



Contamination of Organotin Alternative Antifoulants in the Coastal Seawater and Sediment of the Northern Part of Hiroshima Bay

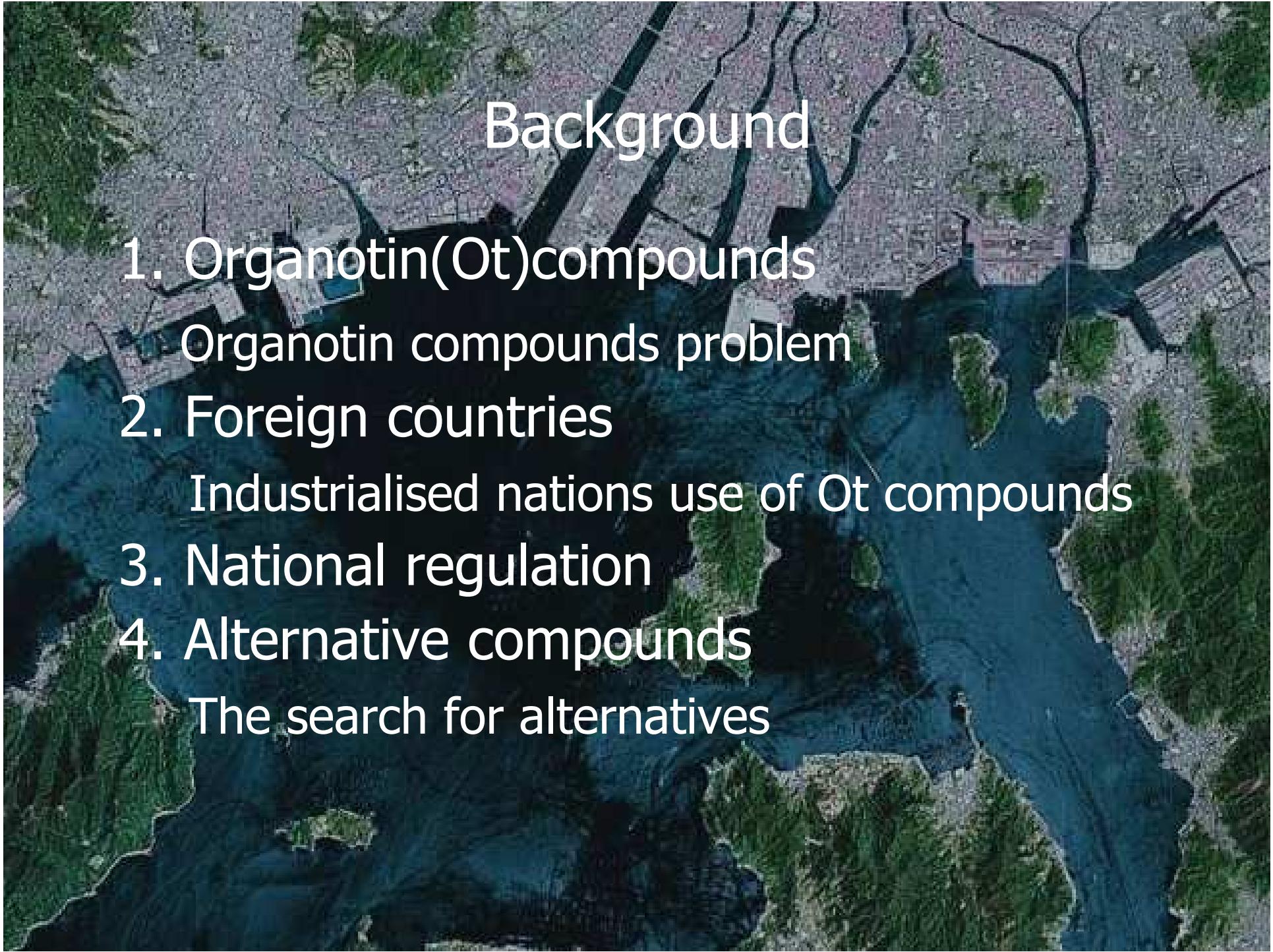
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The background image is a high-resolution satellite or aerial photograph of a coastal urban area. It shows a complex network of waterways, including a large river flowing through the center and several smaller canals or tributaries. The surrounding land is a mix of dense green vegetation, patches of brown earth, and clusters of buildings. In the upper left, there's a prominent industrial or port facility with large white storage tanks and various industrial structures. The overall scene is a blend of natural and human-made environments.

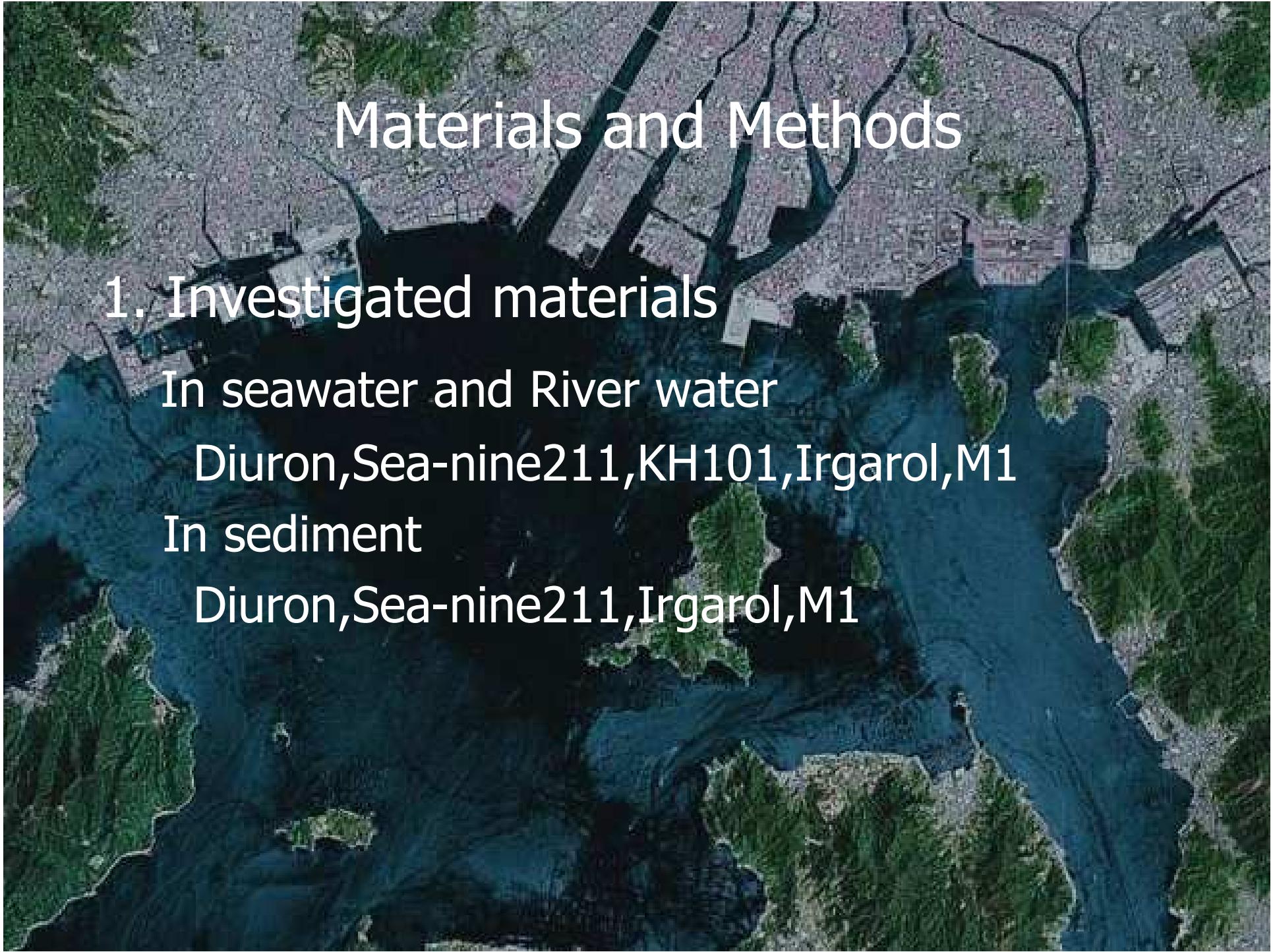
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Background

