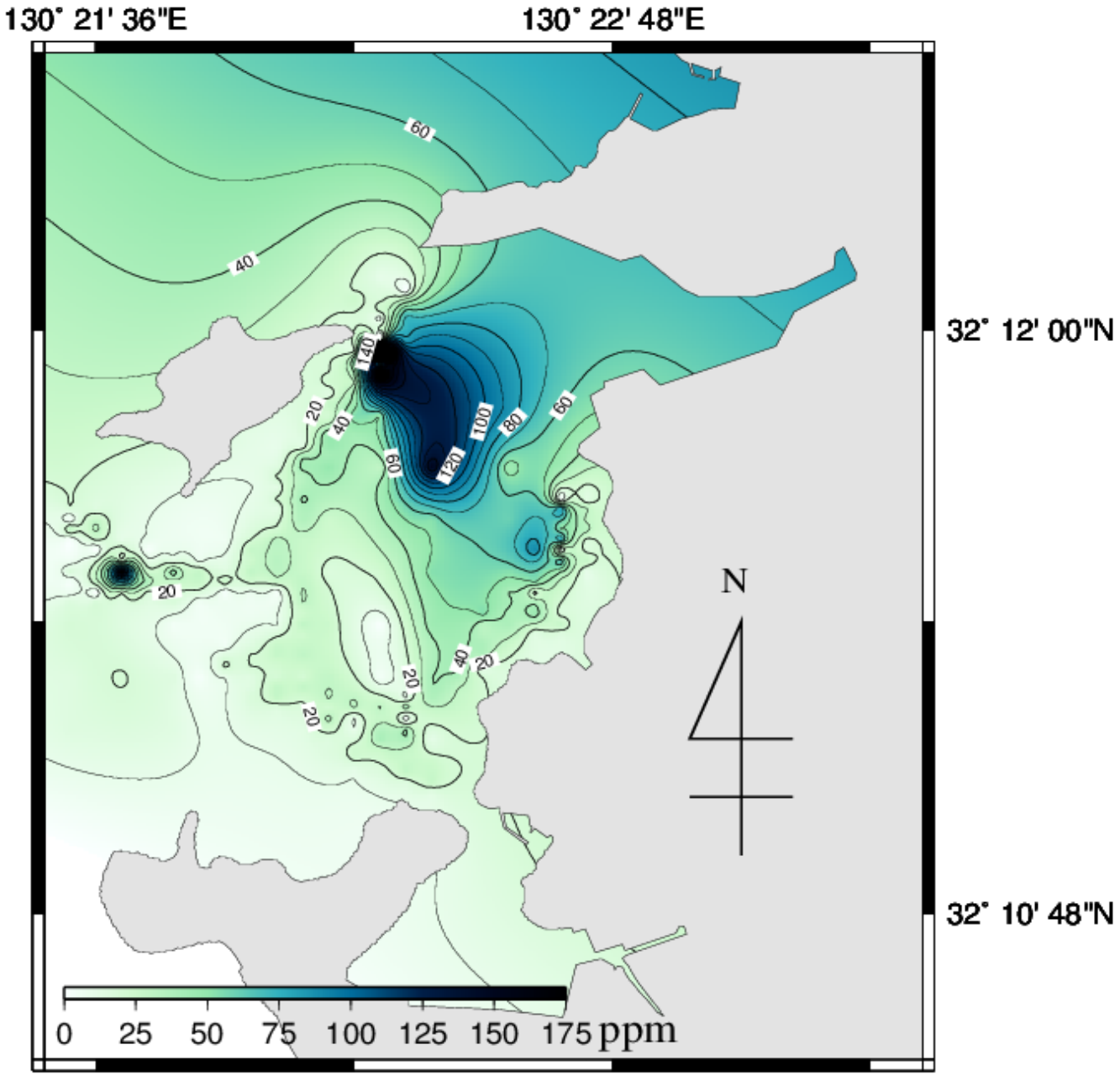
2）Before the dredging project
The second survey in 1985

- The number of the sampling points was 610
- Survey was performed until -1m from surface sediment

