

# Coastal Resilience: Some international perspectives



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# Outline

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- Introduction
- The International Maritime Organization
- The beginning – the 1972 London Convention
- Moving further - the 1996 London Protocol
- Beyond dumping... LP and climate change

# A global regulatory perspective

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- How does coastal resilience relate to the international regulatory frameworks.....?
- The **London Convention/Protocol** are global instruments regulating the disposal of wastes and other matter
- Provides a framework for the issues such as:
  - Restoration and management of habitats
  - Working with Nature
  - Integrated approaches
  - Regional applications
  - Climate change and coastal systems

# International Maritime Organization (IMO)

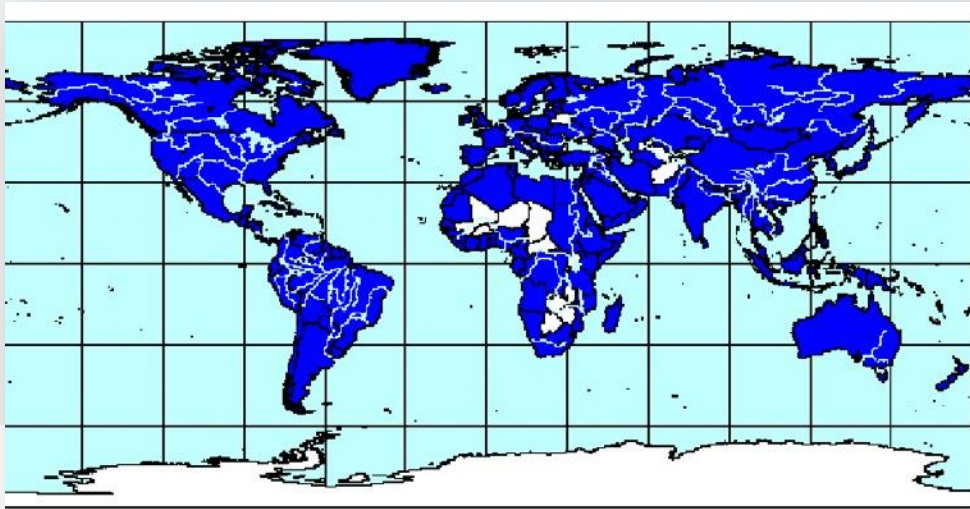
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- Specialized UN agency.
- Develops global regulations.
- Adopts treaties and guidelines at the intergovernmental level.
- Member Governments are responsible for implementing and enforcing the adopted regulatory framework.



# IMO's global coverage

- 170 Member States
- All major ship owning nations
- All major port & coastal states
- Industry associations
- IGOs and NGOs





# IMO's instruments

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- Conventions or Protocols
- Amendments to Conventions or Protocols
- Resolutions, codes, guidelines, recommendations, etc.
- The phases from adoption to implementation and enforcement:
  - **Adoption**, after discussion in IMO
  - **Entry into force** internationally
  - **Implementation** by flag States
  - **Enforcement** by port and coastal States

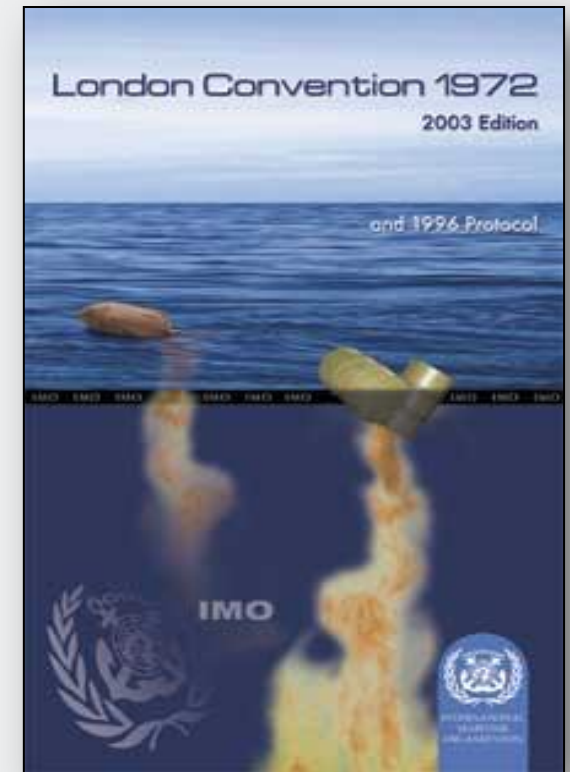


# The London Convention

**One of the first international agreements to protect the marine environment from human activities**

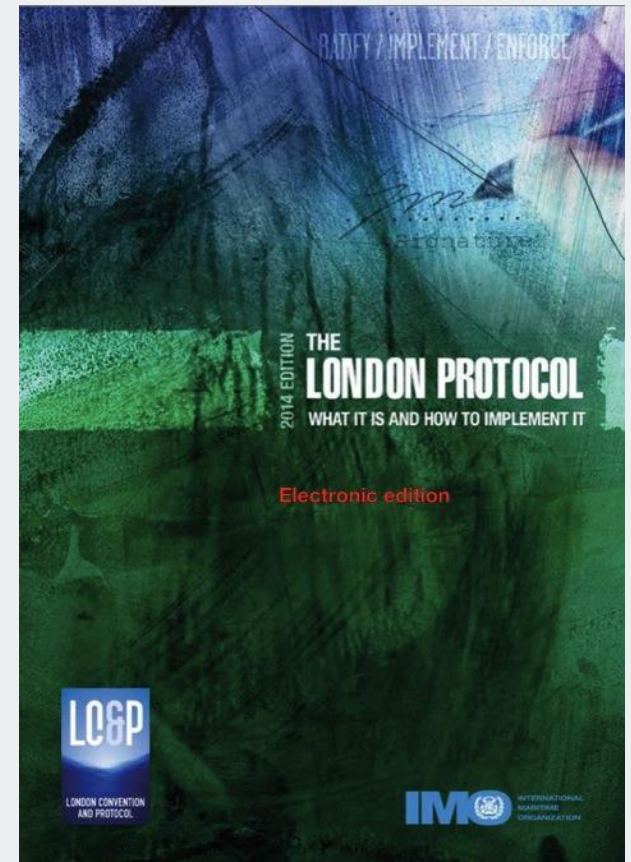
**1968** - United Nations General Assembly notes the “**continuing and accelerated impairment of the human environment**”, highlighting the relationship between human activities and the environment