1. Organotin(Ot)compounds
 - Organotin compounds problem
2. Foreign countries
 - Industrialised nations use of Ot compounds
3. National regulation
4. Alternative compounds
 - The search for alternatives



Materials and Methods

1. Investigated materials

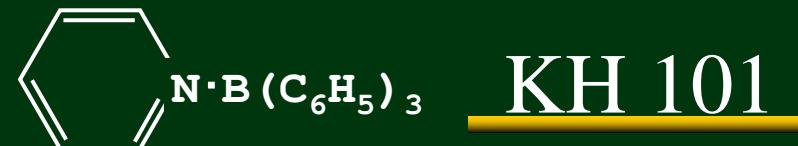
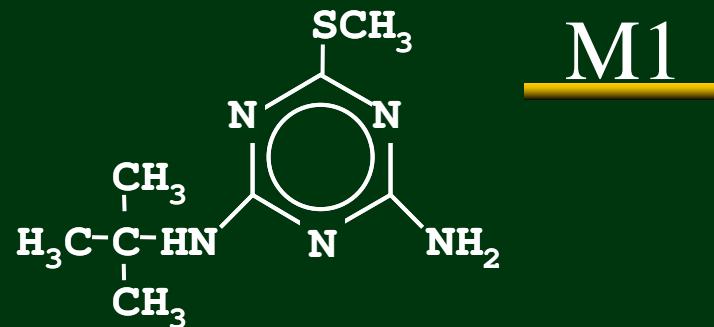
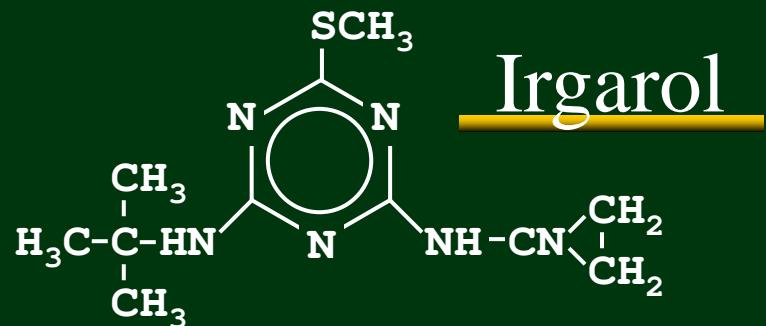
In seawater and River water

