

# Analysis of the Anchoring Ships around the Coastal Industrial Complex in a Stormy Weather

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# BACKGROUND

1

Large transportation amount →

Ships are increasing in size and number

2

A increase of ship traffic →

Ship congestion and accidents are frequent

3

Ships wait for a berth before entering a port →

Many ships are commonly crowded around the port

4

Numerous maritime accidents occur →

A ship is susceptible to wind and current

# BACKGROUND

5

Ship is not only a **victim**, also becomes an **assailant** when a disaster occurs

6

The disaster prevention of coastal industrial complex **has never been considered** a complex disaster **by tsunami**

7

It is necessary to **reconsider** the disaster prevention measures commensurate with **ship navigation**

# OBJECTIVE

Disaster Prevention & Disaster Reduction

The  
viewpoints  
from

Ensuring and improving the safety of ship sailing around the coastal industrial complex

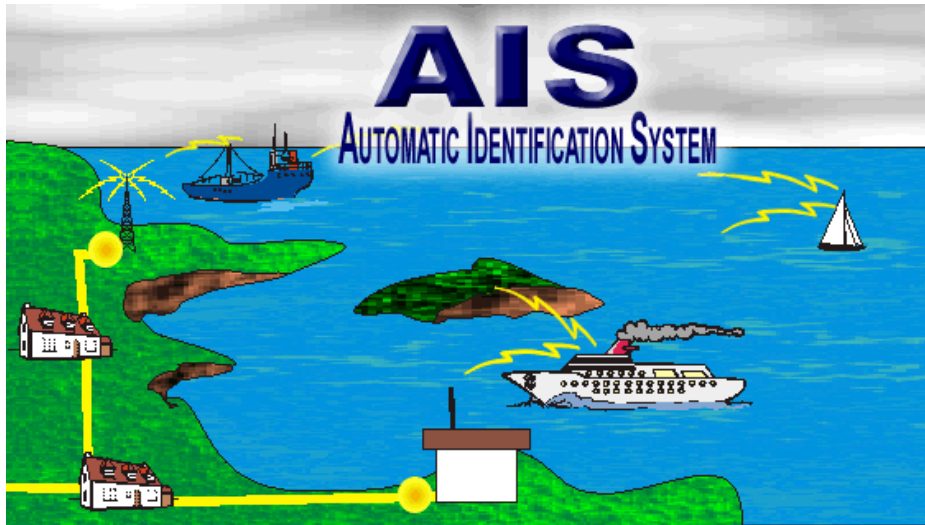
Preventing of the maritime accidents



The focal point:  
The actual situation of anchoring ships,  
and understanding the disaster risk in the  
stormy weather

# METHOD

## Automatic Identification System



<http://www.seanews.com.tr/article/HOTN/48258/Automatic-Identification-System-AIS/>

The hallmark of this analysis:

