



大连海事大学  
DALIAN MARITIME UNIVERSITY

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# The International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)

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## The content of the convention

The Convention includes regulations **aimed** at preventing and minimizing pollution from ships –

- **accidental pollution**
- **routine operations**

MARPOL 73/78 currently includes **6 technical Annexes**.



Annex I Regulations for the Prevention of Pollution by **Oil**

Annex II Regulations for the Control of Pollution by **Noxious Liquid Substances in Bulk**

Annex III Prevention of Pollution by **Harmful Substances** Carried by Sea in Packaged Form

Annex IV Prevention of Pollution by **Sewage** from Ships

Annex V Prevention of Pollution by **Garbage** from Ships

Annex VI Prevention of **Air Pollution** from Ships



Annexes	Entry into force	Contracting states	Gross tonnage	China accession	Effective for China
Annex I Annex II	1983.10.2	155	99.14%	1983.7.1	1983.10.2
Annex III	1992.7.1	147	98.54%	1994.9.13	1994.12.13
Annex IV	2003.9.27	140	91.54%	2006.11.2	2007.2.2
Annex V	1988.12.31	152	98.72%	1988.11.21	1989.2.21
Annex VI	2005.5.19	88	96.16%	2006.3.15	2006.8.23



# 1 Annex I Regulations for the Prevention of Pollution by Oil



## **Annex I : REGULATIONS FOR THE PREVENTION OF POLLUTION BY OIL**

Chapter I (Reg.1~5) : GENERAL

Chapter II (Reg.6~11) : SURVEYS AND CERTIFICATION

Chapter III (Reg.12~17) : REQUIREMENTS FOR MACHINERY SPACES OF **ALL SHIPS**

Chapter IV (Reg.18~36) : REQUIREMENTS FOR THE CARGO AREA OF OIL **TANKERS**

Chapter V (Reg.37) : PREVENTION OF POLLUTION ARISING FROM AN OIL POLLUTION **INCIDENT**

Chapter VI (Reg.38) : **RECEPTION FACILITIES**

Chapter VII (Reg.39) : SPECIAL REQUIREMENTS FOR FIXED OR FLOATING **PLATFORMS**

Chapter VIII (Reg.40~42) : PREVENTION OF POLLUTION DURING **TRANSFER** OF OIL CARGO BETWEEN OIL TANKERS AT SEA

Chapter IX (Reg.43) : SPECIAL REQUIREMENTS FOR THE USE OR CARRIAGE OF OILS IN THE **ANTARCTIC AREA**

Chapter X (Reg.44~45) : **VERIFICATION** OF COMPLIANCE WITH THE PROVISIONS OF THIS CONVENTION

Chapter XI (Reg.46~47) : INTERNATIONAL CODE FOR SHIPS OPERATING IN **POLAR** WATERS

Appendix :



NW European Waters

Baltic Sea

Mediterranean Sea

Black Sea

Gulf Area

Oman Area

# SHIP WONDERS

In **Arctic waters** any discharge into the sea of oil or oily mixtures from any ship shall be **prohibited**.

Southern South African Waters

Red Sea

Gulf of Aden

Antarctic Area



# Oil Pollution

## 1. Special Area

*Special area* means a sea area where for recognized technical reasons in relation to its oceanographical and ecological condition and to the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution by oil is required.



## Adoption, entry into force & date of taking effect of Special Areas

Special Areas	Adopted #	Date of Entry into Force	In Effect From
<b>Annex I: Oil</b>			
Mediterranean Sea	2 Nov 1973	2 Oct 1983	2 Oct 1983
Baltic Sea	2 Nov 1973	2 Oct 1983	2 Oct 1983
Black Sea	2 Nov 1973	2 Oct 1983	2 Oct 1983
Red Sea	2 Nov 1973	2 Oct 1983	*
"Gulfs" area	2 Nov 1973	2 Oct 1983	1 Aug 2008
Gulf of Aden	1 Dec 1987	1 Apr 1989	*
Antarctic area	16 Nov 1990	17 Mar 1992	17 Mar 1992
North West European Waters	25 Sept 1997	1 Feb 1999	1 Aug 1999
Oman area of the Arabian Sea	15 Oct 2004	1 Jan 2007	*
Southern South African waters	13 Oct 2006	1 Mar 2008	1 Aug 2008

The Special Area requirements for these areas have not yet taken effect because of lack of notifications from MARPOL Parties whose coastlines border the relevant special areas on the existence of **adequate reception facilities** (regulations 38.6 of MARPOL Annex I).

## Oil Pollution

### 1. Control of discharge of oil outside of special area

#### Tanker Discharge of Sludge and Oily Substances at Sea

1. Tanker is not within a special area;
2. Tanker is  $> 50$  nm from the nearest land;
3. Vessel is proceeding en route;
4. The instantaneous rate of discharge of oil content does not exceed **30 l/nm**;
5. Total quantity of oil discharged does not exceed for existing tankers **1/15,000**; for new tankers **1/30,000**.
6. The tanker has in operation an oil discharge monitoring and control system and a slop tank arrangement as required by regulations 29 and 31 of this Annex.