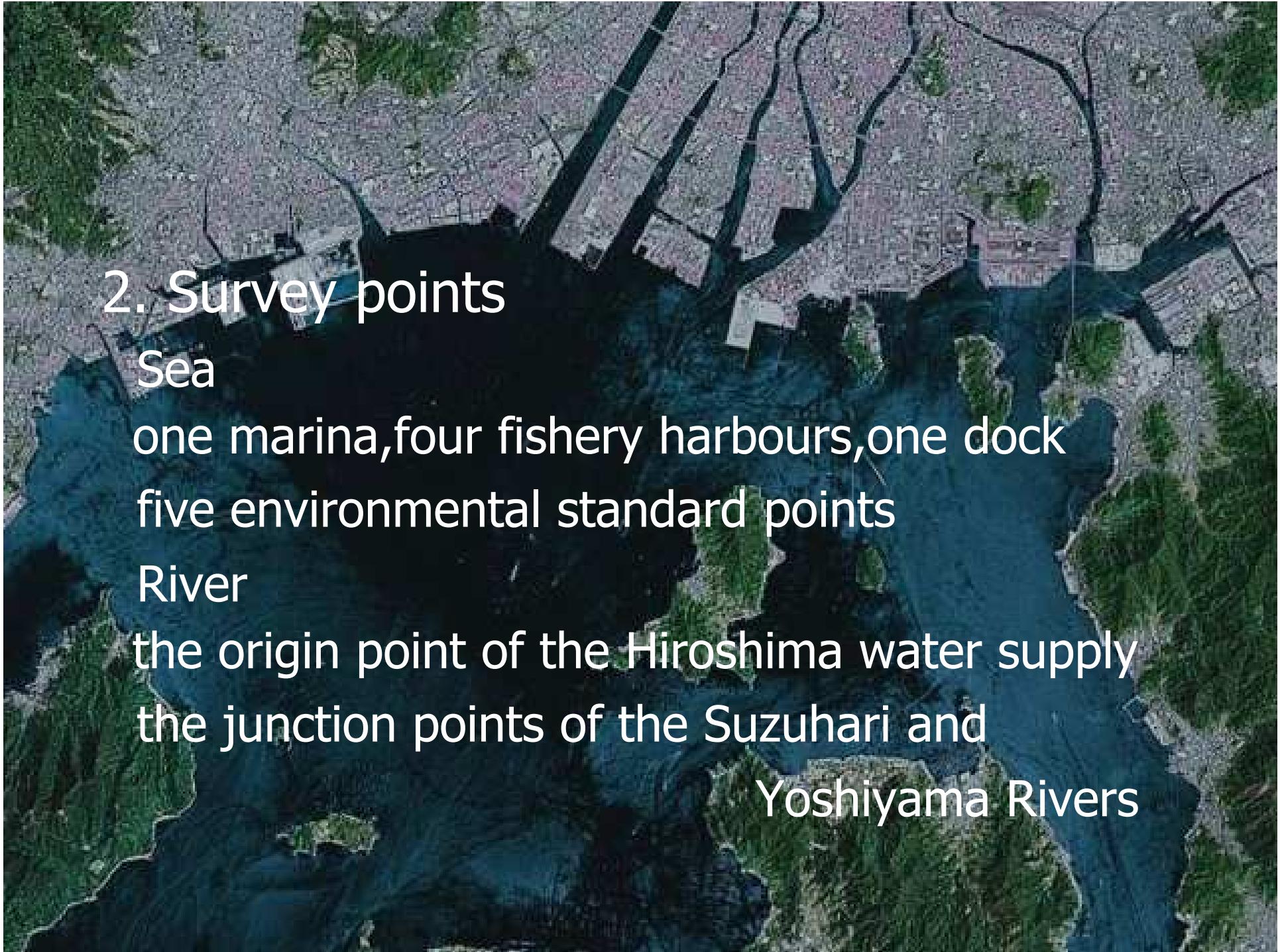
Diuron, Sea-nine211, KH101, Irgarol, M1

In sediment

Diuron, Sea-nine211, Irgarol, M1

Structures of antifouling compounds





2. Survey points

Sea

one marina, four fishery harbours, one dock

five environmental standard points

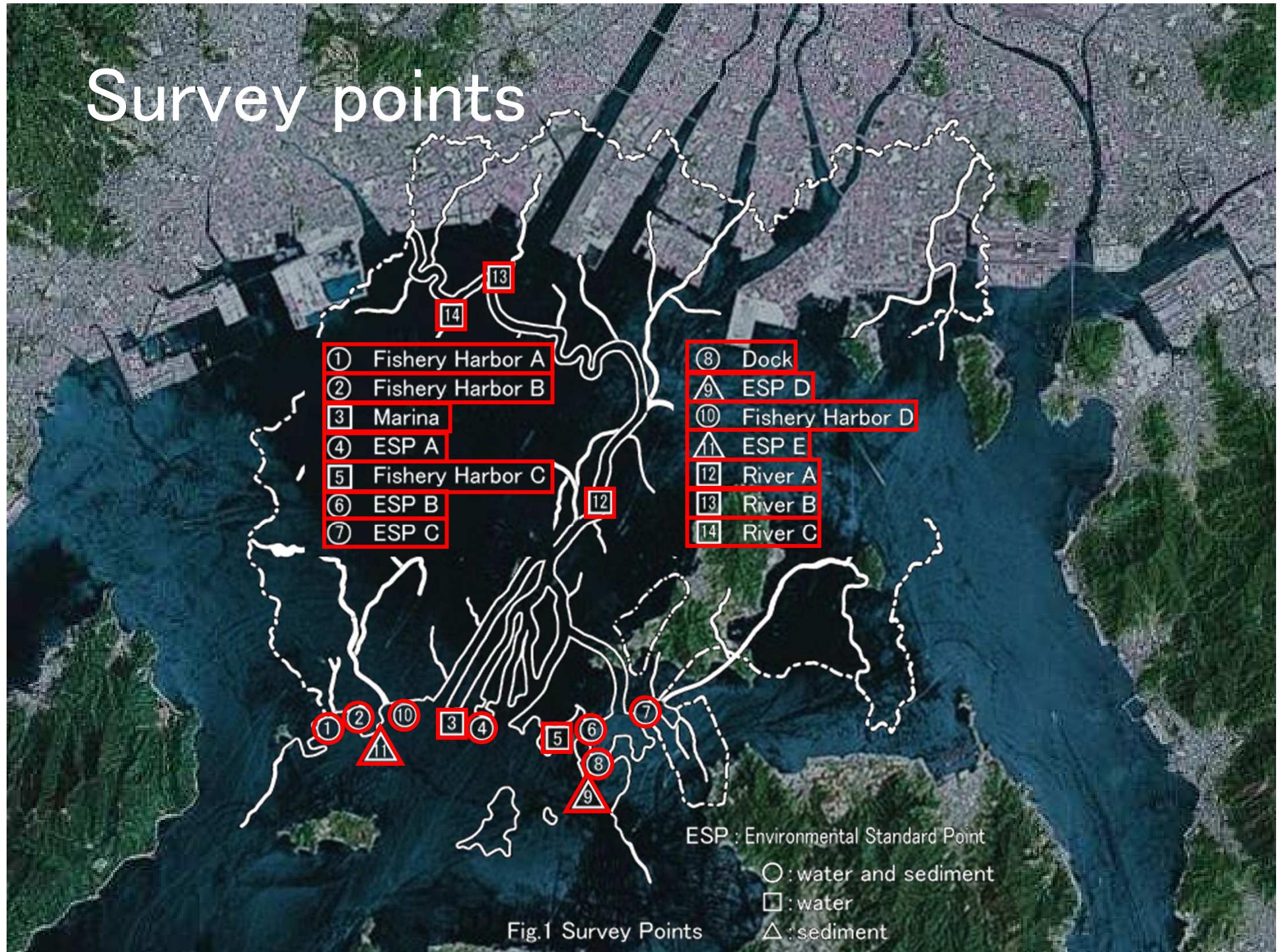
River

the origin point of the Hiroshima water supply

the junction points of the Suzuhari and

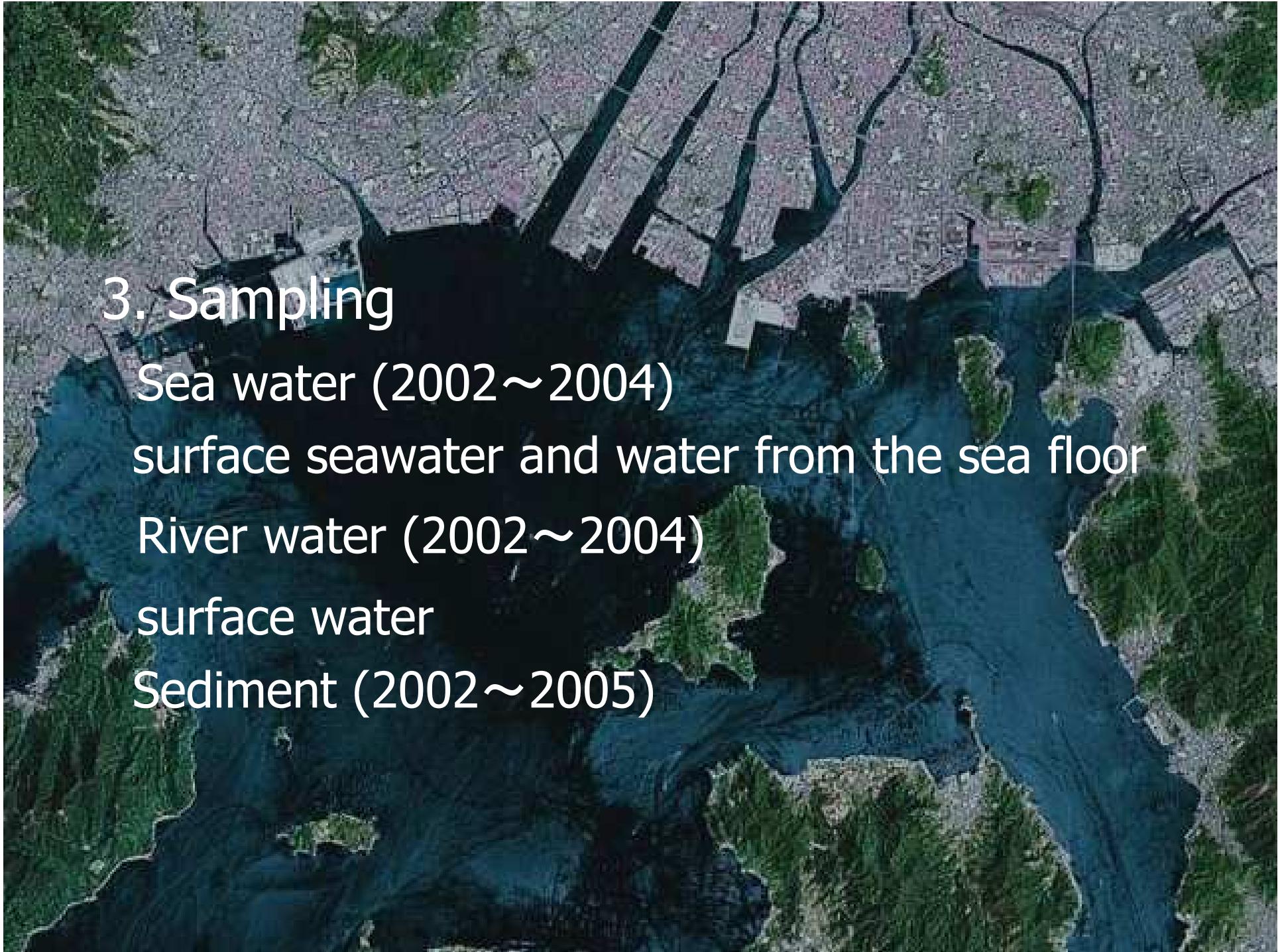
Yoshiyama Rivers

Survey points



Itsukaichi fishery harbor(south)