**1971** – Intergovernmental Working Group on Marine Pollution considers a “Draft Convention on the Regulation of Ocean Dumping”



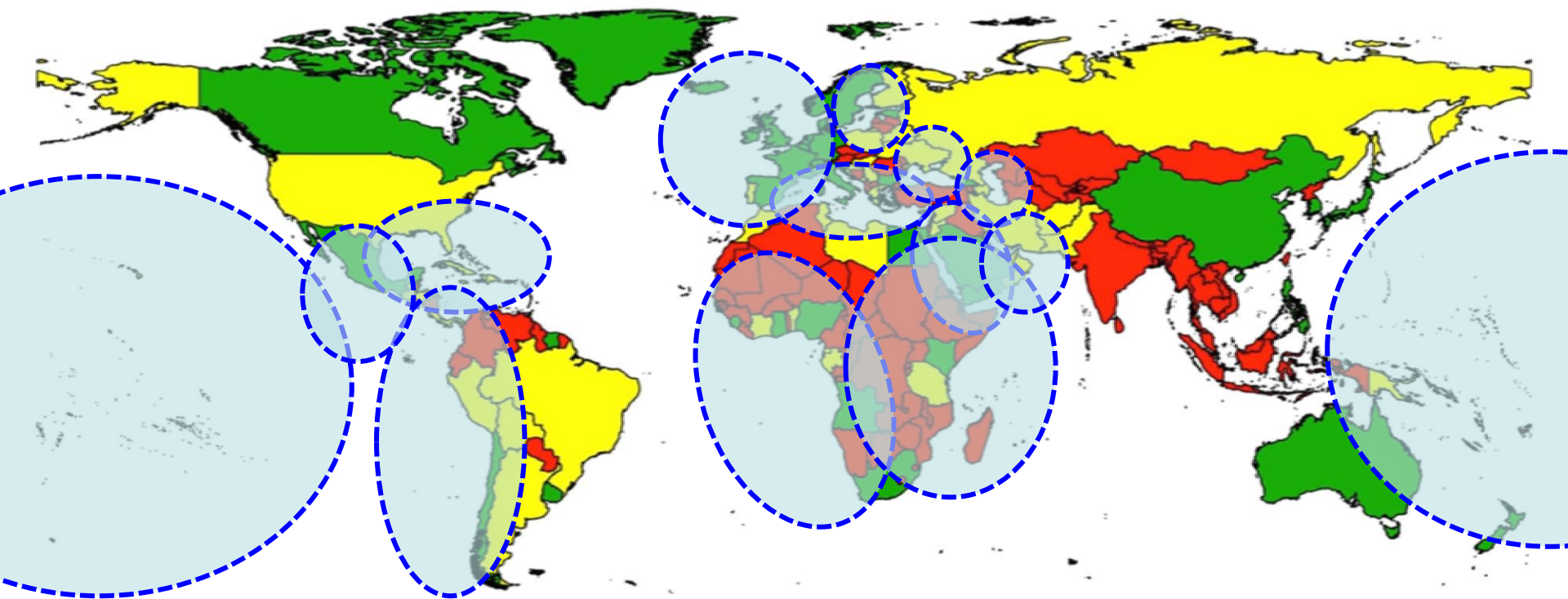
# The London Convention and Protocol

- The London Convention 1972 (LC)
  - In force since 1975.
  - 87 Contracting Parties.
- The London Protocol 1996 (LP)
  - Will eventually replace LC.
  - In force since 2006.
  - 45 Contracting Parties
- Administered by IMO