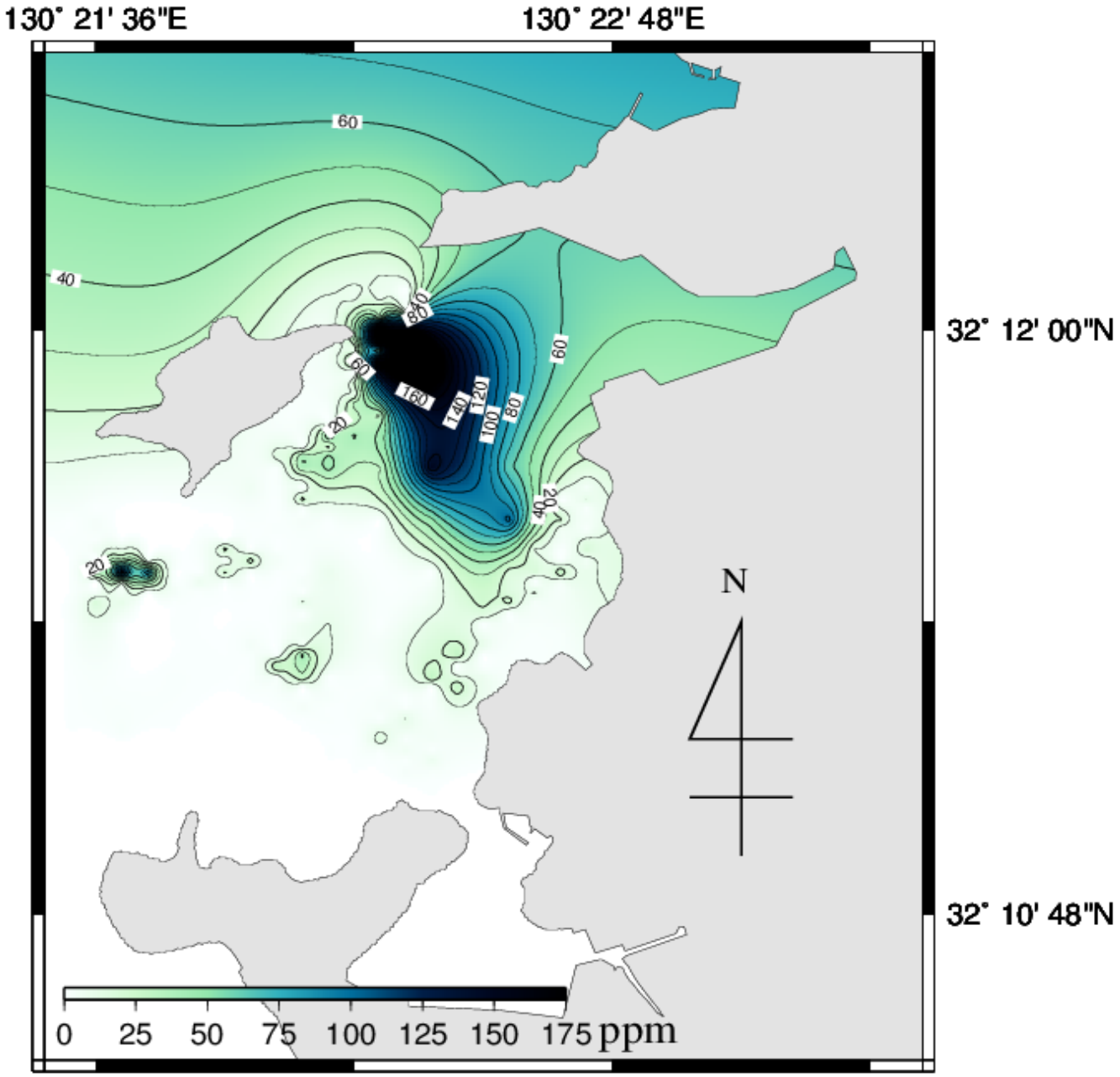
1985
Before dredging
Surface sediment
~ -10cm