3. Sampling

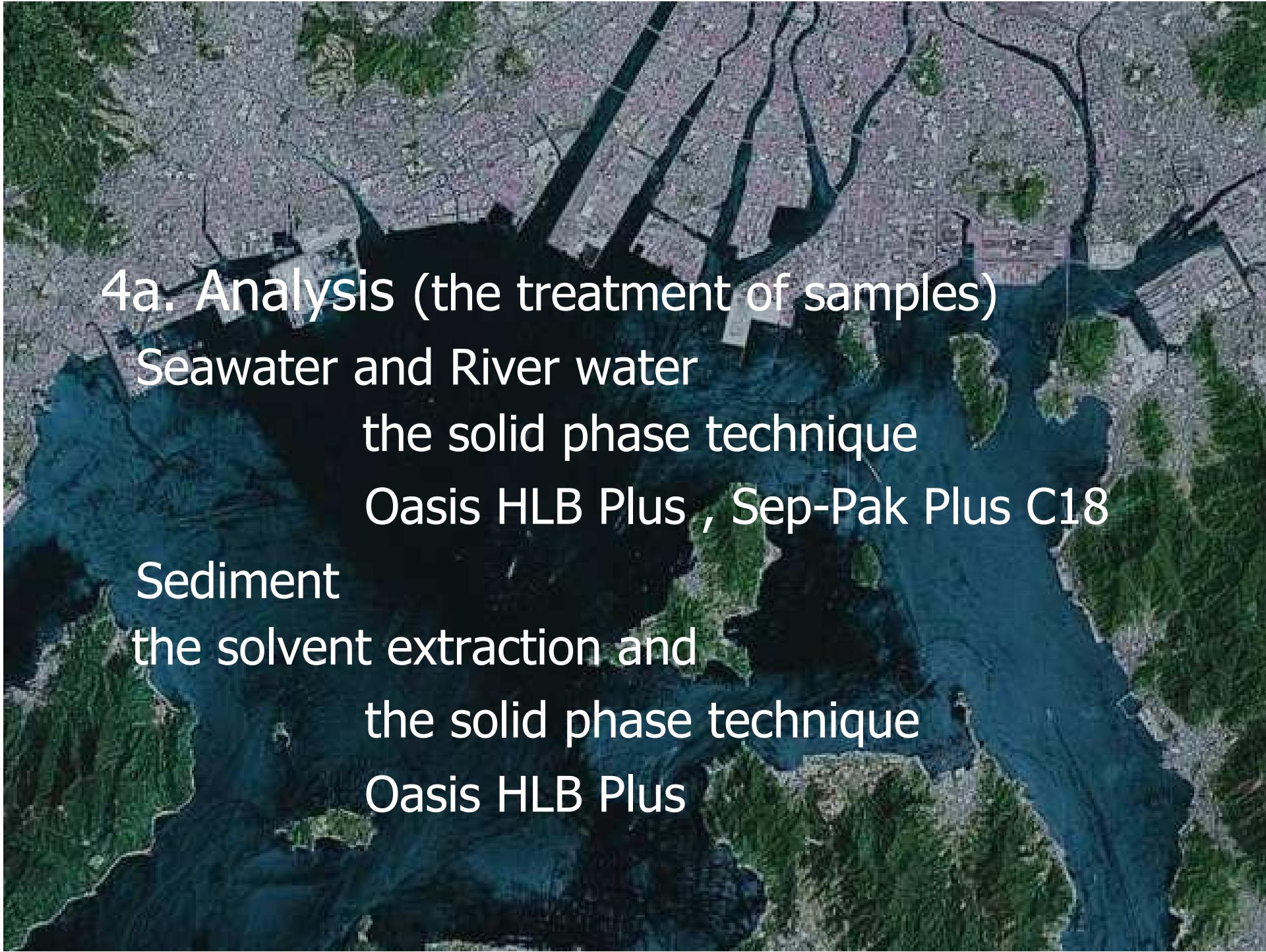
Sea water (2002~2004)

surface seawater and water from the sea floor

River water (2002~2004)

surface water

Sediment (2002~2005)



4a. Analysis (the treatment of samples)