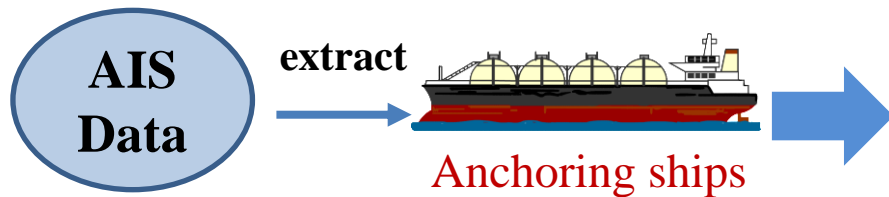
**Quantitatively;**

**Exactly;**

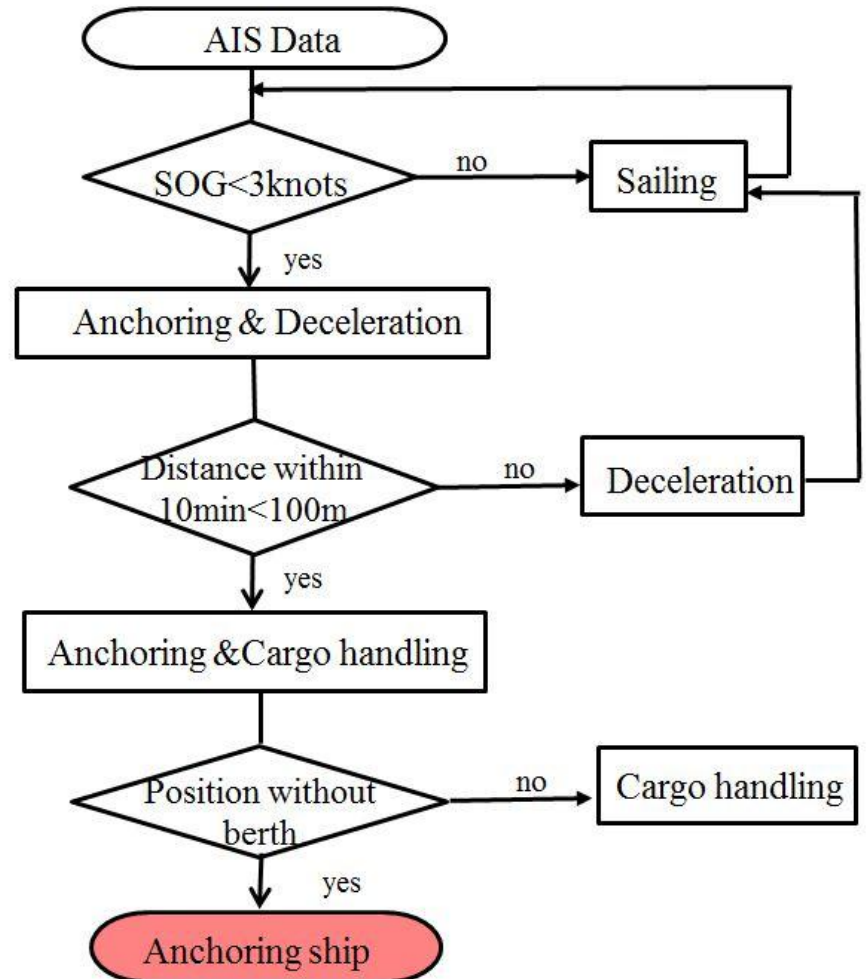
**Reliable**

Data category	Contents
<b>Dynamic Data</b>	Ship's position, Universal Time Coordinated, Speed over ground, Course over ground, Heading, Navigational status, etc.
<b>Static Data</b>	MMSI (Vessel's Maritime Mobile Service Identity) number, IMO ( International Maritime Organization) number, Call sign, Ship name, Type of ship, Length and breadth
<b>Voyage-related Data</b>	Draught, hazardous, Cargo type, Destination, and ETA ( Estimated time of arrival) etc.