-20cm ~ -30cm

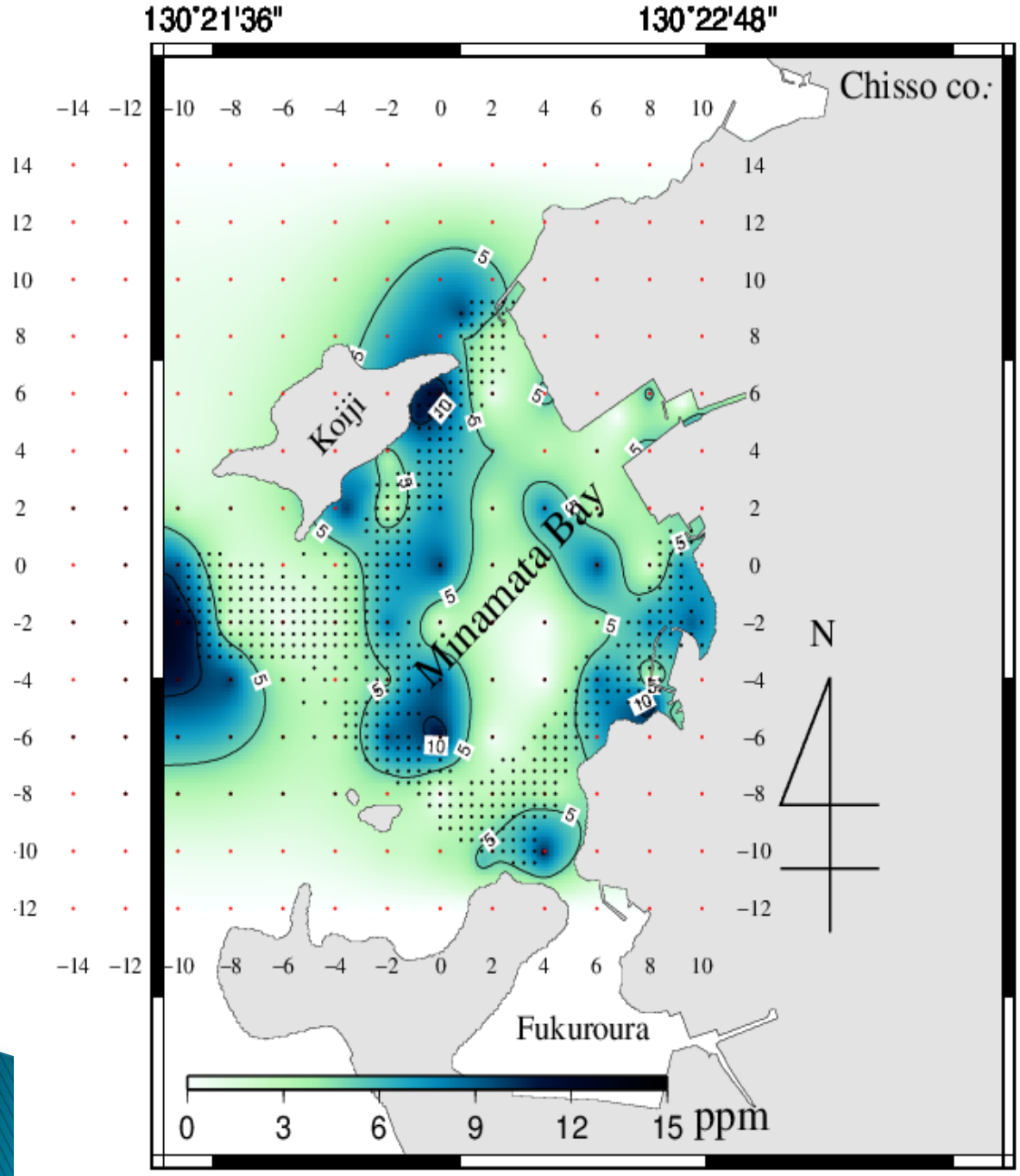

130° 21' 36"E
130° 22' 48"E
32° 12' 00"N
32° 10' 48"N
N
0 25 50 75 100 125 150 175 ppm

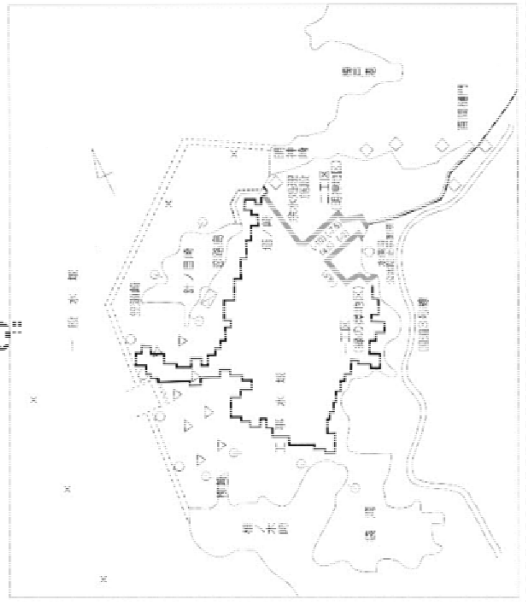
-40cm ~ -50cm


130° 21' 36"E
130° 22' 48"E
32° 12' 00"N
32° 10' 48"N
N
0 25 50 75 100 125 150 175 ppm

3) After the dredging project
The third survey in 1987

- The number of the sampling points was 84
  (only surface sediment)


130°21'36"
130°22'48"
Chisso co.
Koiji
Minamata Bay
Fukuroura
N
32°12'00"
32°10'48"
0 3 6 9 12 15 ppm