Seawater and River water

the solid phase technique

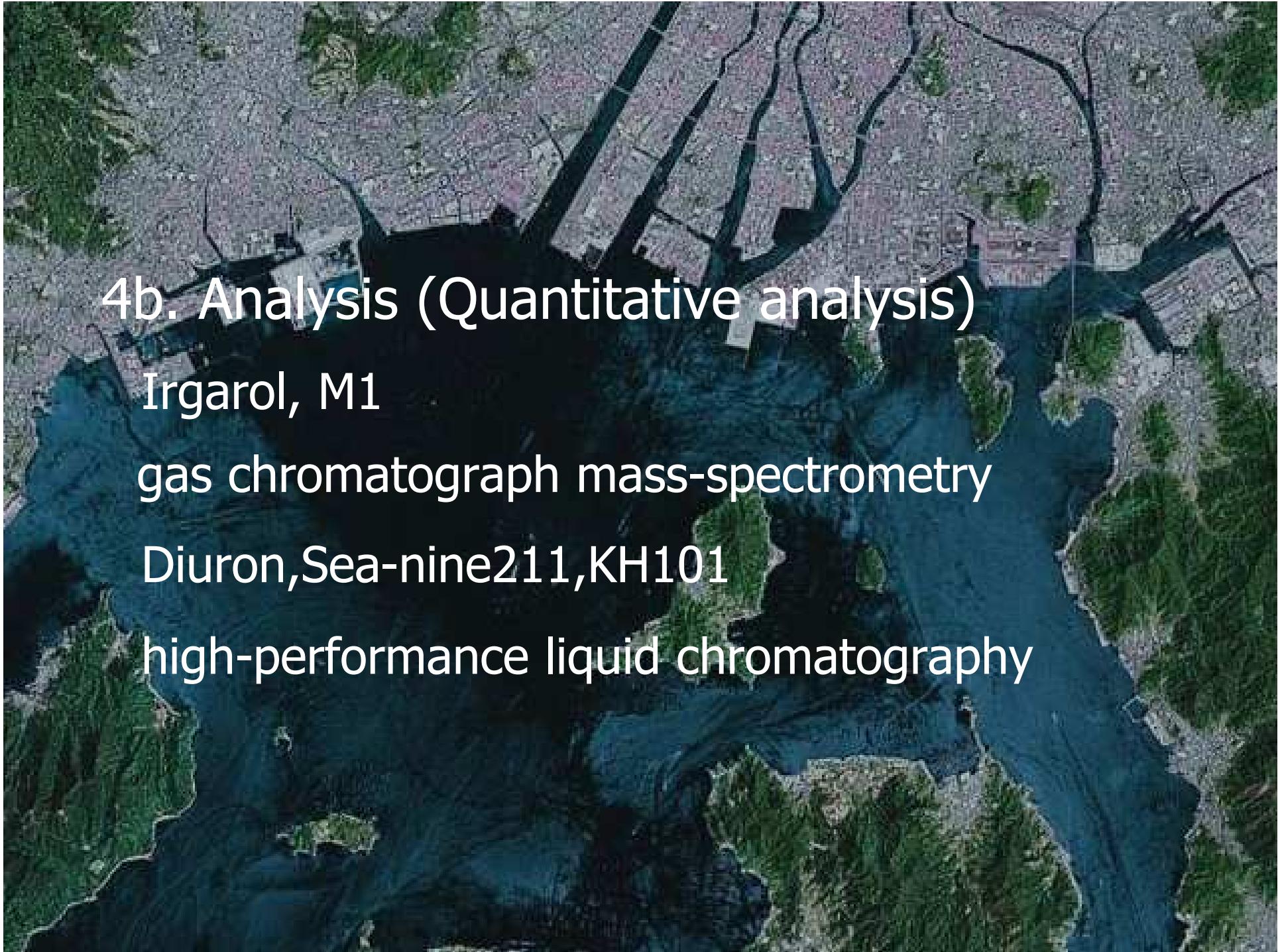
Oasis HLB Plus , Sep-Pak Plus C18

Sediment

the solvent extraction and

the solid phase technique

Oasis HLB Plus



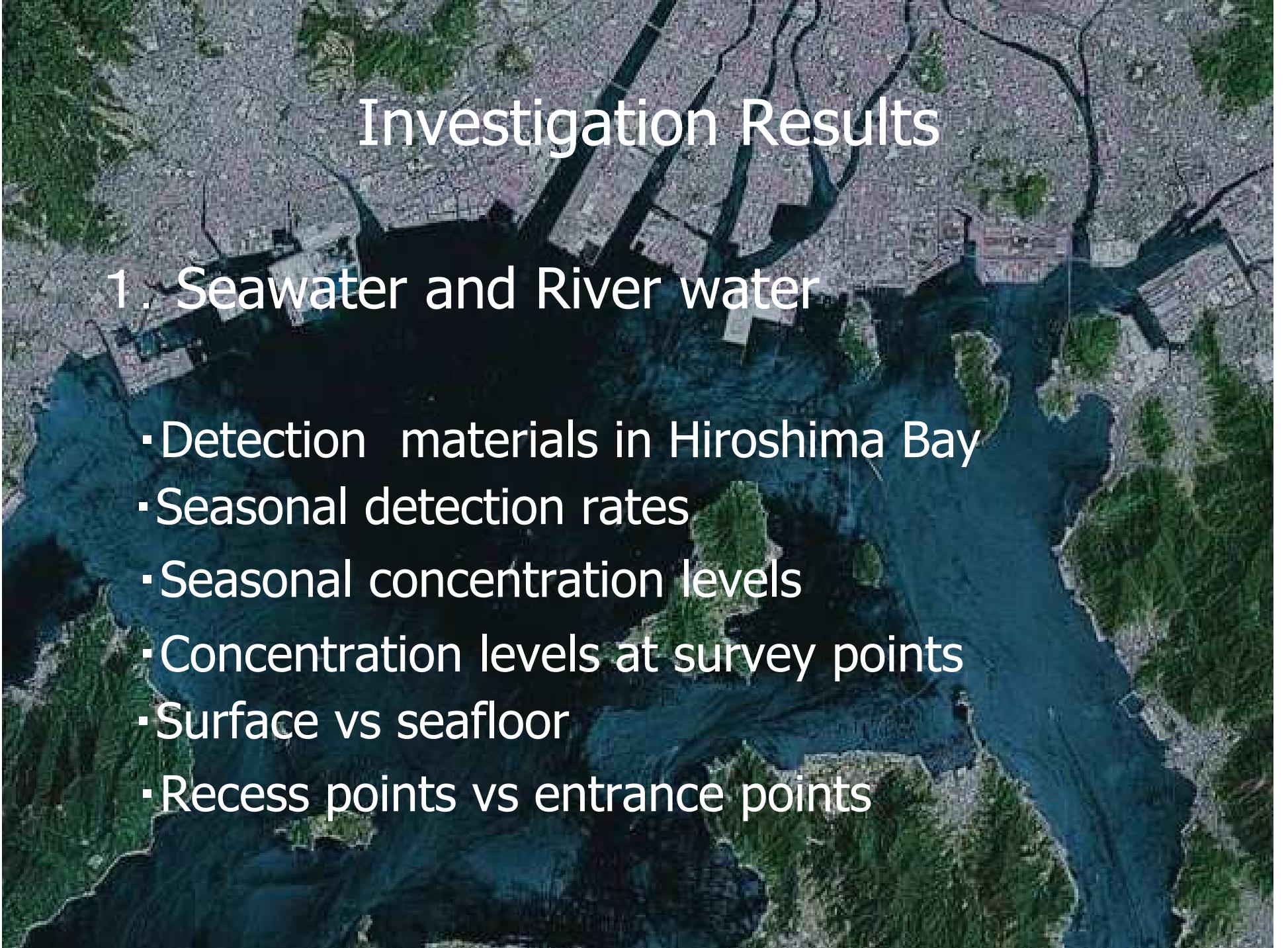
4b. Analysis (Quantitative analysis)

Irgarol, M1

gas chromatograph mass-spectrometry

Diuron, Sea-nine 211, KH101

high-performance liquid chromatography

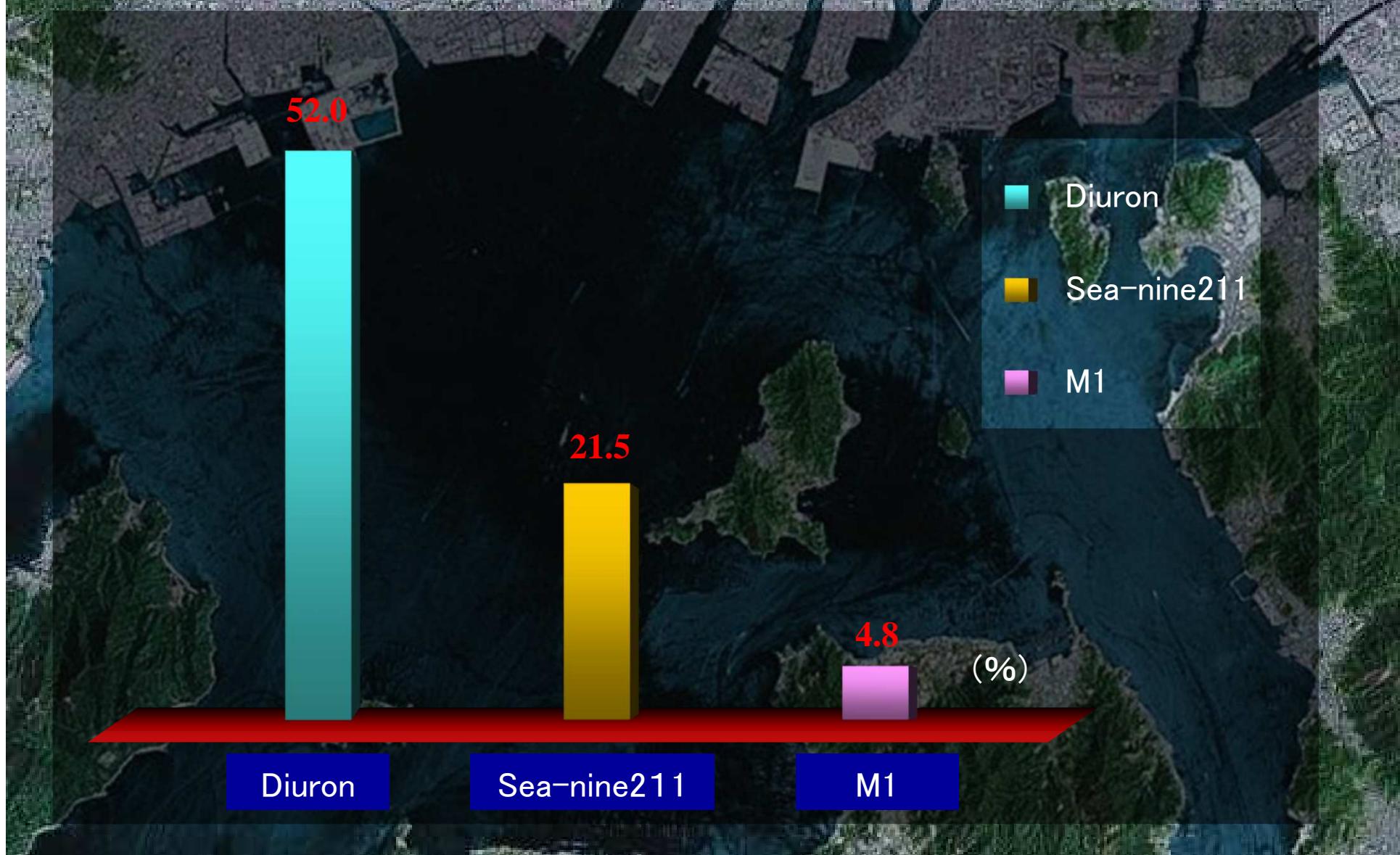
An aerial photograph of Hiroshima Bay, showing the city of Hiroshima in the background and several large industrial ships docked at the port. The water is a deep blue-green color, and the surrounding land is a mix of green vegetation and grey urban areas.