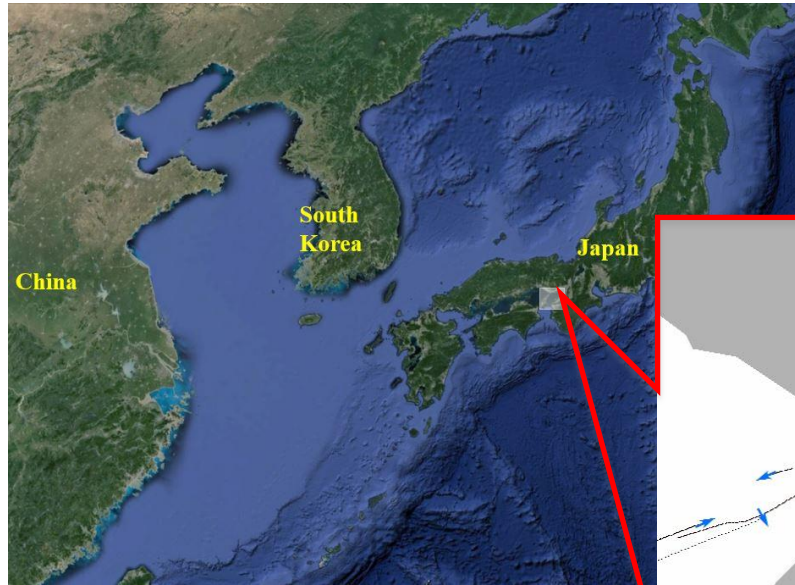
# PROCESS



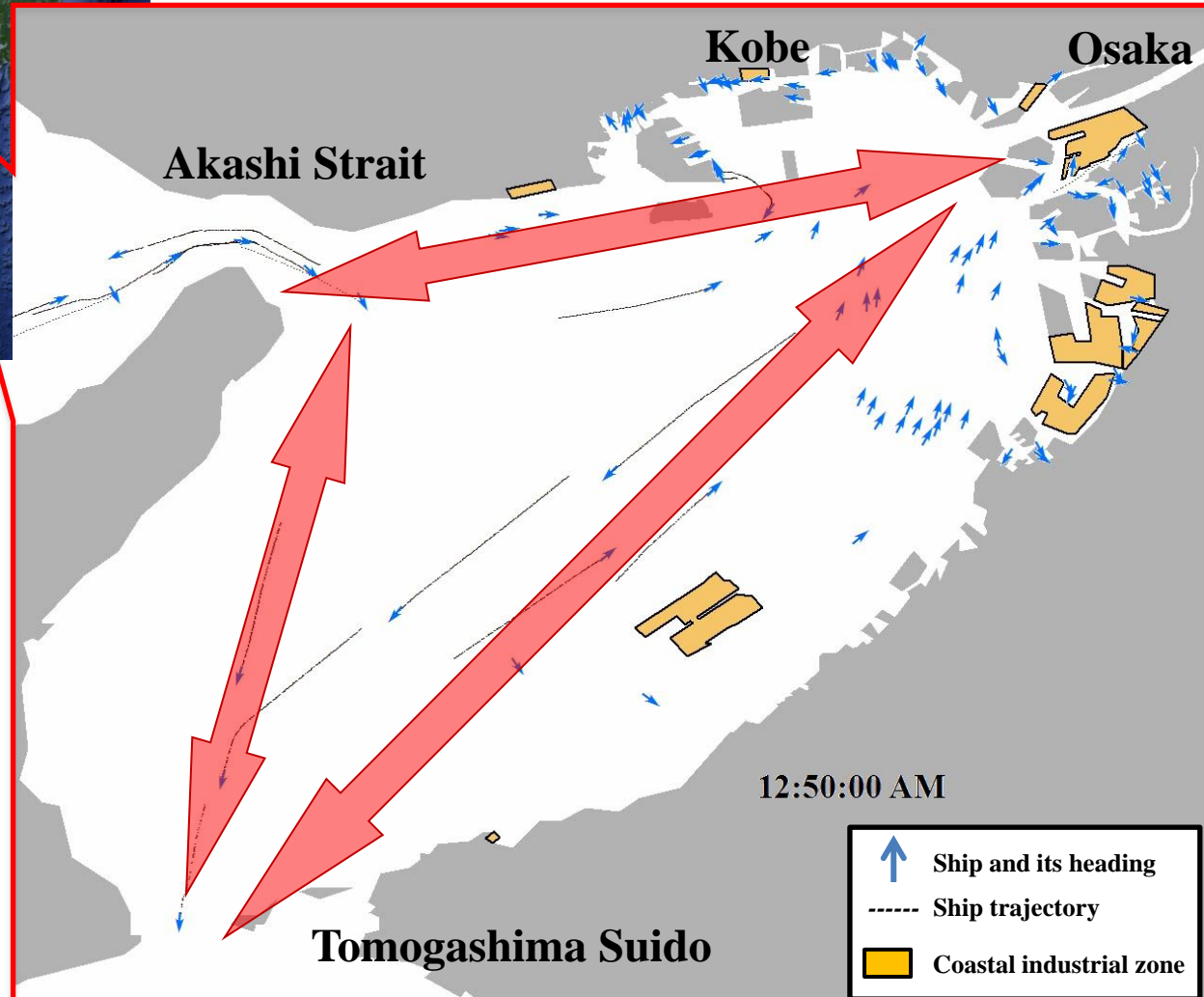
## Extraction of Anchoing Ship



# RESEARCH AREA

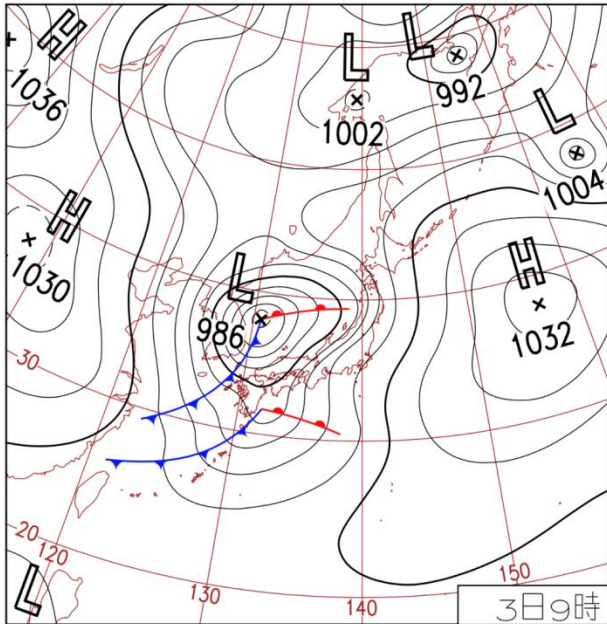


## OSAKA BAY



# RAPIDLY DEVELOPED LOW PRESSURE (2012/4/3 Tue.)

Pressure chart

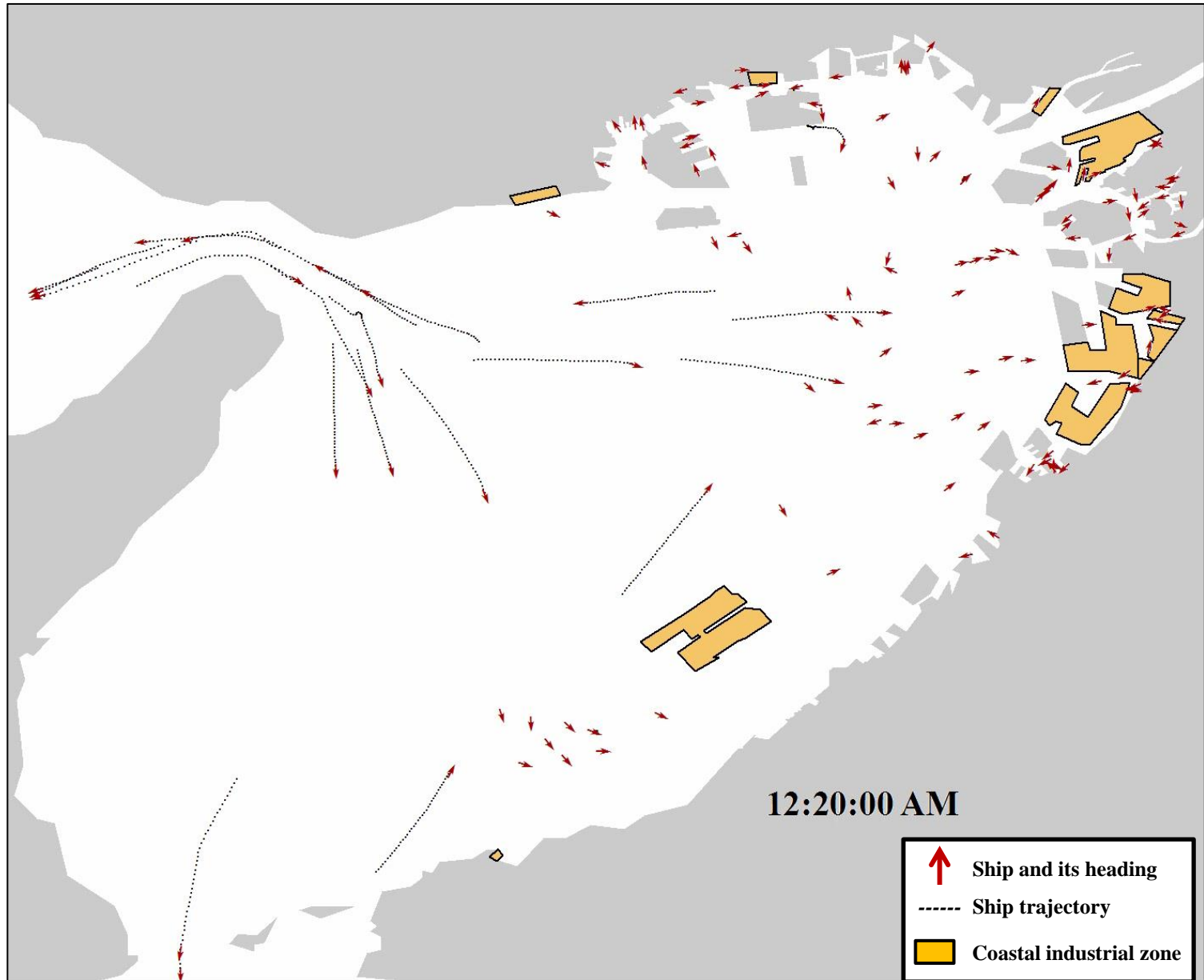