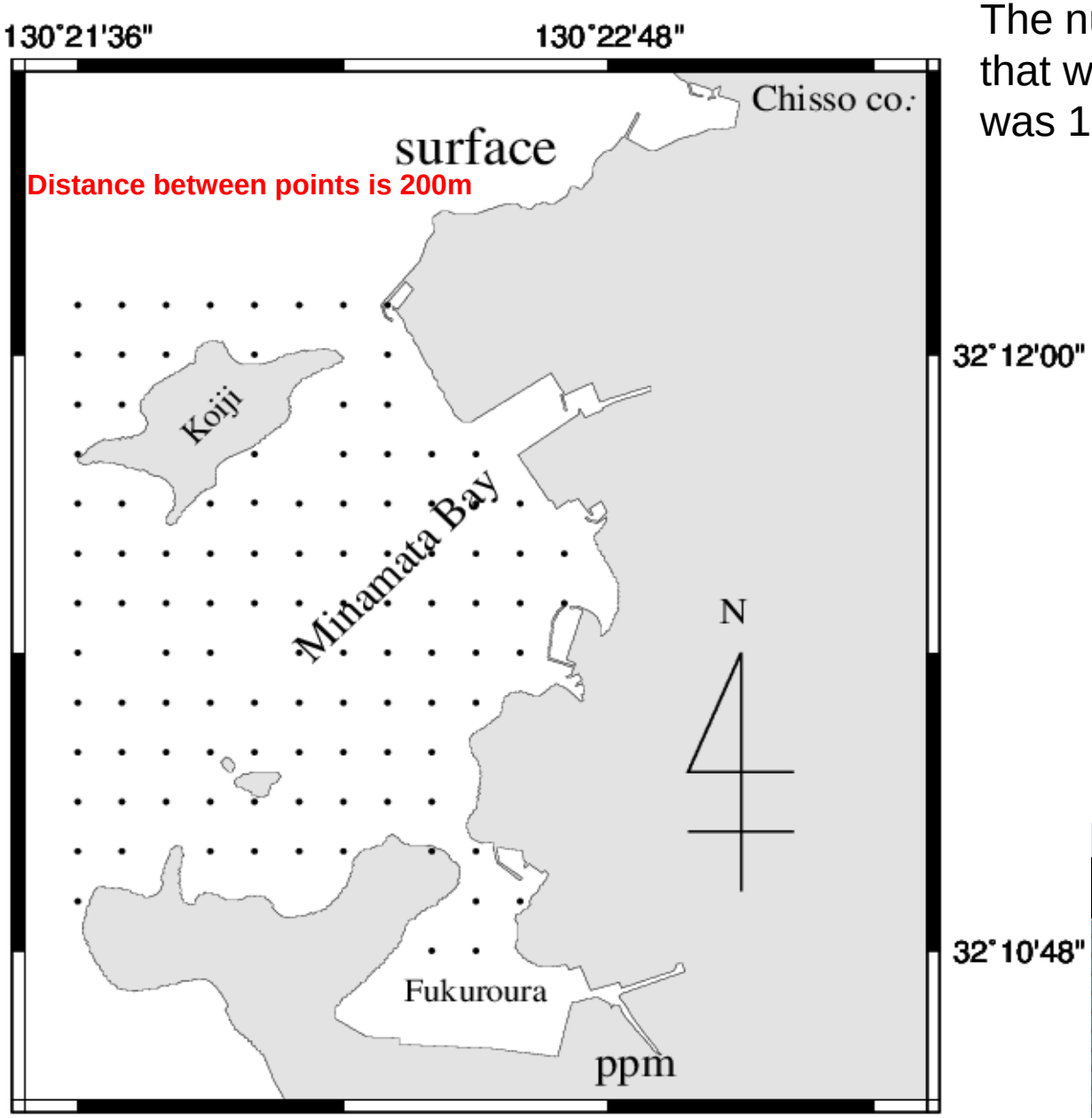


The survey as for Minamata Bay sediment by NIMD in 2014

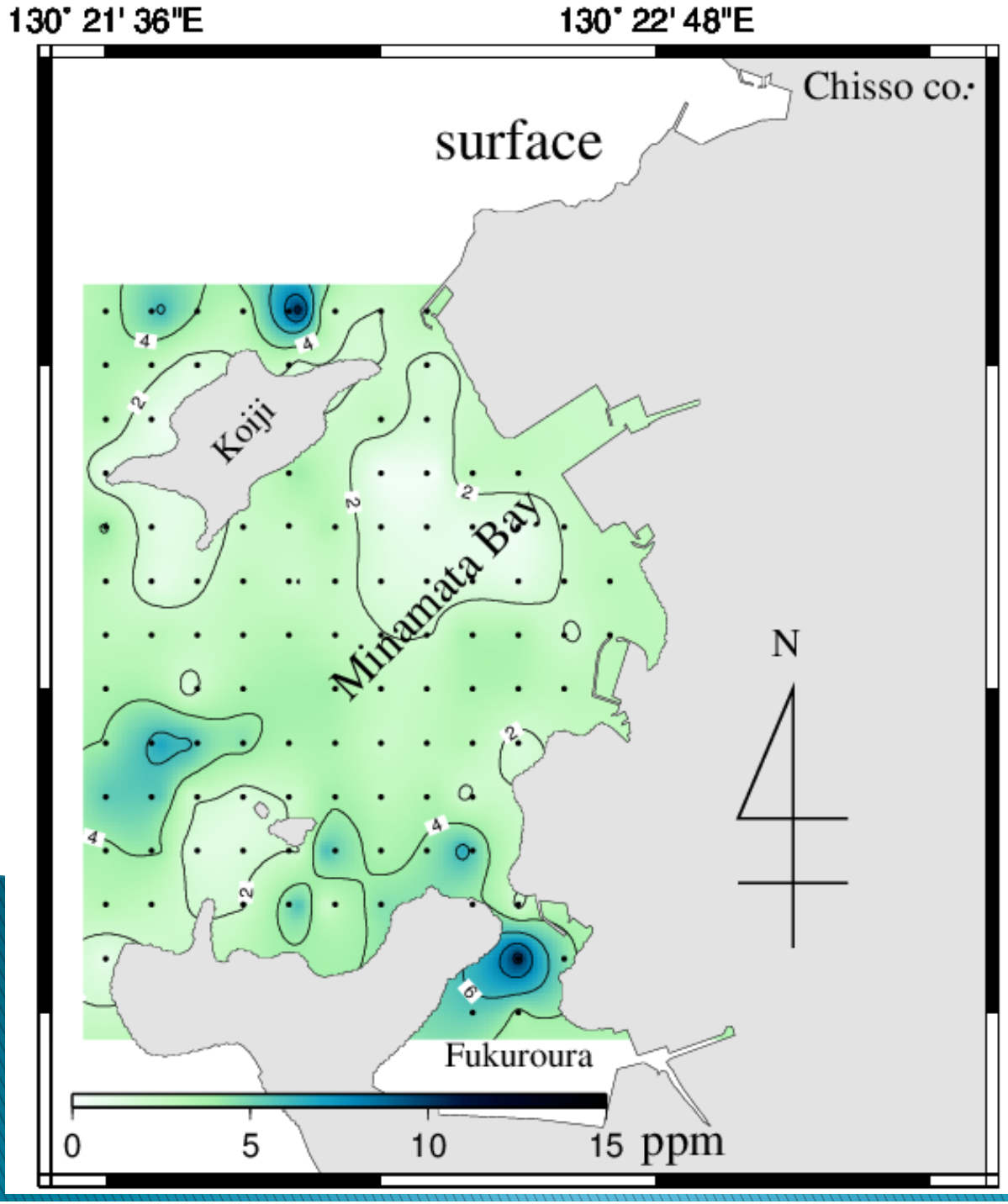
- The number of sampling points was 107
  (671 sediment samples were obtained from 107 points)