## Oil Pollution

**All ships** Discharge of Sludge and Oily Substances at Sea

1. Ship  $\geq 400$  gt (excluding oil tanker) is not within a special area;
2. Vessel is proceeding en route;
3. Oil content of effluent is less than 15 ppm;
4. Ship has in operation equipment as required by regulation.

## Methods for the prevention of oil pollution from ships while operating in special areas

- 1. **Bilge water** does not originate from cargo pump-room bilges and not mixed with oil cargo residues;
- 2. The ship is **proceeding en route**;
- 3. Oil content of effluent without dilution < **15 ppm**;
- 4. Ship has in **operation oil filtering equipment**.



## Exceptions to discharge into the sea of oil or oily mixture

- 1. For the purpose of **securing the safety of a ship or saving life** at sea;
- 2. Resulting from **damage to a ship or its equipment**;
- 3. **Approved by the Administration** for the purpose of combating specific pollution incidents.





## Precautions to Prevent Oil Pollution

1. Strictly follows the procedures in Engine Room Procedures Manual & Shipboard Safety Manual.
2. Do not pump out any oily ballast water or bilges during port.
3. If pumping ballast water is unavoidable, a continuous watch of the ballast outlet should be maintained to ensure that only clean ballast water is pumped out.
4. No storage of ballast water in oil tanks is allowed.
5. The engine room shall not be left unattended and engine room bilge shall be kept fairly clean.



## Precautions to Prevent Oil Pollution

6. Any oily mixture or sludge in the engine room shall be kept in the bilge collecting tank and be burnt by the ship's incinerator or auxiliary boiler, if practicable. This equipment should be kept ready for operation at all times.
7. Use of the oily water separators.
8. Use of non-toxic chemicals for oil cleaning.
9. Maintenance and regular inspection on piping and pumping systems.

## Disposal of Oil Residues (Sludge)

Every ship is equipped with **sufficient capacity of sludge spaces** so to store the purification of fuel and lubricating oils and oil leakage in the machinery spaces.

In cases where the vessel requires sludge disposal ashore, the Master should provide timely notice with following information to SMD:

- Capacity of the sludge tank and/or bilge water tank;
- Quantity of oily wastes;
- Name of port intend to dispose.



## Proper Entry in the MARPOL Oil Record Book

In compliance with MARPOL 73/78 , Master is requested to ensure that the vessel **MUST** possess an **OIL RECORD BOOK** with proper entries(in English) which shall be preserved for **3 years** after last entry.

Application: Every oil tanker of **150** gross tonnage and above and every ship of **400** gross tonnage and above other than an oil tanker.

The **OIL RECORD BOOK** shall be kept by the **Chief Engineer** and updated at all times.





## Proper Entry in the MARPOL Oil Record Book

The OIL RECORD BOOK should be completed:

1. Ballasting or cleaning of fuel oil tanks;
2. Discharge of dirty ballast or cleaning water from tanks;
3. Disposal of oil sludge, i.e. to the reception facilities ashore, incinerated on board, etc.;
4. Discharge overboard or disposal otherwise of bilge water that has accumulated in machinery spaces;
5. Any transfer and storage of the engine room bilge water and sludge, etc..



Each entry of the operation items must be completed and signed by **the Chief Engineer Officer**.

Each completed page must be **counter-signed by the Master**.

**No pre-signing** by the Master in the blank pages is allowed



# ANNEX II Pollution Caused by Noxious Liquid Substances in Bulk

## Definitions

- (1) Chemical tanker
- (2) Clean ballast
- (3) Segregated ballast
- (4) Liquid substances
- (5) Noxious liquid substance
- (6) Special area
- (7) International Bulk Chemical Code (IBC)
- (8) Bulk Chemical Code

# Cargo Types-NLS

1. Category X: if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a **major hazard** to either marine resources or human health.
2. Category Y: a **hazard** to either marine resources or human health, or cause harm to amenities or other legitimate uses of the sea.
3. Category Z: a **minor hazard** to either marine resources or human health.
4. Other Substances: **outside category X, Y, or Z** as defined in Regulation 6.1 of Annex II as they are, at present, considered to present **no harm** to marine resources, human health, amenities or other legitimate uses of the sea .