Kansai airport 2012/4/3

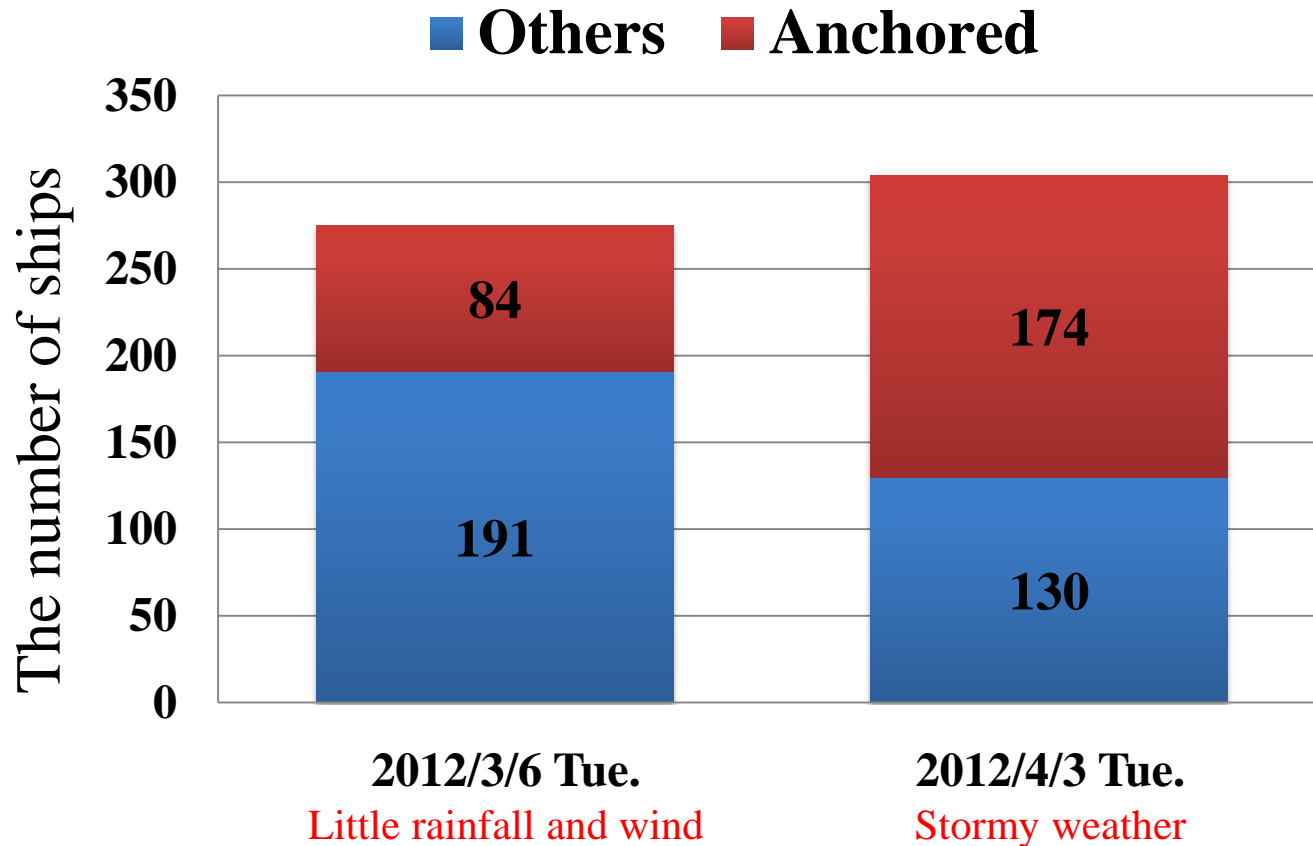
Timez	Max. Instantaneous (m/s)		Average (m/s)	
	Wind Speed	Wind Direction	Wind Speed	Wind Direction
	1	7.2	SSE	5.3
2	7.7	SSE	5.4	SSE
3	8.2	SSE	5	SSE
4	12.3	SSE	8.7	S
5	13.9	S	11	S
6	13.9	SSE	9.4	S
7	17	S	10.8	S
8	11.8	S	7.6	S
9	12.3	SSE	8.5	SSE
10	13.9	S	10.3	S
11	10.8	SSE	5.7	SSE
12	20.6	S	15.2	S
13	25.2	SSE	17.7	S
14	30.3	S	23	SSW
15	13.9	W	10	WSW
16	22.1	WSW	15.1	WSW
17	27.3	W	19.7	W
18	27.3	W	20.8	W
19	23.1	WSW	18.9	WSW
20	18.5	W	12.4	W
21	13.4	W	10.3	W
22	12.9	WNW	9.2	WNW
23	12.3	W	8.7	W
24	14.4	WNW	10.3	W