Investigation Results

1. Seawater and River water

- Detection materials in Hiroshima Bay
- Seasonal detection rates
- Seasonal concentration levels
- Concentration levels at survey points
- Surface vs seafloor
- Recess points vs entrance points

Detection rates of survey compounds (2004)



Analytical results of Diuron (Surface seawater)

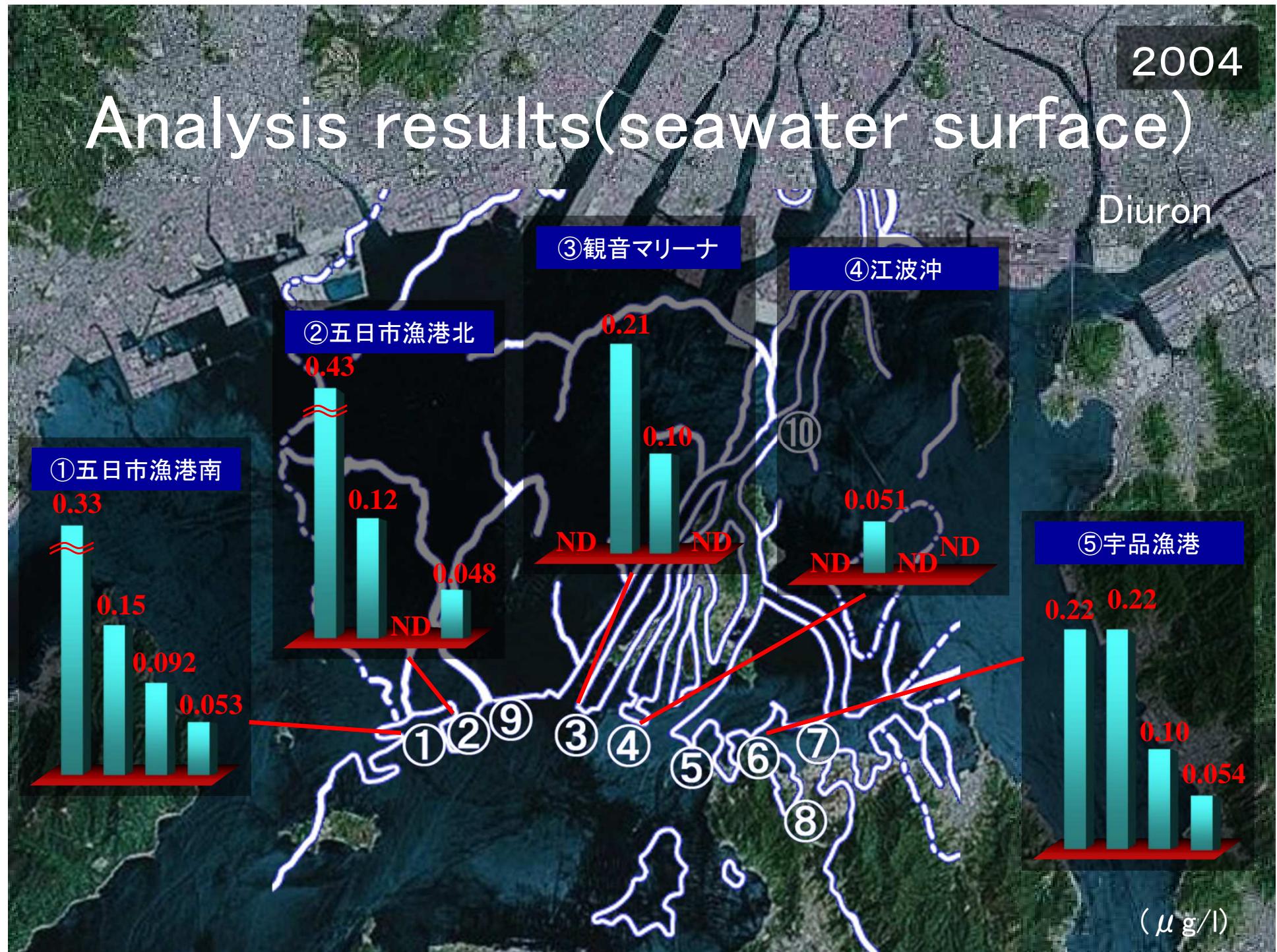
(2004)

		05. 24	08. 24	11. 29	03. 01
①	A	0. 43	0. 20	0. 13	0. 079
	B	0. 33	0. 15	0. 092	0. 053
	C	0. 069	0. 19	0. 051	0. 077
④		ND	0. 051	ND	ND
⑥		0. 10	0. 086	ND	ND
⑦		0. 10	0. 14	ND	ND
⑧		0. 15	0. 074	0. 058	ND
⑩		0. 17	0. 059	ND	ND

($\mu\text{g/l}$)

2004

Analysis results(seawater surface)



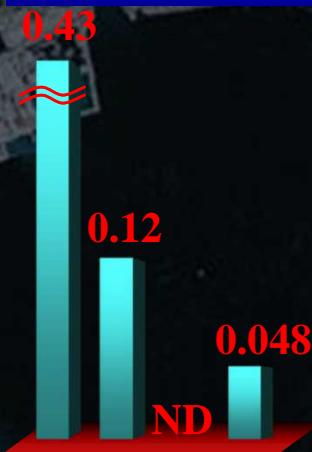
Analysis results (compared with bottom) 2004