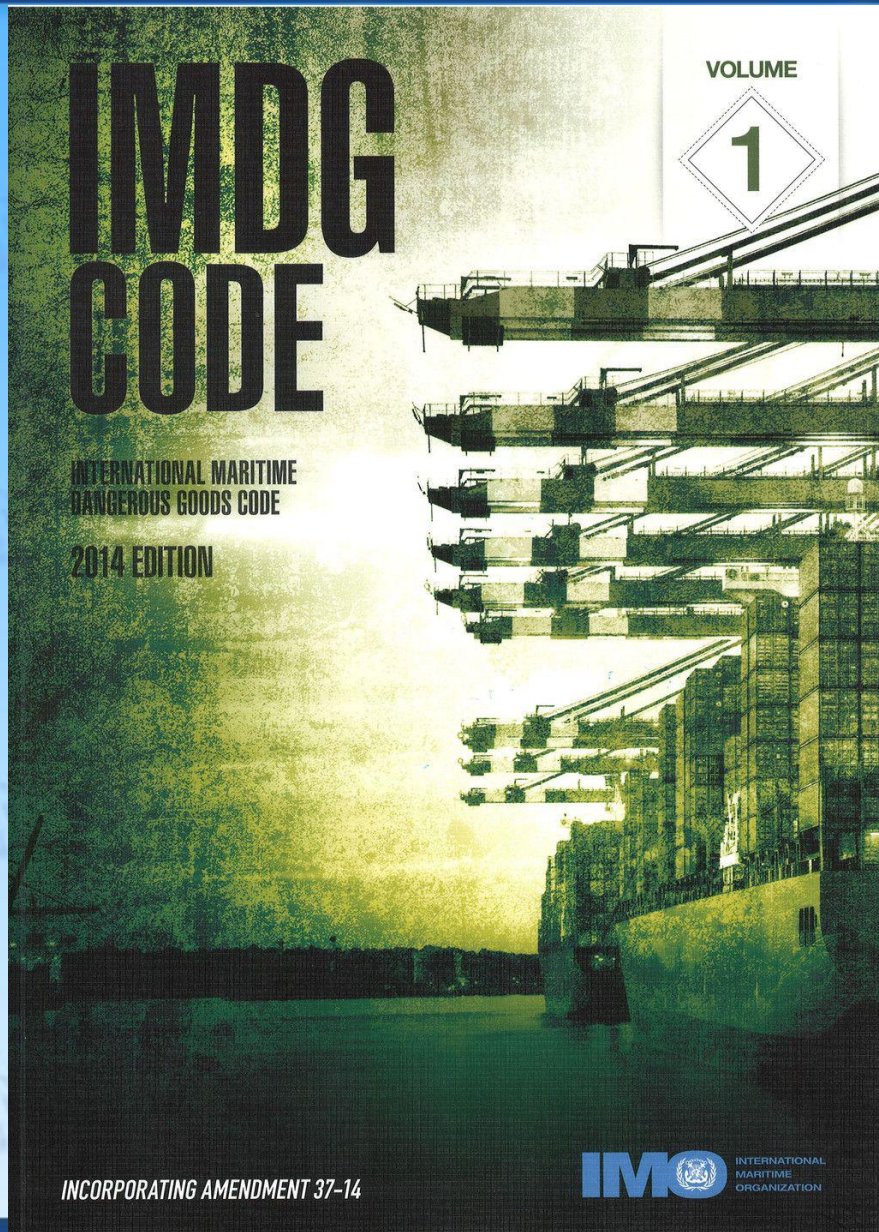
## Annex III. Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form

- Regulation 1 Application
- Regulation 2 Packing
- Regulation 3 Marking and labelling
- Regulation 4 Documentation
- Regulation 5 Stowage
- Regulation 6 Quantity limitations
- Regulation 7 Exceptions
- Regulation 8 Port State control on operational requirements