# SHIPS NAVIGATION IN THE STORMY WEATHER (2012/4/3)

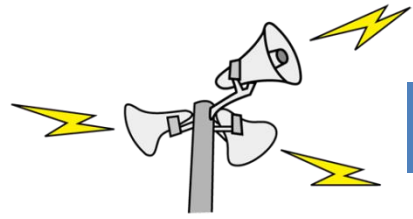


# THE NUMBER OF ANCHORING SHIPS



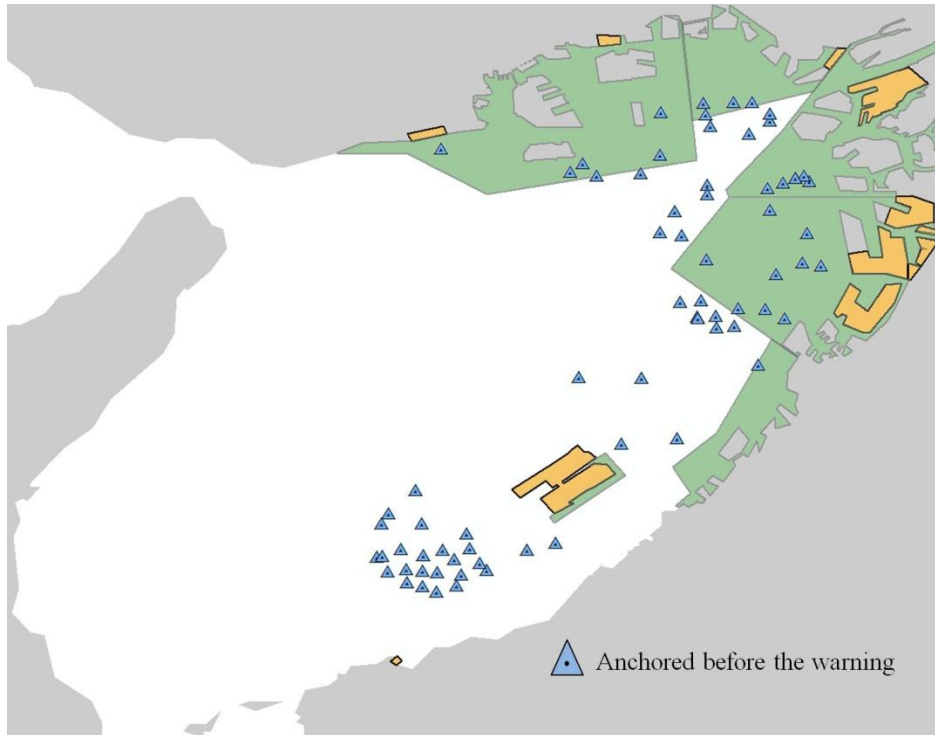
1. Compared to the number of anchoring ships on March 6, the number on April 3 almost doubled to 174 ships.
2. The increased ships were the evacuation ships

# DISTRIBUTION OF ANCHORING SHIPS



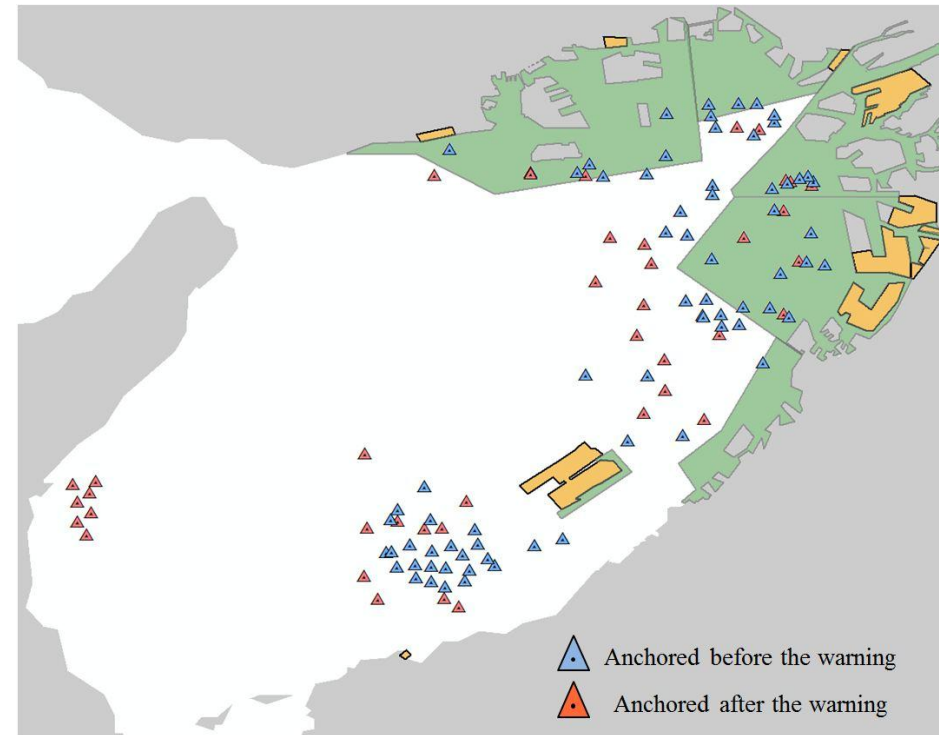
The storm and waves warning (2012/4/3 9:55AM)