# The London Protocol – a global instrument



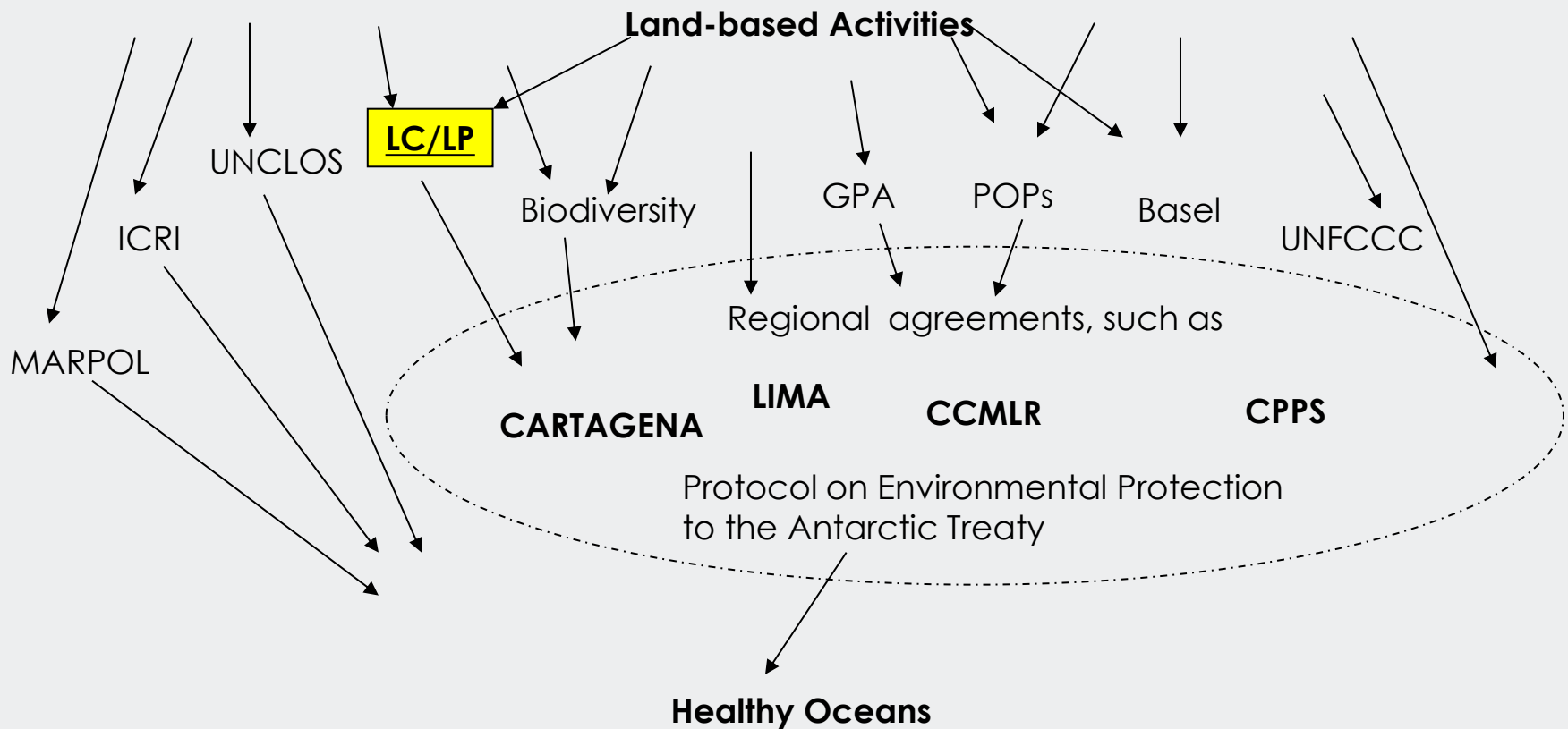
# UNCLOS – linkage with LC/LP

*Article 210*  
*Pollution by dumping*

1. States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment by dumping.

- Definition of “dumping” under UNCLOS is copied from the London Convention.
- Article 210(6) states: “national laws, regulations and measures shall be no less effective in preventing, reducing and controlling such pollution than the global rules and standards”, .....which implicitly refers to those set under the London Convention/Protocol.

# Part of a global framework of MEAs



# Going from re-active to pro-active

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- With the LP, waste management went from **re**-active to truly **pro**-active and precautionary

## **Article 3**

### *General obligations*

**1** In implementing this Protocol, Contracting Parties shall apply a precautionary approach to environmental protection from dumping of wastes or other matter whereby appropriate preventative measures are taken when there is reason to believe that wastes or other matter introduced into the marine environment are likely to cause harm even when there is no conclusive evidence to prove a causal relation between inputs and their effects.

# Changing the approach to managing wastes





# Going from re-active to pro-active

	<b>LC</b>	<b>LP</b>
<b>Prohibition</b>	No permit/ no disposal	No permit/ no disposal
<b>Wastes</b>	Black, grey list	Reverse list
<b>Factors</b>	Annex III	WAG



# The LP approach - Considering alternatives

## Protocol – Art 4.1.2

- “Particular attention shall be paid to opportunities to **avoid dumping in favour of environmentally preferable alternatives.**”

## Protocol – Annex 2, paragraph 1

- “The acceptance of dumping under certain circumstances shall not remove the obligations to make further attempts to reduce the necessity for dumping.”
- Polluter pays
- No transfer of damage
- From Waste to Resource



# From waste to resource

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- Applications to dump shall demonstrate appropriate consideration of a hierarchy of waste management options:
  - Re-use;
  - Off-site recycling;
  - Destruction of hazardous constituents;
  - Treatment to reduce or remove hazardous constituents; and
  - Disposal on land, into air and into water.
- Can the waste or other matter be made acceptable for disposal at sea?
- The practical availability of other means of disposal (land, air) should be considered in the light of a comparative risk assessment involving both the dumping and the alternatives.

# Beyond dumping ...

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- Regulates dumping of wastes and other matters, but Parties also have an obligation to protect the marine environment from **all sources of pollution**

## Article 2

### *Objectives*

Contracting Parties shall individually and collectively protect and preserve the marine environment from all sources of pollution and take effective measures, according to their scientific, technical and economic capabilities, to prevent, reduce and where practicable eliminate pollution caused by dumping or incineration at sea of wastes or other matter. Where appropriate, they shall harmonize their policies in this regard.