- Survey was performed until -40 cm from surface sediment

Sampling plan for sediment in Minamata Bay

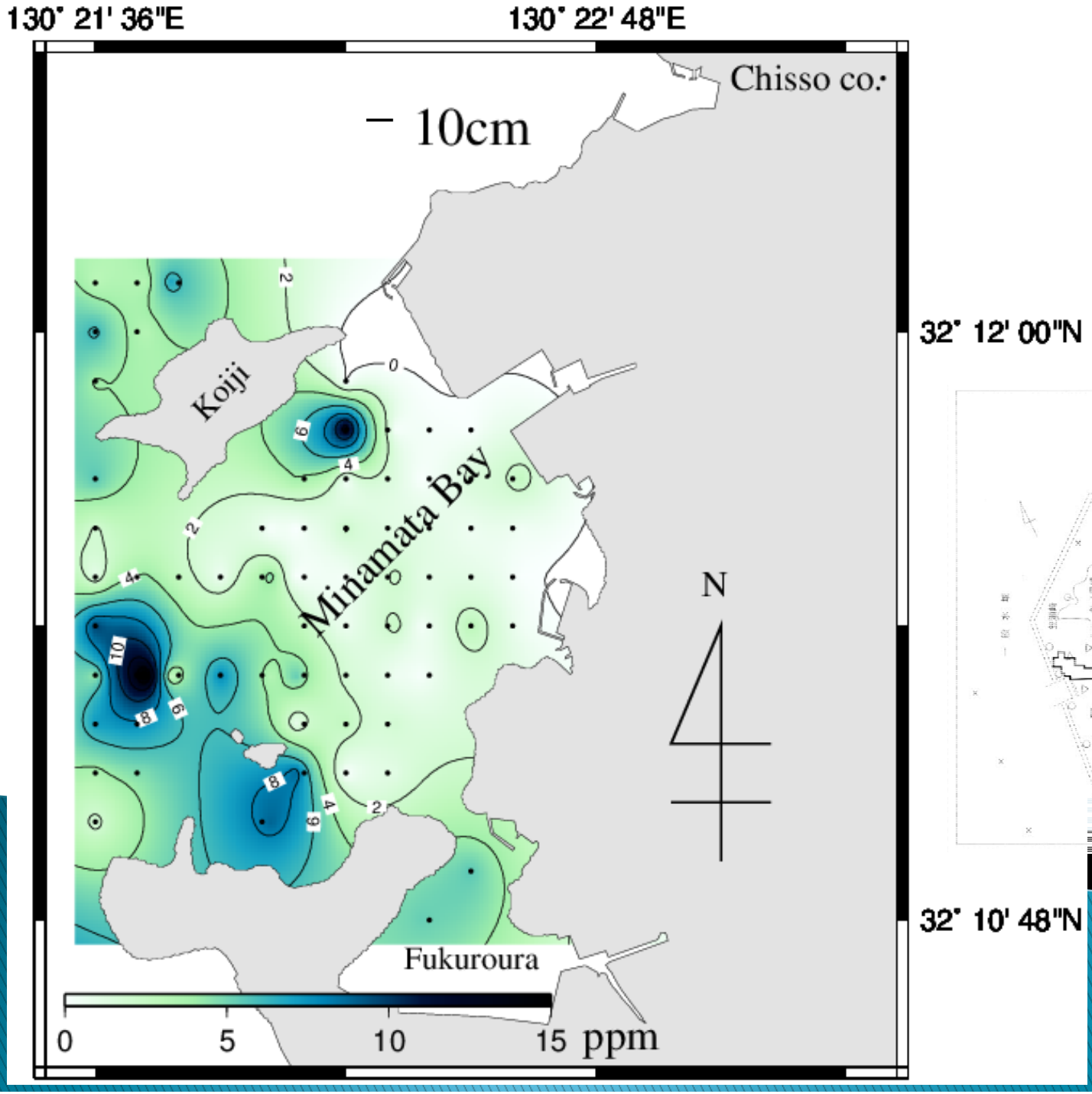