**Before**



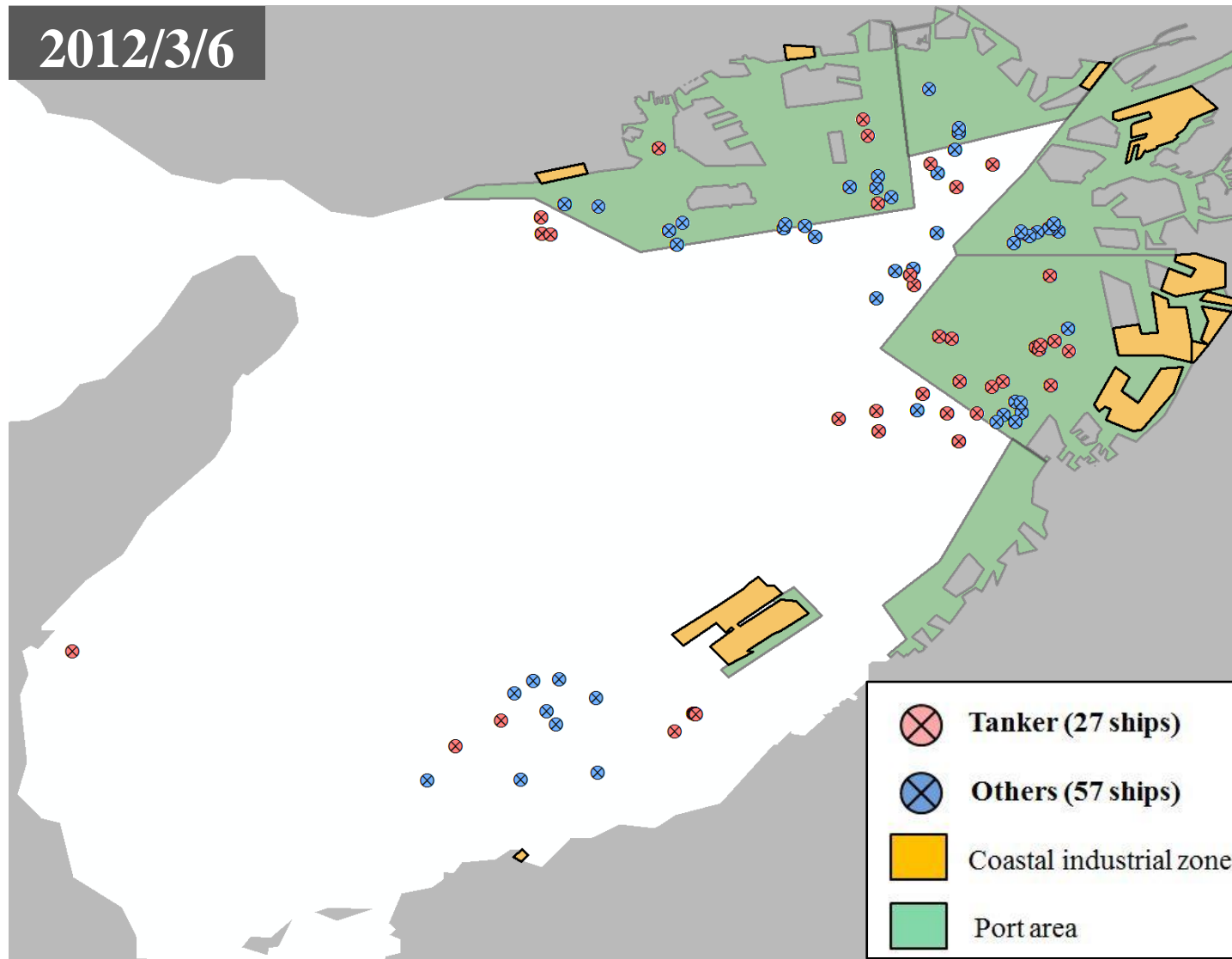
Many ships anchored around the port and kansai airport.

**After**



Costal area was congestion.