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VOLUME

1

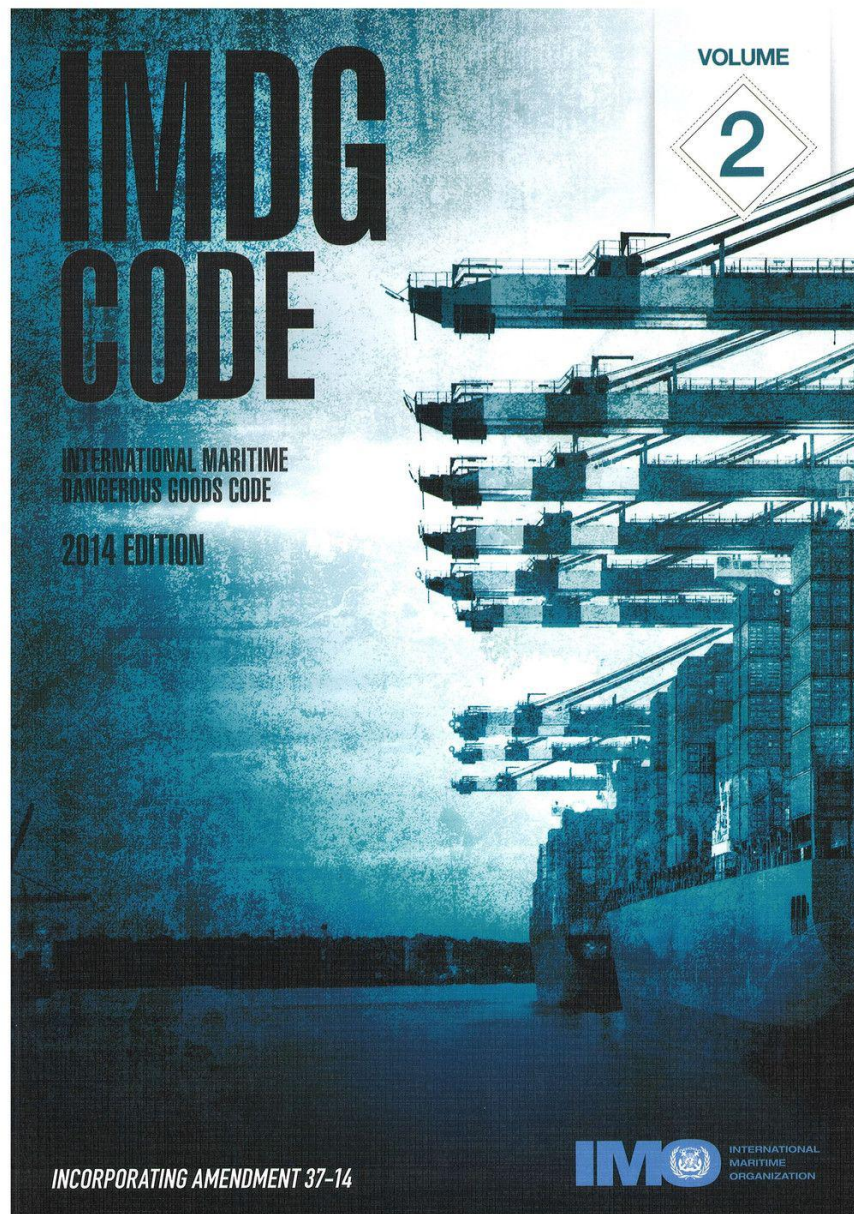
# IMDG CODE

INTERNATIONAL MARITIME  
DANGEROUS GOODS CODE

2014 EDITION



INCORPORATING AMENDMENT 37-14



VOLUME

2

# IMDG CODE

INTERNATIONAL MARITIME  
DANGEROUS GOODS CODE

2014 EDITION



INCORPORATING AMENDMENT 37-14





### 3 Annex IV Prevention of Pollution by Sewage from Ships

#### **Sewage means:**

1. drainage and other wastes from any form of **toilets and urinals**;
2. drainage from **medical premises** (dispensary, sick bay, etc.) via wash basins, wash tubs and scuppers located in such premises;
3. drainage from spaces containing **living animals**; or
4. other waste waters when **mixed** with the drainages defined above.

The coastal areas listed below had already imposed such strict control on the sewage disposal:

- All territorial water of United States
- **Baltic Sea area(Special area entered into effect from 2013.1.1), MEPC.200(62)**
- Suez & Panama Canals
- Black Sea area
- Yantze River in China
- Cayman Islands
- **Polar Waters** .
- etc



The discharge of sewage into the sea is **prohibited**, except when:

- The **ship** is discharging **comminuted** and **disinfected** sewage using a **system** approved by the Administration in accordance with regulation 9.1.2 of this Annex at a distance of more than **3** nautical miles from the nearest land,
- or sewage which is **not comminuted or disinfected** at a distance of more than **12** nautical miles from the nearest land,
- provided that, in any case, the sewage that has been stored in holding tanks shall not be discharged instantaneously but at a moderate rate when the ship is en route and proceeding at not less than **4 knots**;
- the **rate of discharge** shall be **approved** by the Administration based upon standards developed by the Organization.

## Sewage Pollution

- During stay in ports, the Master and Chief Engineer Officer shall ensure that no sewage discharge is permitted **directly into the harbour**.
- A record of discharge of sewage in open-sea must be maintained properly **by the responsible officer**.
- The Master and the Chief Engineer Officer are required to ensure all concerned equipment, fittings, and materials of the sewage treatment plant are **always in good working condition**.
- Other than the above, the pipeline fitted with the standard shore **connection for the discharge of sewage to the reception facility** should also be checked constantly.



# Annex V Prevention of Pollution by **Garbage** from Ships

## 1. Definitions

Ship-generated garbage consists of :

- All kinds of food waste
- Domestic wastes and operational wastes
- All Plastics (synthetic ropes, etc.)
- cargo residues;
- cooking oil
- fishing gear and animal carcasses
- Ash from incinerators





## Marpol 73/78 Annex V - Special Areas

The North Sea

The Baltic Sea

Black Sea



**Wider Caribbean region**

*incl. the Gulf of Mexico and  
the Caribbean Sea*

Mediterranean Sea

Red Sea

"Gulfs area"

**Antarctic area** (south of latitude 60 degrees south)



# IMO MARPOL 73/78 Annex V

## Disposal of Garbage into sea

Entry into force Jan 2013  
for ALL vessels & rigs

**X - Prohibited**

	Previous rules		Amendments MEPC62	
	OUTSIDE Special Area	INSIDE Special Area	OUTSIDE Special Area	INSIDE Special Area
PLASTIC	X	X	X	X
FLOATING dunnage, lining...	>25 nm	X	X	X
GROUND paper, glass, metal...(<25 mm)	>3 nm	X	X	X
Cargo res, paper, rags, glass, metal...	>12 nm	X	X	X
Food Waste	>12 nm	>12 nm	>12 nm <sup>1</sup>	X
GROUND Food Waste (<25 mm)	>3 nm	>12 nm	>3 nm <sup>1</sup>	>12 nm
Incinerator ash	>12 nm	X	X	X
Cooking oil			X	X

Note: When garbage is mixed the more stringent disposal requirements shall apply.