surface

①五日市漁港南



②五日市漁港北



③観音マリーナ



④江波沖

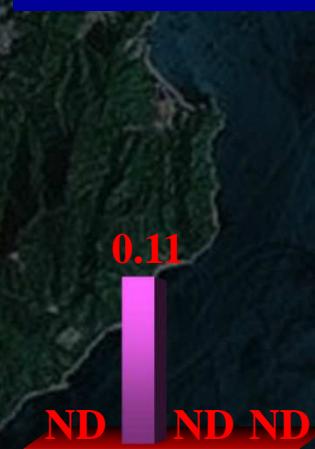


⑤宇品漁港



sea floor

①五日市漁港南



②五日市漁港北



③観音マリーナ



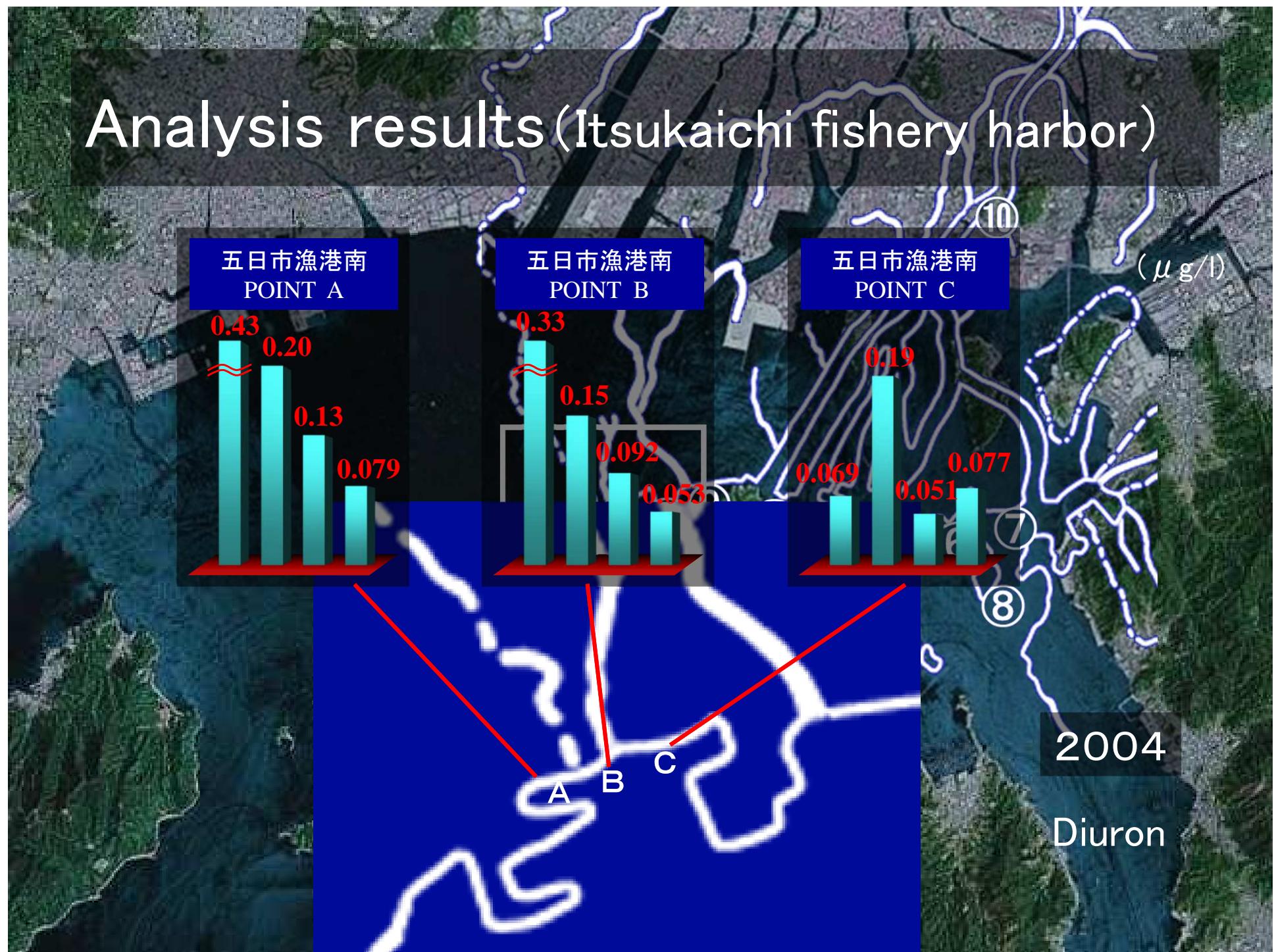
④江波沖

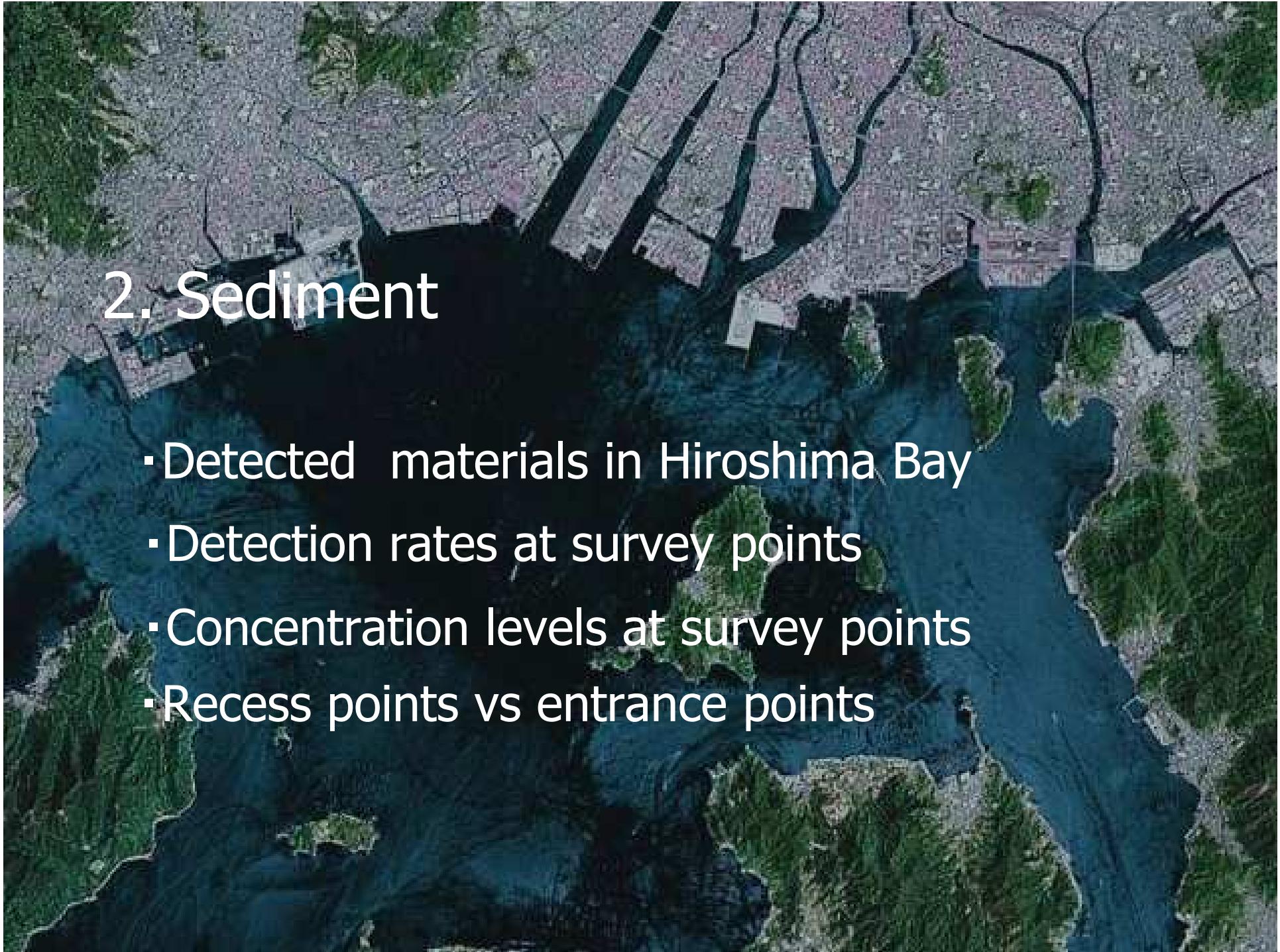


⑤宇品漁港



Analysis results (Itsukaichi fishery harbor)





2. Sediment

- Detected materials in Hiroshima Bay
- Detection rates at survey points
- Concentration levels at survey points
- Recess points vs entrance points

Detection rates of survey compounds

sediment

82.3

73.5

67.6

M1

Diuron

Irgarol

(%)