## **CO<sub>2</sub> Sequestration in Sub-seabed Geological Formations and Ocean Fertilization/Geoengineering**



# London Protocol and climate change

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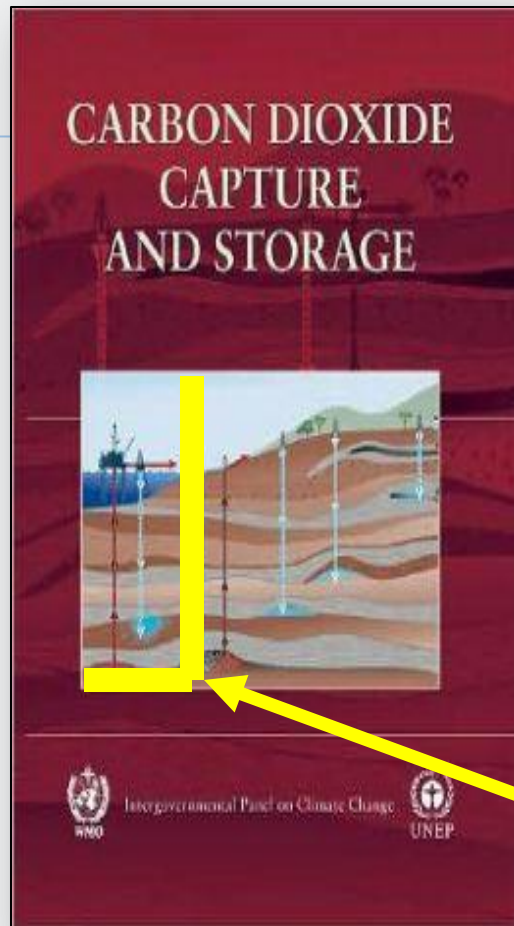
## Why?

1. Increasing levels of CO<sub>2</sub> in the atmosphere contributes to ocean acidification reducing ecosystem resilience
2. CO<sub>2</sub> sequestration at large point sources is one option of a range of measures to tackle these challenges, including, the need to further develop and use low carbon forms of energy and conservation measures to reduce emissions
3. The aim of carbon capture of CO<sub>2</sub> and storage in sub-seabed geological formations is: permanent isolation!

# Carbon Dioxide Capture and Storage

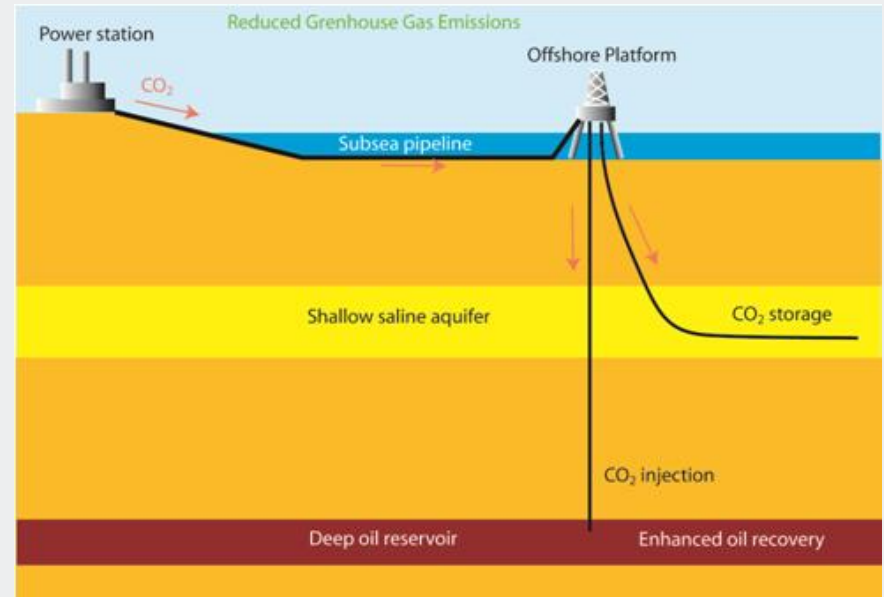
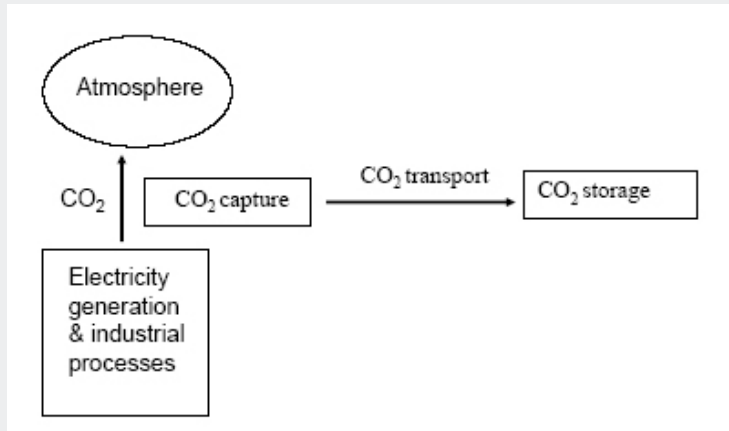
Approved and accepted by IPCC Working Group III and 24 Session of the IPCC in Montreal, 26 Sep. 2005