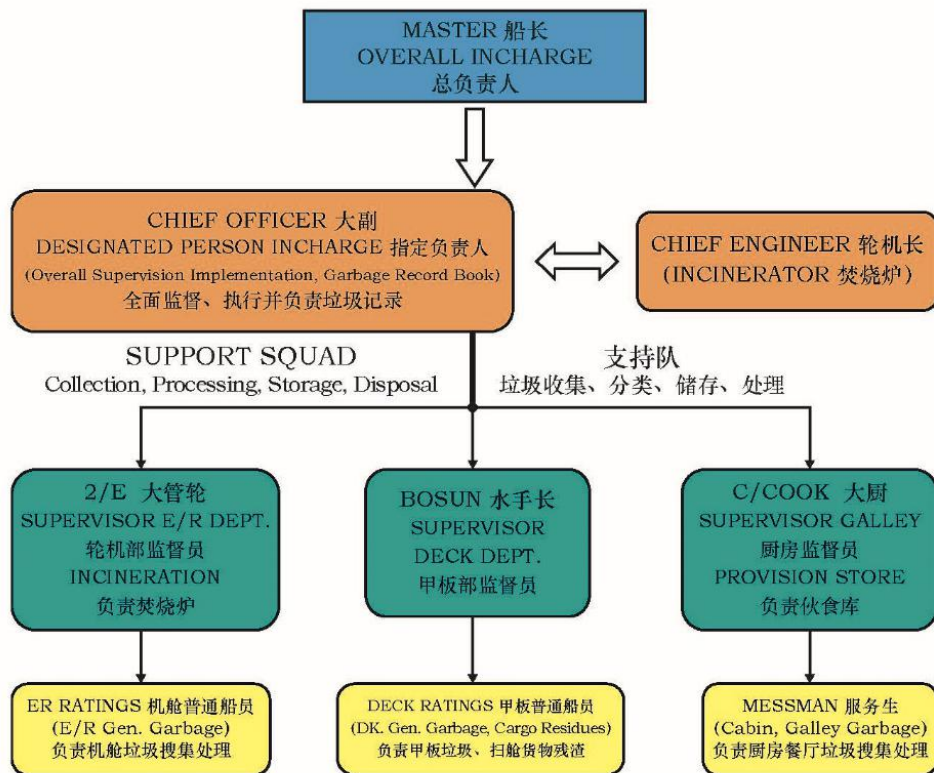
1) Rigs & vessels closer than 500 m - discharge only if food waste is grounded & > 12 nm from nearest land