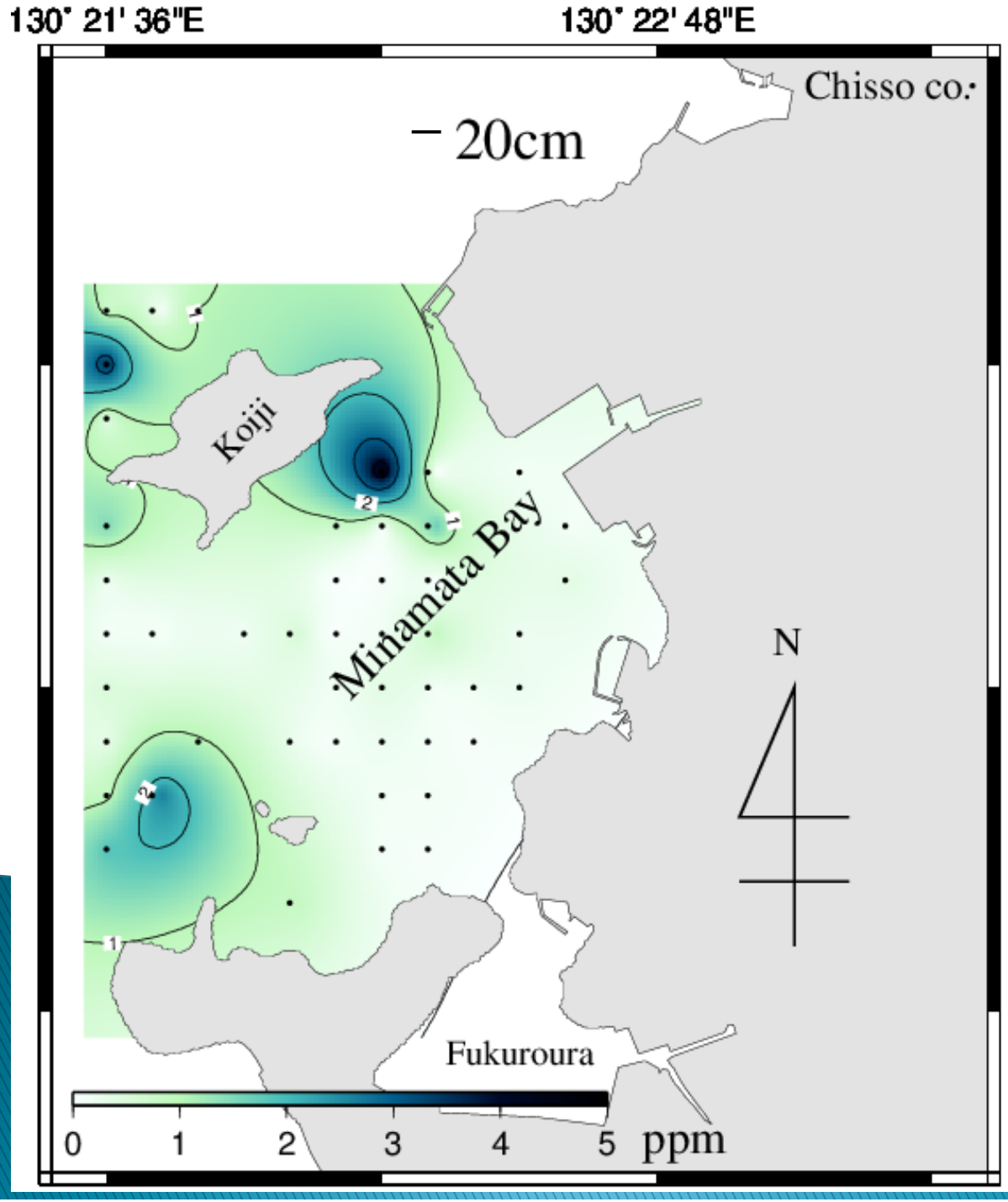
The number of sampling point that were set in Minamata Bay was 107.