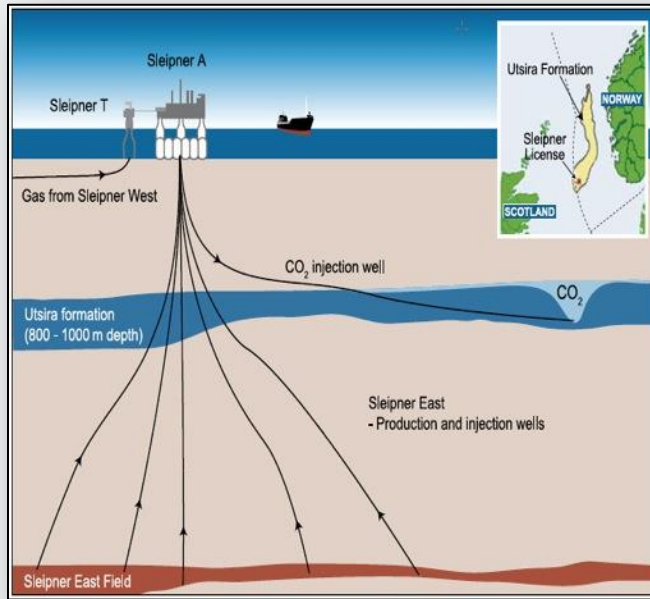
Confirmed in IPCC Fifth Report



Scope of London Protocol

# CO<sub>2</sub> Sequestration





## Sleipner West Field

## CO<sub>2</sub> Sequestration



# LP Amendments on CCS

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1. 2006 Amendments regulate the sequestration of CO<sub>2</sub> streams from CO<sub>2</sub> capture processes in sub-seabed geological formations
2. In force since February 2007
3. Forms basis in international environmental law to regulate carbon capture and storage (CCS) in sub-seabed geological formations for permanent isolation



# CCS in Transboundary Formations

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- 2009 amendments to Article 6 allows the export of carbon dioxide streams for disposal in accordance with Annex 1.
- Not in force
- To date – two ratifications
- Unintended transboundary migration within reservoir after injection: Not regarded as export

# Guidance Documentation

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- Risk Assessment and Management Framework for CO<sub>2</sub> Sequestration in Sub-seabed Geological Formations (2006)
- Specific Guidelines for Assessment of CO<sub>2</sub> Sequestration in Sub-seabed Geological Formations (2007) and amended in 2012/2013 to include migration after injection and arrangements for export/import of CO<sub>2</sub>