# Designated Persons in Charge of Garbage Plan

## G a r b a g e Management Plan

### ORDER FOR GARBAGE MANAGEMENT PLAN

#### 船长命令 - 船舶垃圾管理计划



#### NOTES 注意事项

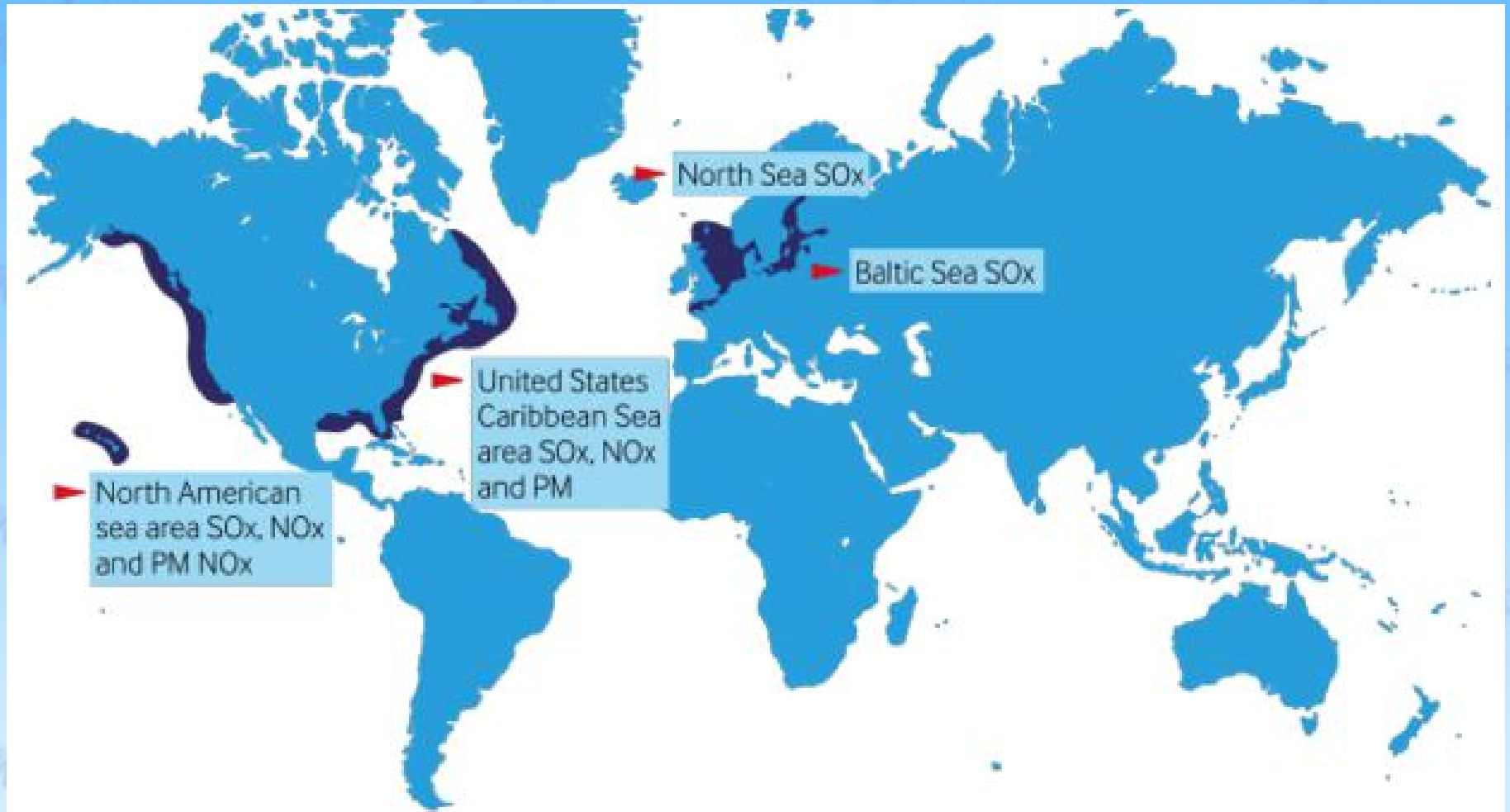
- ◆ All crewmembers must comply MARPOL annex V regulations to disposed the garbage and provide the full and unconditional support to the Chief Officer in correction ,separation and processing of garbage on board.  
在船上，所有船员必须按照MARPOL公约附则五的要求处理垃圾，并在收集、分类和处理方面给予大副无条件的支持。
- ◆ PLASTICS—Disposal of plastics into the sea or by incinerator is strictly prohibited. Plastics must be landed ashore.  
塑料垃圾严禁处理入海或焚烧炉焚烧。必须送岸处理。
- ◆ Chief Officer—to keep all personnel concerned with garbage management plan as to entering/leaving ” SPECIAL AREAS” or within 25 miles from shore.  
大副--当船舶进入特殊区域或离岸25海里以内时，应就垃圾管理的规定通知相关人员。
- ◆ Whilst in port, use of incinerator is prohibited unless permitted by local authorities which shall be confirmed by Master.  
船舶在港期间，除非经船长与港口当局确认，获得港口当局同意，不得使用焚烧炉。