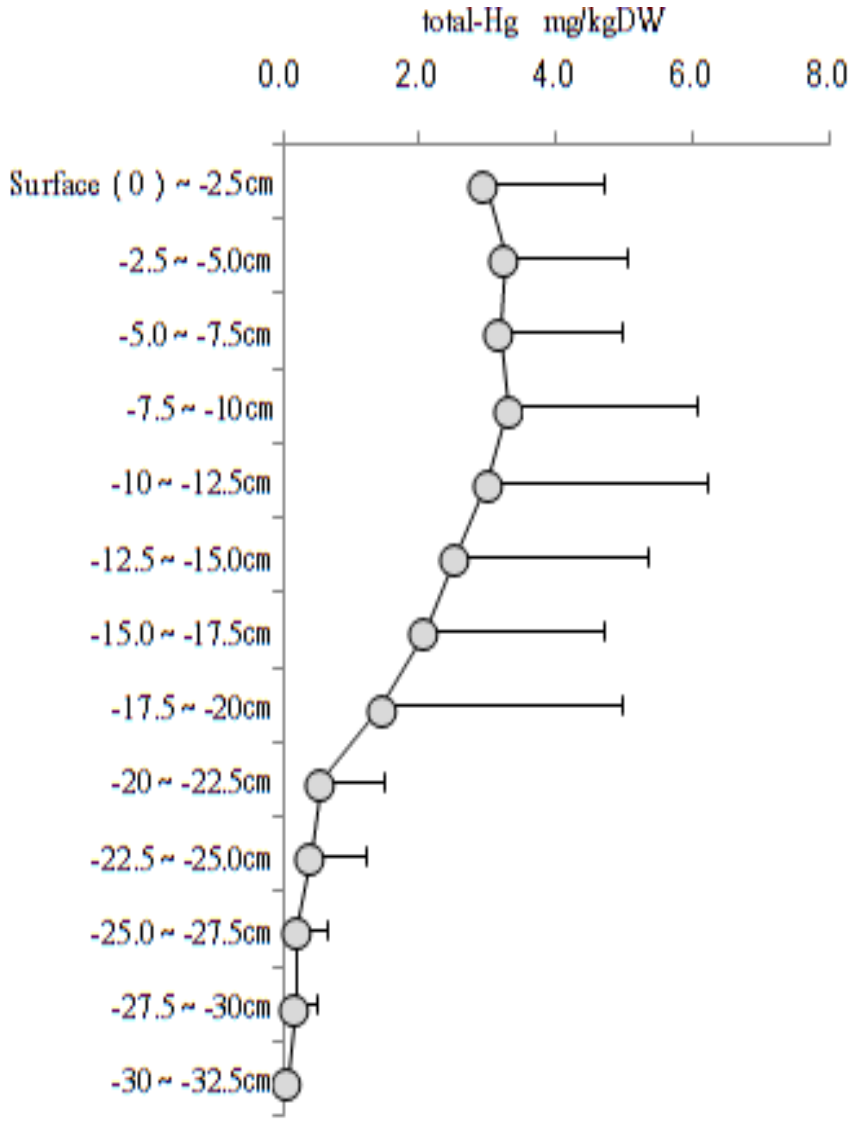


32° 12' 00"N

32° 10' 48"N


130° 21' 36"E
130° 22' 48"E
32° 12' 00"N
32° 10' 48"N
Chisso co.
− 10cm
Koiji
Minamata Bay
Fukuroura
N
0
5
10
15 ppm


130° 21' 36"E
130° 22' 48"E
Chisso co.
− 20cm
Koiji
Minamata Bay
Fukuroura
N
32° 12' 00"N
32° 10' 48"N
0
1
2
3
4
5
ppm



Average vertical distribution of total-Hg (mg⁄kg (DW)) in sediments from Minamata Bay

Outline of results of our survey

- A weighted average value of total mercury concentration and the total mass volume of mercury in the bottom sediment of Minamata Bay were estimated 2.3 ppm (dry weight basis) and 3.4 ton respectively.

- An average value of Total mercury concentration of surface sediment was 3.0 ppm (dry weight basis)

- Average value of total mercury concentration of surface sediments that was reported by kumamoto Prefecture 25 years ago was 4.7 ppm (dry weight basis)

Simple research question 1

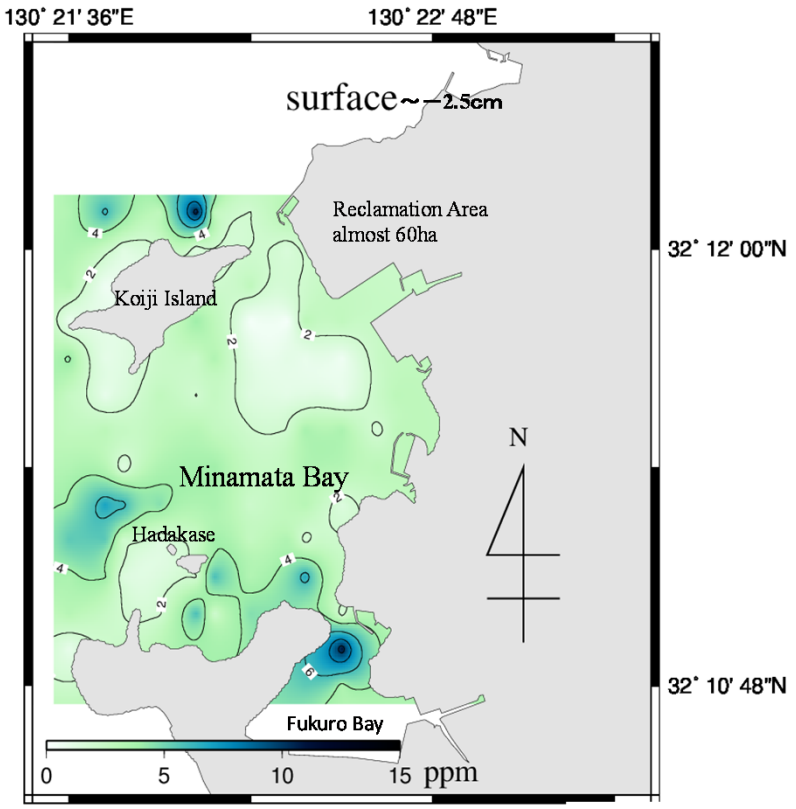
- How about the present distribution state of methylmercury concentration that is accumulated in Minamata Bay surface sediment ?

An average value of total mercury concentration in Minamata Bay surface sediment
3.0 ppm dry weight basis

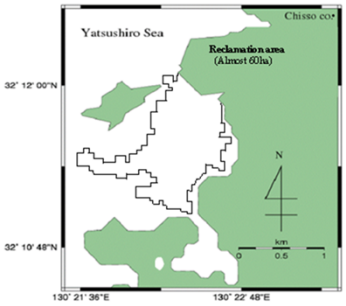
A previous average value of total mercury concentration that was surveyed by Kumamoto Prefecture 25 years ago 4.7 ppm dry weight basis