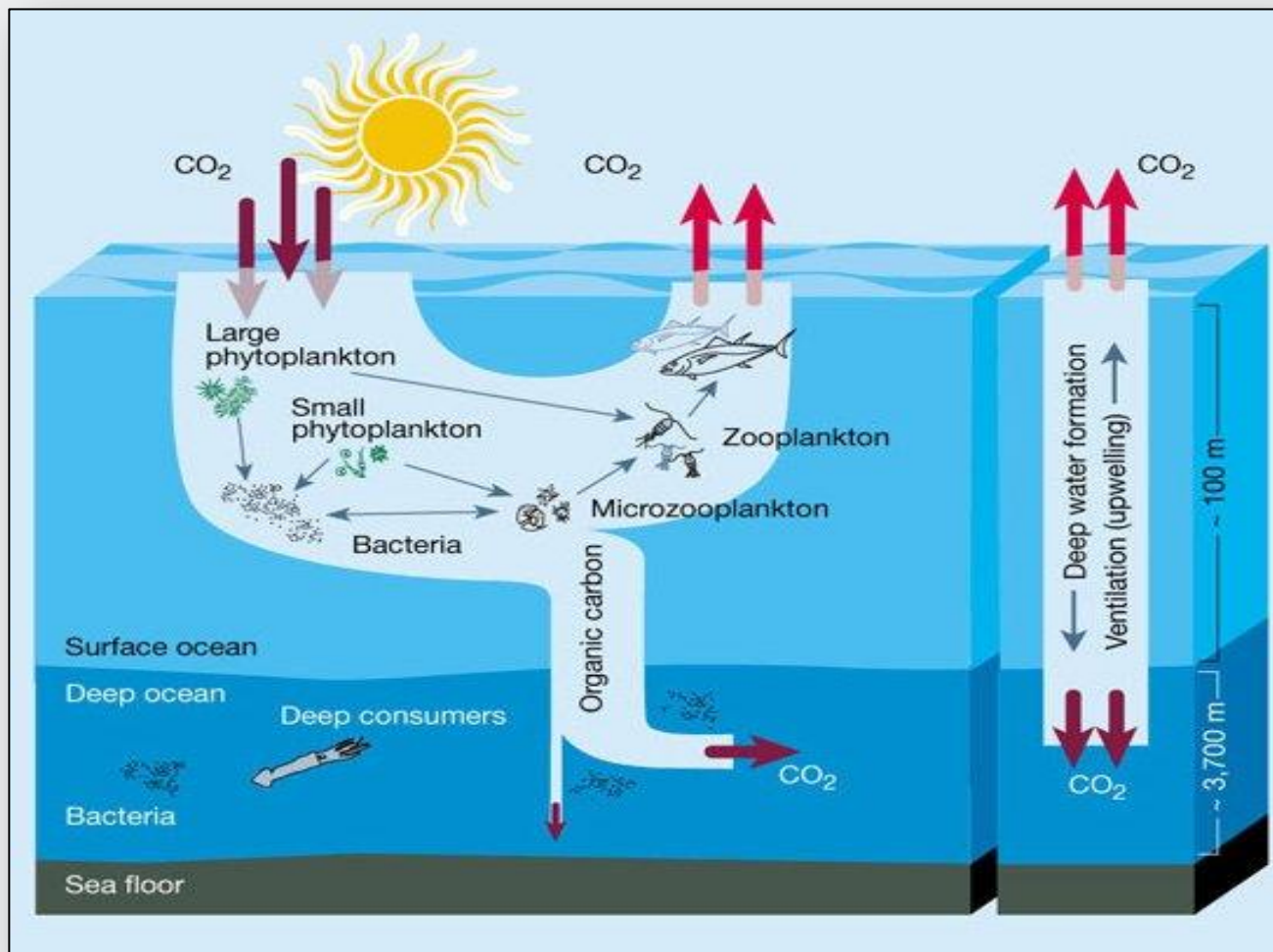
# Regulation of Ocean Fertilization

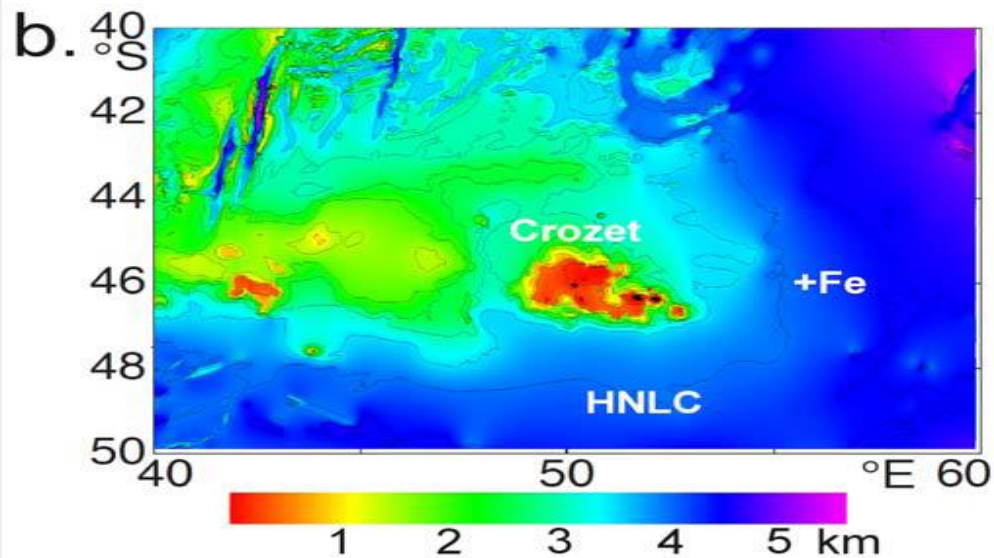
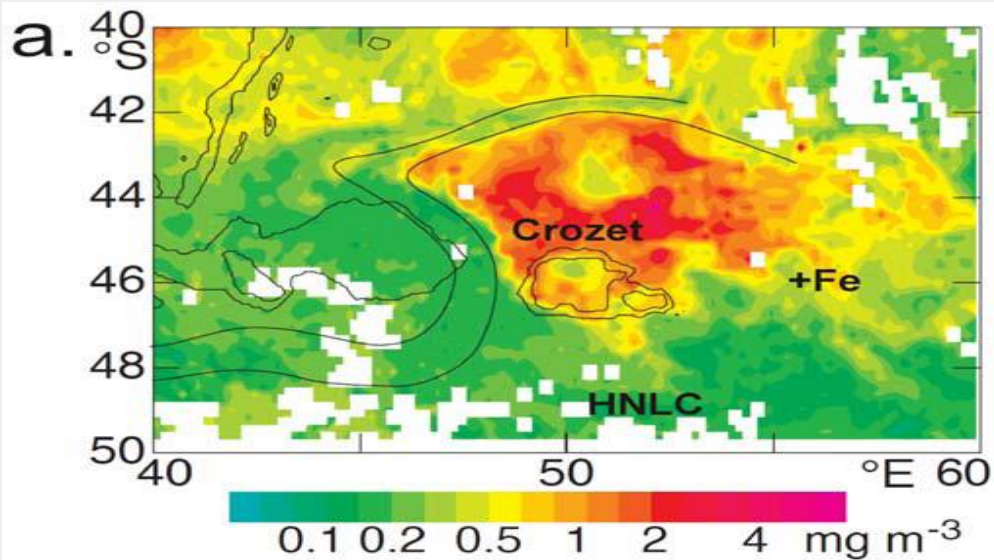
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What is it?: Stimulation of natural photosynthesis through phytoplankton production in the oceans, i.e., by “seeding” with nutrients, to draw down part of the surplus of CO<sub>2</sub> from the atmosphere

Concerns?: (1) effectiveness of the method, does it work? (2) potential irreversible impacts on the marine environment and human health