M1

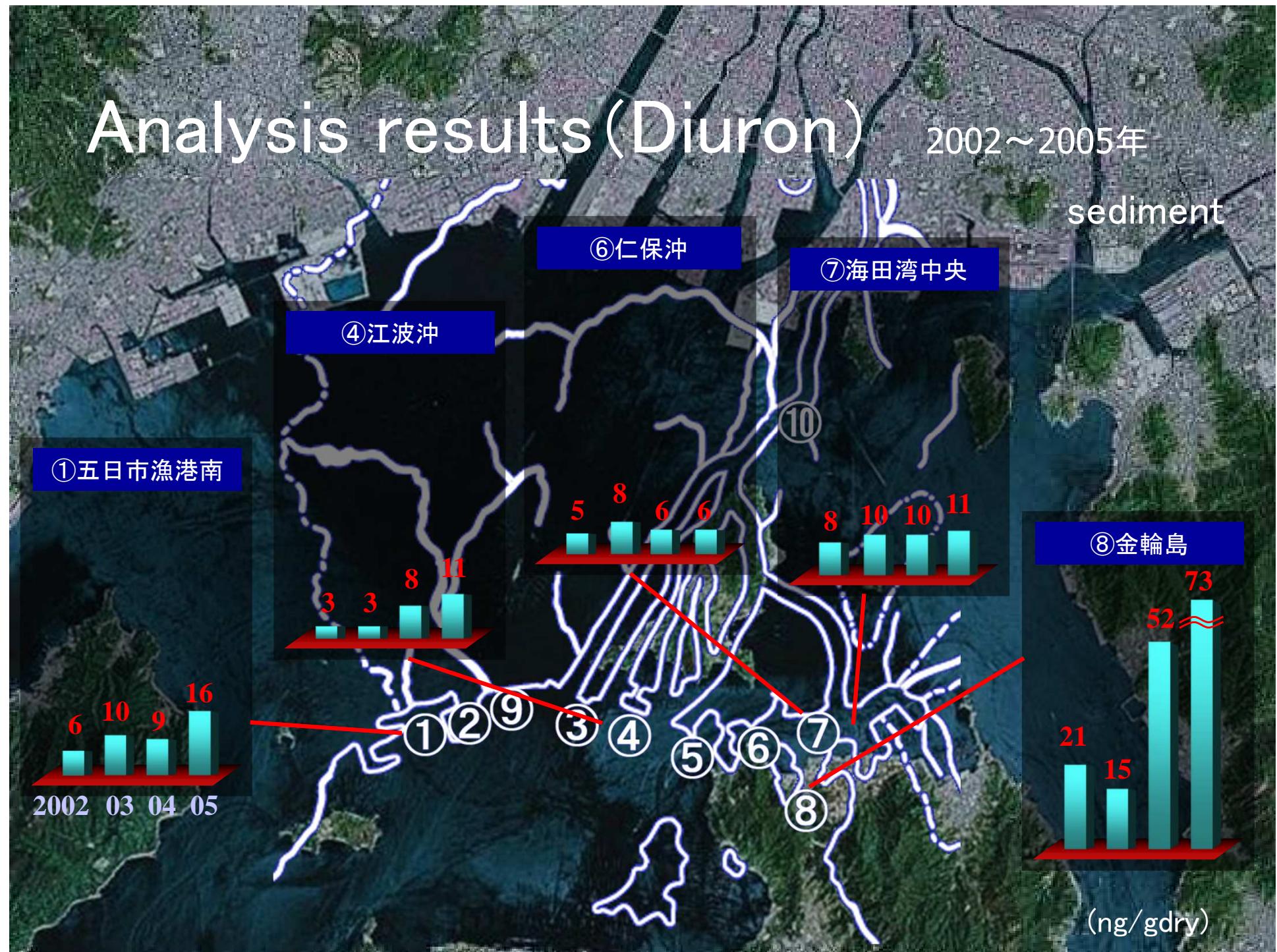
Diuron

Irgarol

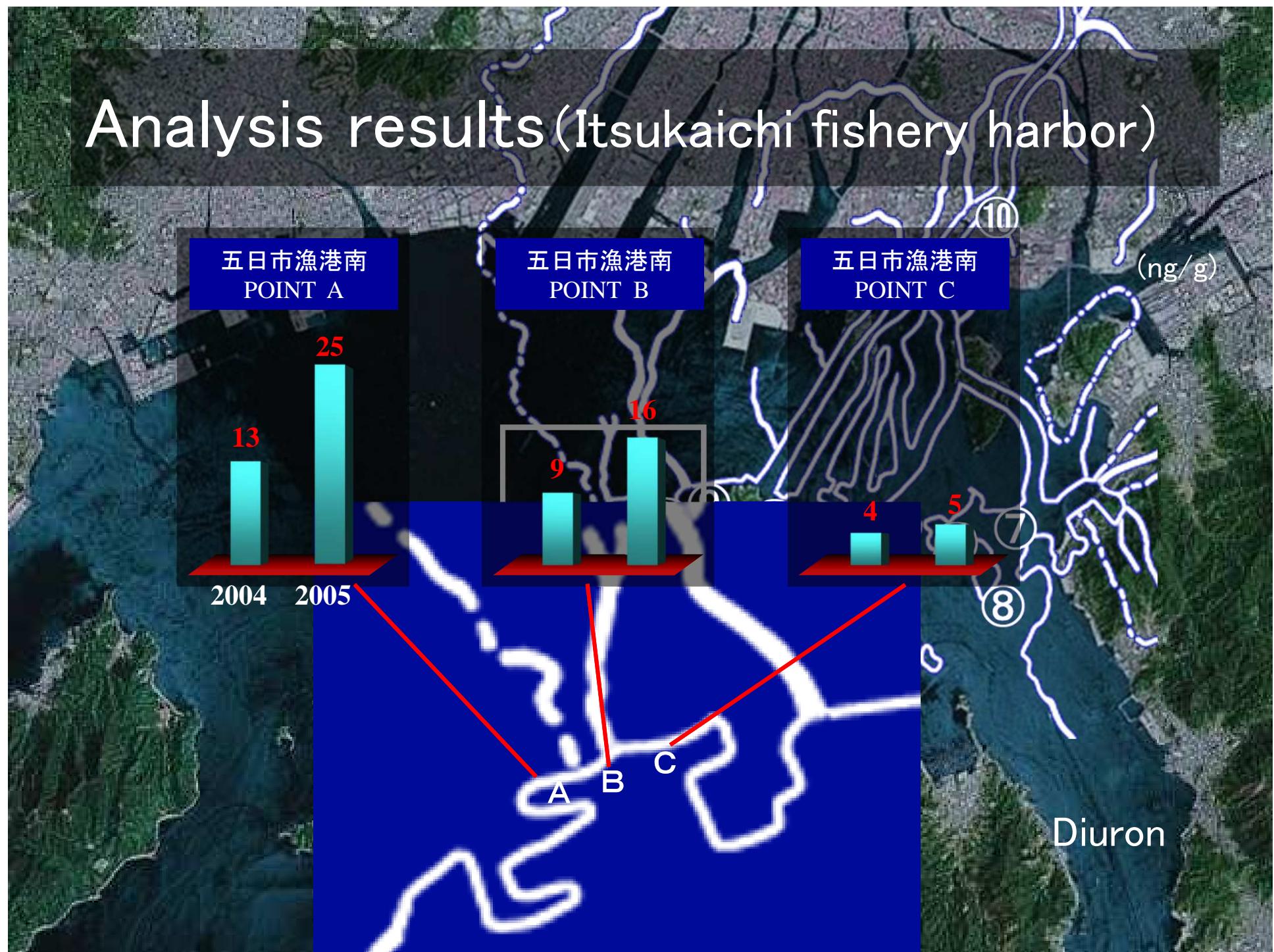
Analysis results (Diuron)

2002~2005年

sediment



Analysis results (Itsukaichi fishery harbor)





Summary and future actions

1. The sources of the chemicals
2. Contaminated areas
3. Future toxicity tests
4. Recommended action

Analytical results of Diuron (Sediment)

	2002.07.30	2003.08.25	2004.08.24	2005.11.14
①	A ---	---	13	25
	B 6	10	9	16
	C ---	---	4	5
④	ND	ND	8	11
⑥	5	8	6	6
⑦	A ---	---	---	10
	B 8	10	10	11
	C ---	---	---	ND
⑧	21	15	52	73
⑨	---	ND	ND	ND
⑩	20	---	17	---
⑪	---	ND	ND	ND

(ng/g)