Colour of Receptacle↕
Red↕
Green↕
Yellow↕
Brown↕
Blue↕
Gray↕
↕

# Annex VI Prevention of Air Pollution from Ships







# Shipping air emissions and its impacts

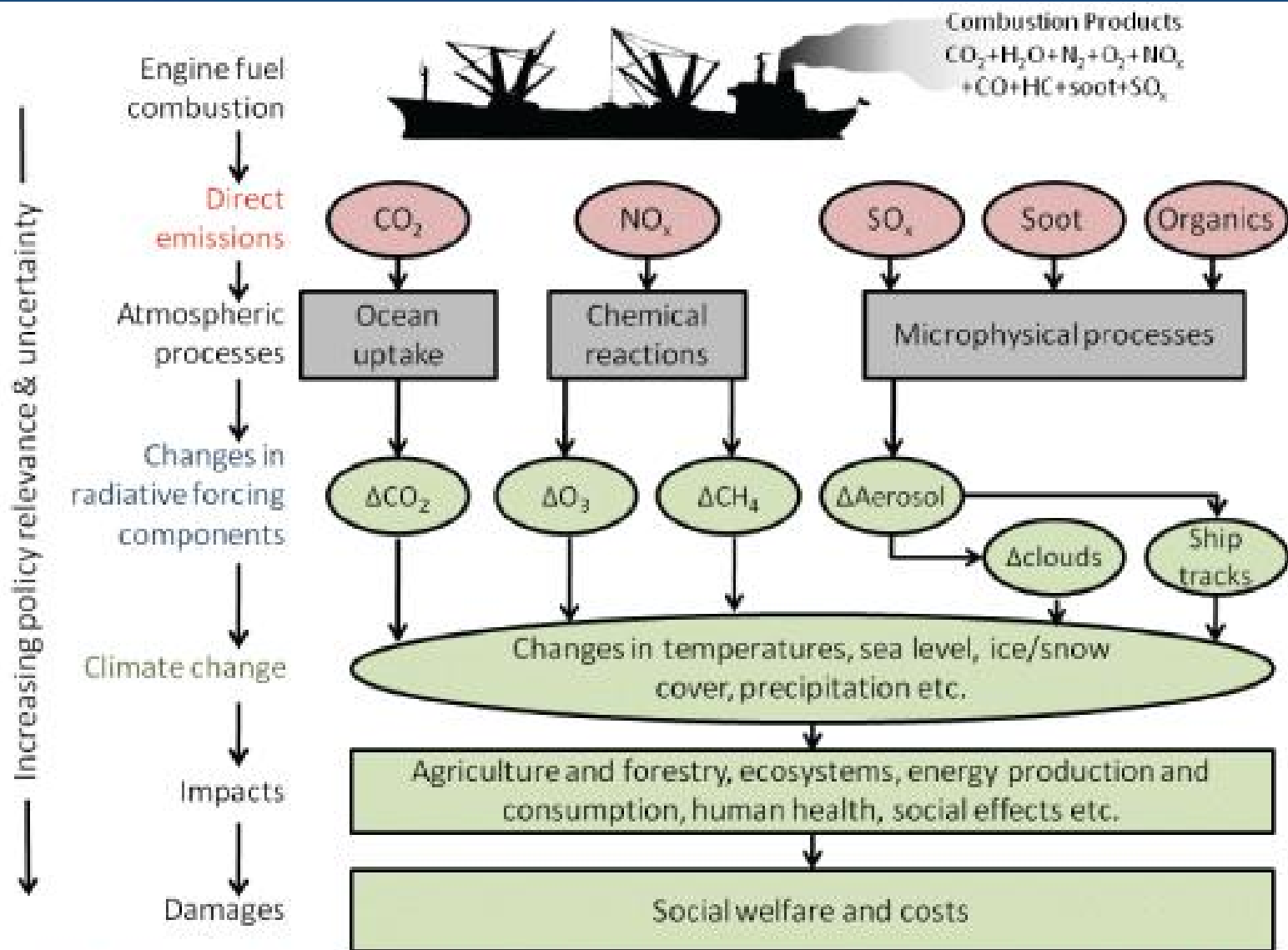


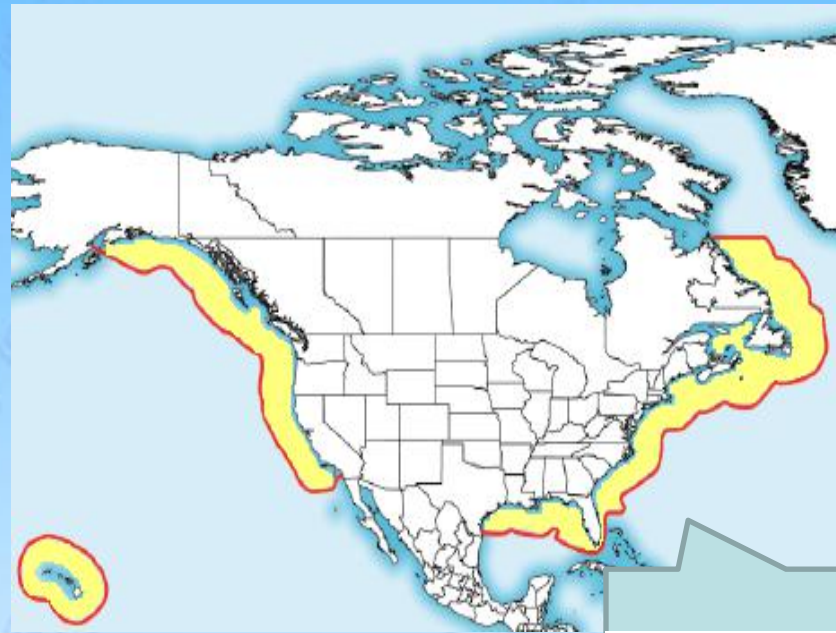
Figure 8.1 Schematic diagram of the overall impacts of emissions from the shipping sector on climate change (from Lee et al., 2009a)

# Emission Control Areas (ECAs) for SO<sub>x</sub> emission control

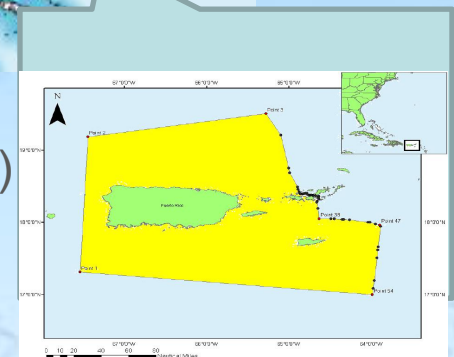
## North Sea and Baltic Sea ECAs



## North American ECA (Effected from 01/08/2012)



## U.S. Caribbean ECA (Effected from 01/01/2014)



## International Ship Engine and Fuel Standards (MARPOL Annex VI)

	Year	Fuel Sulfur	NOx
Emission Control Area (ECA)	to June 2010	15,000 ppm	
	from July 2010	10,000 ppm (1.0 %)	
	2015	1,000 ppm (0.1%)	
	2016		Tier 3 Aftertreatment*
Global	to Jan 2012	45,000 ppm	
	from Jan 2012	35,000 ppm (3.5%)	
	2020	5,000 ppm (0.5%)**	
	2011		Tier 2 Engine Controls*

\* Today's Tier 1 NOx standards range from approximately 10 to 17 g/kW-h, depending on engine speed. The Tier 2 standards represent a 20% NOx reduction below Tier 1, and the Tier 3 standards represent an 80% NOx reduction below Tier 1.