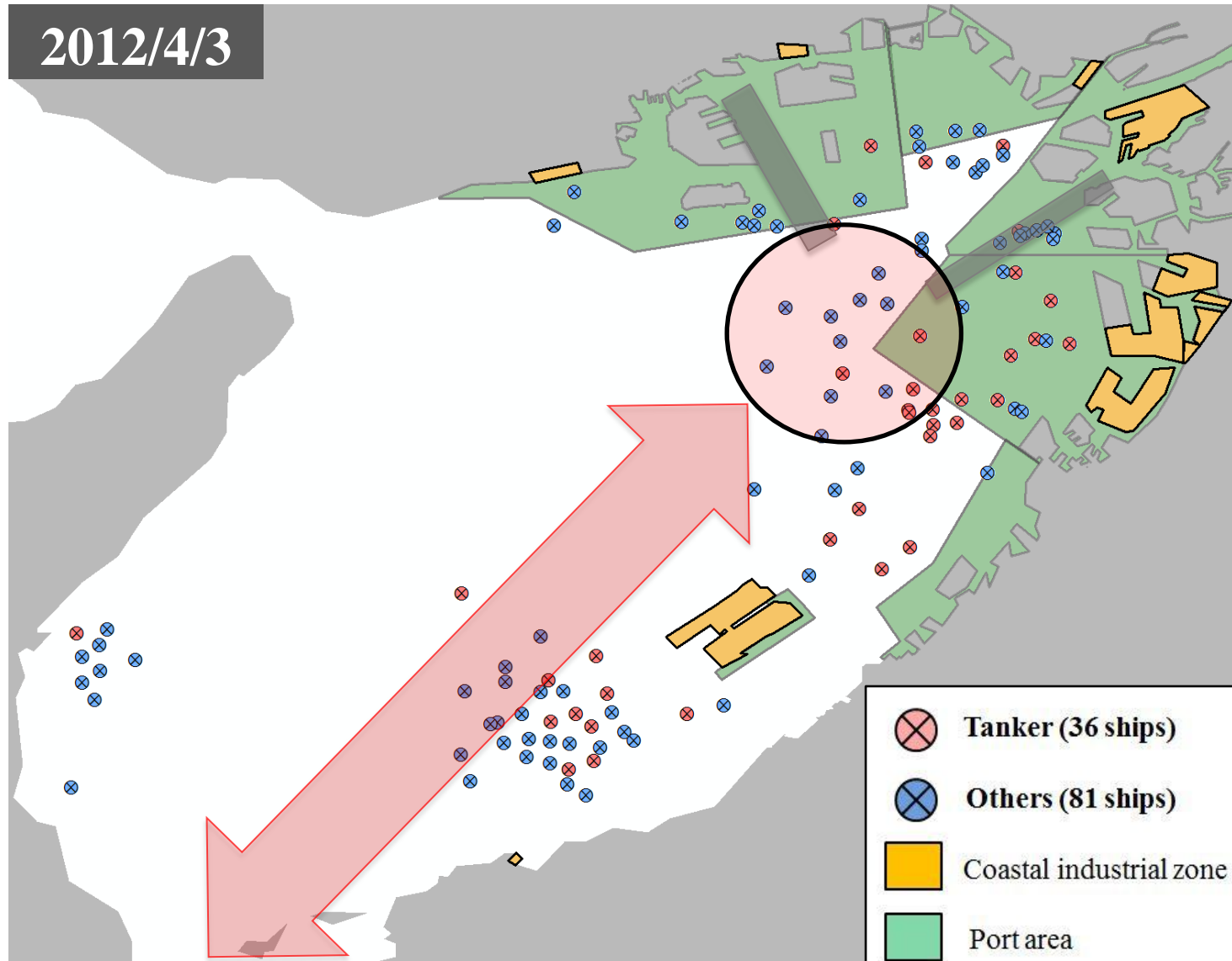
# DISTRIBUTION BASED ON SHIP'S TYPE



Many tankers were anchored at usual times

# DISTRIBUTION BASED ON SHIP'S TYPE

2012/4/3



- Several ships anchored at the navigational route
- Crossing area of route crowded with anchoring ships

# CONCLUSIONS

1. The anchoring ships were successfully extracted from AIS data. The actual navigation situation of anchoring ships was understood.

*-Ship traffic:* The number of ships were **dramatically increase** in the stormy weather. The increased ships were **the evacuation ships**  
*-Anchoring Distribution:* Anchored ship is extensively distributed throughout the Osaka Bay

2. The disaster risk areas was understood.
3. This study could be applied to ensure safe navigation, and it is expected to develop a safe and efficient evacuation.

**Thank you for your attention!**