# Ocean Fertilization





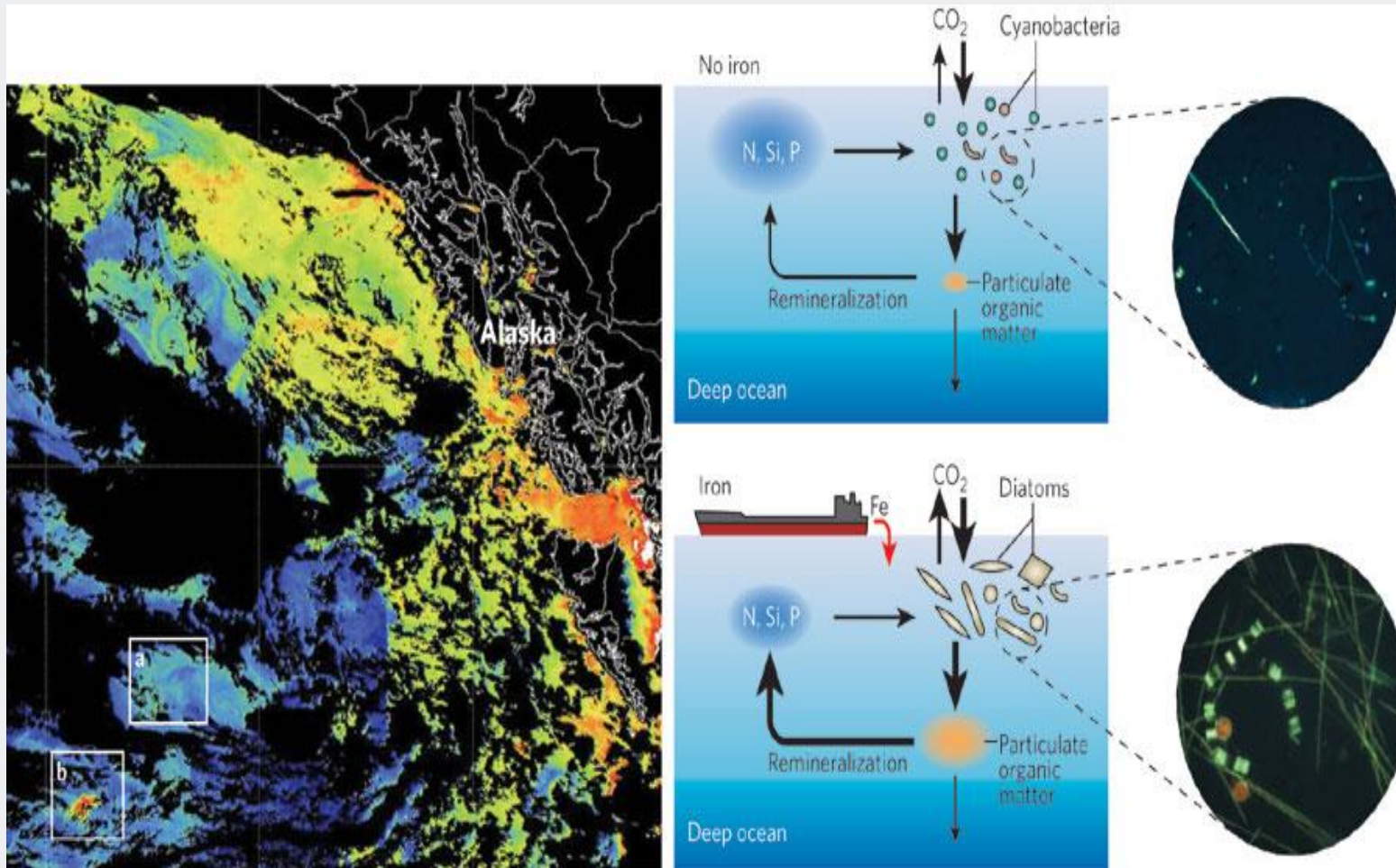
## Natural Iron Fertilization:

Location maps of the +Fe and high nutrient low chlorophyll (HNLC) oceanic waters sites with respect to:

- a. typical spring bloom to the north of the Crozet Plateau in the Sub-Antarctic
- b. Water depth (km) in the corresponding Crozet region



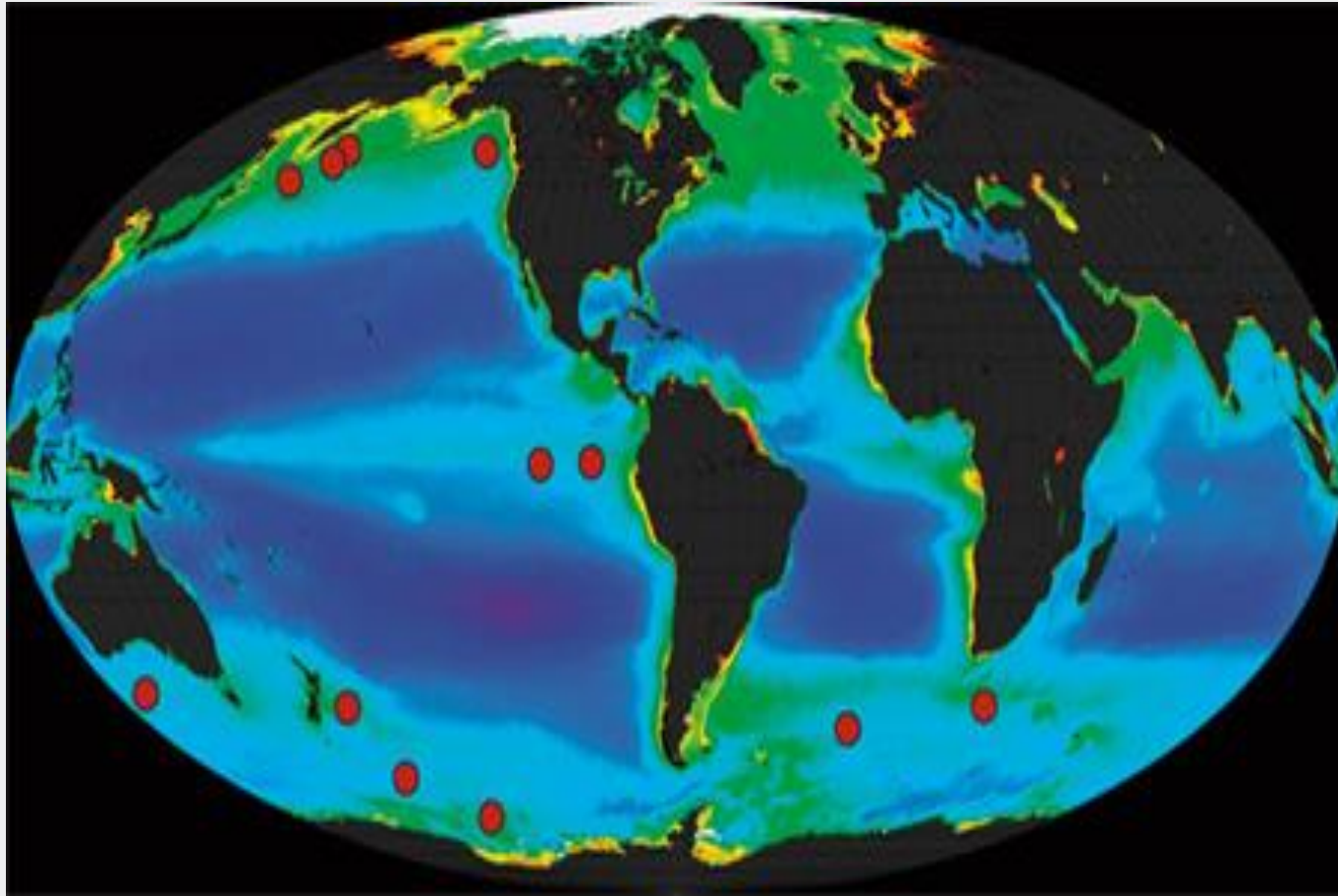
# Ocean Fertilization



From Armbrust, E. V. (2009). The life of diatoms in the world's oceans Nature 459, 185-192, doi:10.1038/nature08057.