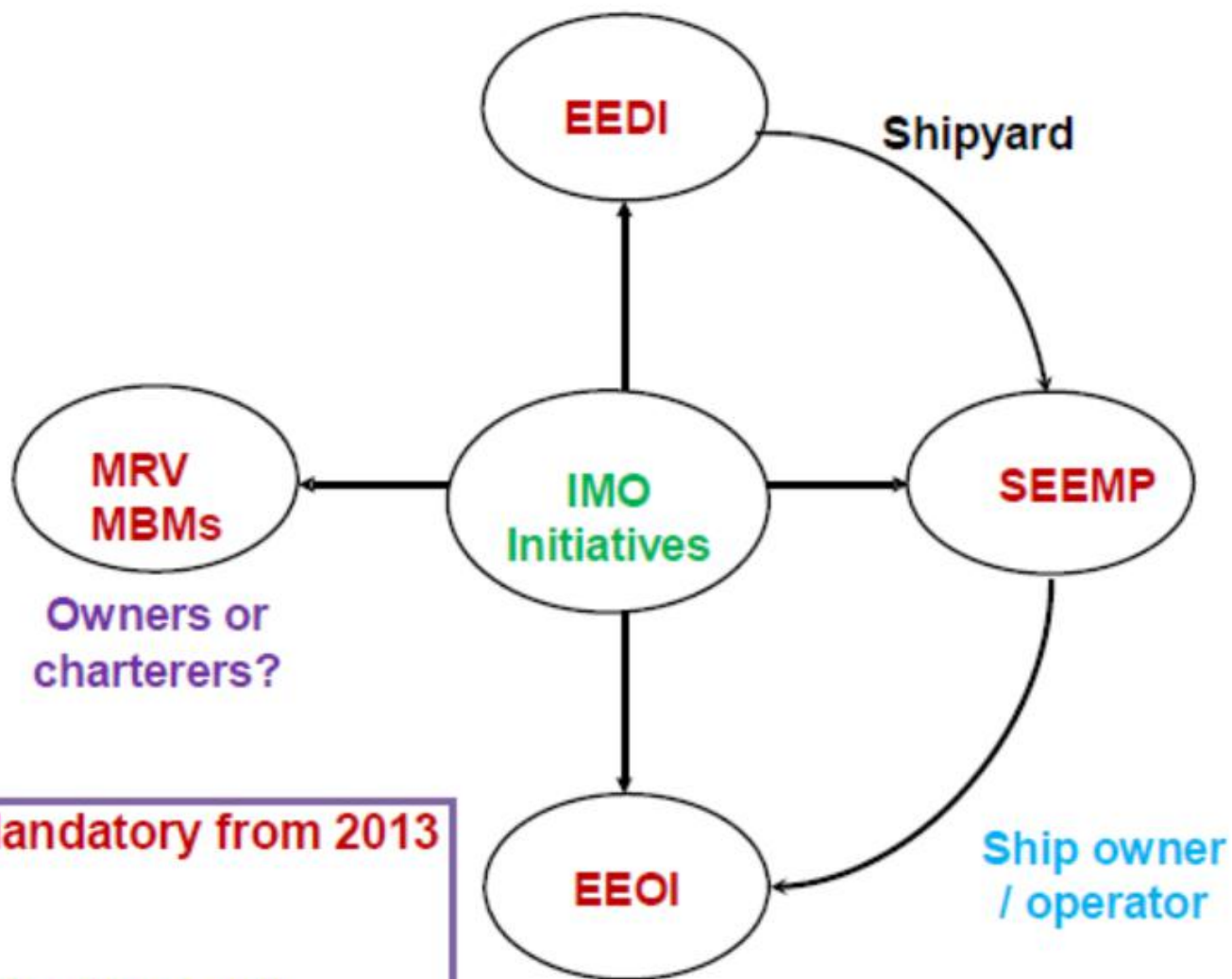
### ppm to %

There is a factor of 10,000 between ppm and percentage: ppm stands for 'parts per million', whereas percent means per hundred, and there is a factor of 10,000 between one hundred and one million. To go from ppm to percentage, divide by 10,000 and from percentage to ppm multiply by 10,000.

\* [www.epa.gov/otaq/regs/nonroad/marine/ci/420f09001.htm](http://www.epa.gov/otaq/regs/nonroad/marine/ci/420f09001.htm)

\*\* This date could be deferred to 1 Jan. 2025, depending on the outcome of a review, to be completed by 2018, as to the availability of compliant fuel oil.

# IMO framework for GHG emissions control from ships



**EEDI and SEEMP: Mandatory from 2013**

**EEOI: Voluntary**

**MRV (Monitoring, Reporting and Verification): Under discussion**

**MBMs: Discussion currently suspended**

Source: IMO presentation on Technical measures



# EEDI, EEOI and SEEMP links