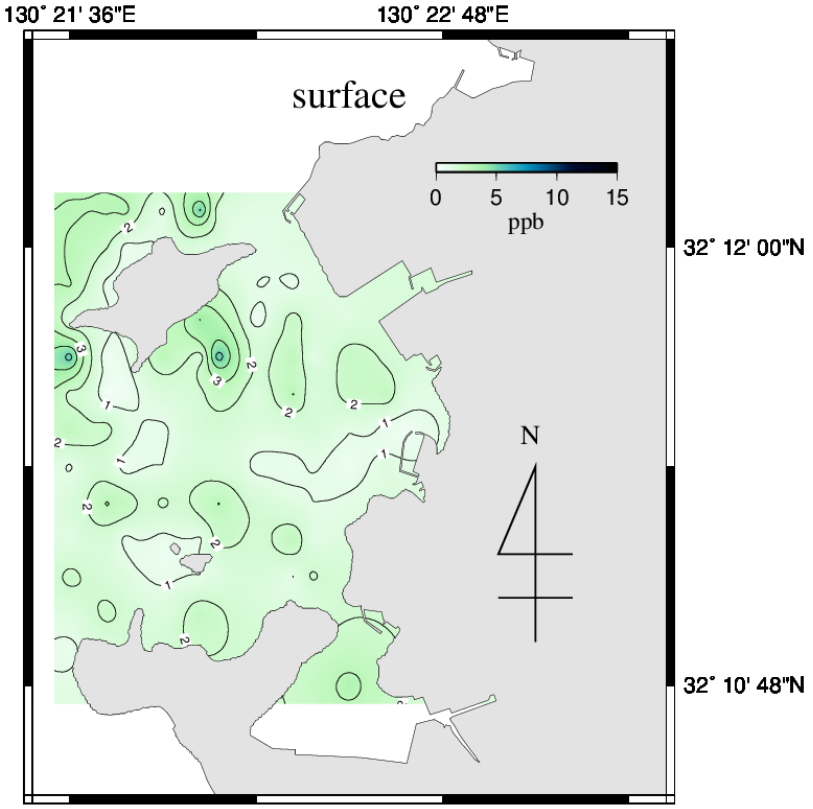
An average value of methylmercury concentration in Minamata Bay surface sediment

3.1 ± 1.9 ppb dry weight basis (107 sampling points)



Total mercury

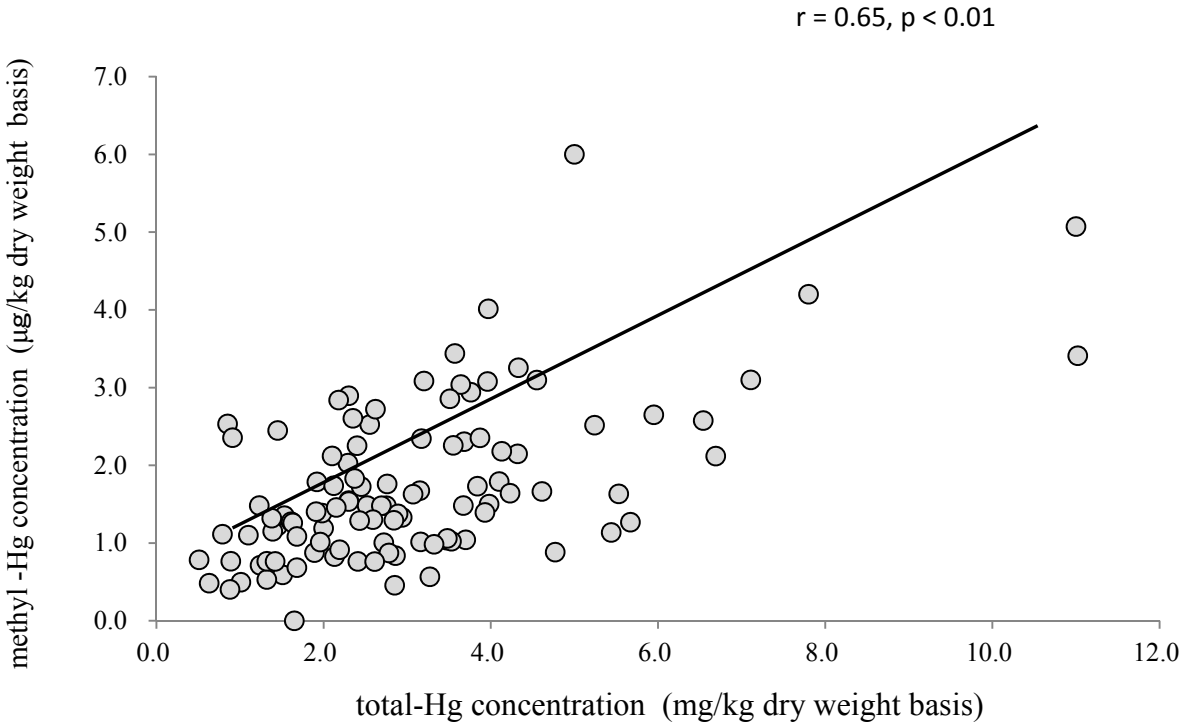




Methylmercury

Dredge area in Minamata Bay

Distribution of mercury that was distinguished by chemical form in Minamata Bay-sediment



Relationship between total mercury concentration and methymercury concentration in Minamata Bay-sediment

Conclusion

- There was no exceeding of 25 ppm(tentative regulatory standard value of mercury for sediment) as total mercury concentration in all sediment samples.

- Almost 95%-98% of total volume of mercury that was discharged from Chisso Corp has been removed by the dredging project due to Kumamoto Prefecture.


Thank you for your attention