# Ocean Fertilization Experiments

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# Regulation of Ocean Fertilization

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2007: Parties issued “Statement of Concern”. Agreed to work towards regulation of ocean fertilization

2008: “Policy” resolution adopted allowing “legitimate scientific research” ONLY (no commercial activities)!

2010: Adoption of the “Assessment Framework for Scientific Research Involving Ocean Fertilization”

# Assessment Framework

Resolution LC-LP.2(2010) – Not legally binding!

Guidance to:

- .1 determine whether a project is legitimate scientific research;
- .2 characterize risks to the marine environment from ocean fertilization on a project-specific basis; and
- .3 collect the necessary information to develop a [risk] management strategy.





# Regulation of Ocean Fertilization under the LC/LP

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Resolution LP.4(8) (2013) prohibits the placement of matter for ocean fertilization and other marine geoengineering activities

Allows other marine geoengineering activities to be considered and listed in a new annex in the future if they fall within the scope of the London Protocol and have the potential to harm the marine environment

# Marine Geoengineering

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Defined as:

“a deliberate intervention in the marine environment to manipulate natural processes, including to counteract anthropogenic climate change and/or its impacts, and that has the potential to **result in deleterious effects, especially where those effects may be widespread, long-lasting or severe**”.

# Marine Geoengineering

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## Does not include:

- direct harvesting of marine organisms,
- conventional aquaculture or mariculture,
- the creation of artificial reefs,
- use of dispersants in oil spill response,
- or the production of energy from the wind, currents, waves, tides, or ocean thermal energy conversion,
- deep sea mining,
- or conventional marine observation and sampling methods.



# Marine Geoengineering – Types

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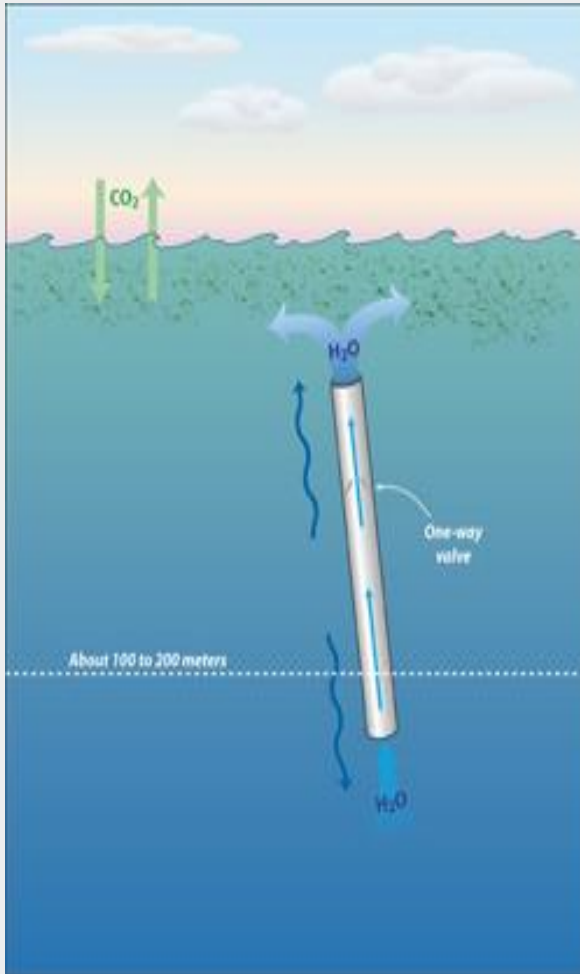
- Increase carbon flux to the deep-sea through stimulating additional production by:
  - Adding iron
  - Adding nitrogen
  - Raising nutrient-rich deep-waters to the surface

# Marine Geoengineering – Types

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- Depositing organic material on the deep seabed:
  - Crop wastes
  - Charcoal/Biochar
- Increasing the uptake of CO<sub>2</sub> from the atmosphere by :
  - Adding e.g. Calcium oxide, hydroxide or carbonate, directly
  - Enhancing the chemical weathering of silicate rocks

# Marine Geoengineering – Types



**Floating Tubes** (Lovelock and Rapley (2007)) involves the deployment of thousands of plastic tubes (~300-600 feet long and ~30 feet in diameter) in the oceans, bridging nutrient-poor surface waters with colder, nutrient-rich waters at depth. One-way valve would pump nutrient-rich deep water through the tubes to the ocean surface, stimulating phytoplankton activity

# Marine Geoengineering – Types



## Wave-Powered Ocean Pumps

Bring nutrient-rich deep water to the surface to stimulate plankton blooms (Karl and Letelier, 2008).

## Beyond 2015 – A new framework for sustainable development

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- The control of marine pollution and marine disposal of waste and tailings, including from land-based activities, is prominent in the discussions towards the Sustainable Development Goals – SDGs
- Will replace the Millennium Development Goals beyond 2015
- ‘Conservation and sustainable use of marine resources, oceans and seas’ is one of the current Focus Areas

# Thank you for listening!

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