

Climate Change and Oceans: New Challenges for the Law of the Sea

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Outline

Part I *Introduction*

Part II *Impact of climate change on the oceans*

Part III *Protection of the marine environment*

Part VI *Maritime boundaries*

Part V *Shipping*

Part VI *The Arctic*

Part I

Introduction

UNCLOS and Climate Change

1967

- ❖ Arvid Pardo appeared before the UNGA for the Common Heritage of Mankind (now the “Area”)
- ❖ Negotiation and adoption in 1982 of the United Nations Convention on the Law of the Sea (UNCLOS)

1988

- ❖ David Attard and Malta’s proposal to the UNGA and adoption of UNGA Res. 43/53 declaring climate change to be a common concern of mankind
- ❖ Adoption in 1992 of the United Nations Framework Convention on Climate Change
- ❖ 196 Parties

UNCLOS and Climate Change

- ❖ Adopted 10 years before 1992 UNFCCC
- ❖ “Pollution” oriented
- ❖ Issue of coastal regression limited
- ❖ No reference to climate change
- ❖ No reference in the UNFCCC to UNCLOS (eg. Kyoto Protocol made express reference to IMO and ICAO)
- ❖ Is there a “gap”?
- ❖ Can climate change be incorporated into UNCLOS?
- ❖ Restrictive or progressive interpretation of UNCLOS?

UNCLOS and Climate Change

UNCLOS Preamble

- ❖ Constitution for the oceans
- ❖ “[p]rompted by the desire to settle, in a spirit of mutual understanding and cooperation, *all issues* relating to the law of the sea.....”
- ❖ Objective is to create, “a legal order for the seas and oceans which will....promote the equitable and efficient utilization of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment...”

UNFCCC and Oceans

Article 3

(d) Promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and [oceans](#) as well as other terrestrial, coastal and marine ecosystems;

(e) Cooperate in preparing for [adaptation](#) to the impacts of climate change; develop and elaborate appropriate and integrated plans for [coastal zone management](#), water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods;

Part I
Impact of climate
change on the
oceans

Climate Change

- ❖ Anthropogenic–caused warming of the earth’s climate (“Anthropocene” era)
- ❖ Fossil fuels principal cause + deforestation + agriculture (livestock)
- ❖ Six GHG gases
 - Carbon dioxide (CO₂); • Methane (CH₄); • Nitrous oxide (N₂O); • Hydrofluorocarbons (HFCs); • Perfluorocarbons (PFCs); and • Sulphur hexafluoride (SF₆)
- ❖ Scientists warn global temperature rise to be kept below 2° C.

Impact of climate change on the oceans

❖ **Arctic**

- ❖ Ice-free by 2030? 2040?
- ❖ Passage regime of the Northwest Passage
- ❖ Offshore exploration and protection of the marine environment in the Arctic

❖ **Sea-level rise**

- ❖ Coastal inundation
- ❖ Disappearing baselines (delimitation)
- ❖ Disappearing islands (and EEZs?)

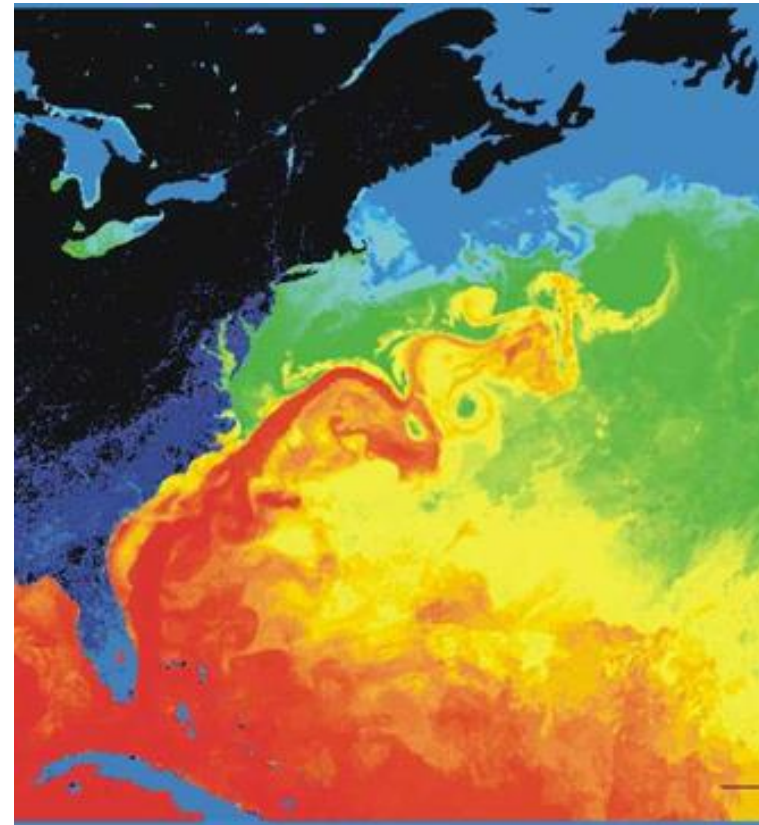
❖ **Marine environment protection**

- ❖ Ocean acidification
- ❖ Loss of habitat and biodiversity
- ❖ Transboundary impacts
- ❖ Invasive species
- ❖ Ocean dumping
 - ❖ Geo-engineering (ocean fertilization)
 - ❖ Carbon sequestration and use of seabed for storage

Climate Change and the Oceans

- ❖ 70% of earth's surface
- ❖ Importance of oceans to regulating the climate, weather and redistributing heat
 - Gulf stream (scientists say there has been a definite 10 to 15 per cent slowdown in the Gulf Stream, which brings a constant flow of warm water and mild weather to northern Europe)
- ❖ Oceans serve as an important sink and reservoir by absorbing and storing CO₂ from the atmosphere
- ❖ Reflective force of the oceans
- ❖ Oceans sustain life

- Gulf Stream



IPCC Fifth Report

- ❖ Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane and nitrous oxide that are unprecedented in at least the last 800,000 years.
- ❖ The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen.
- ❖ **Sea-level rise under-estimates made in 4th Assessment – now predicts 1 meter rise by 2100.**
- ❖ The amount of carbon dioxide (ppm) in the atmosphere has risen by 25% since 1958, and by about 40% since the Industrial Revolution.
- ❖ **Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850.** The period from 1983 to 2012 was *likely* the warmest 30-year period of the last 1400 years in the Northern Hemisphere, where such assessment is possible (*medium confidence*).

IPCC Fifth Report

- ❖ **Ocean warming dominates the increase in energy stored in the climate system**, accounting for more than 90% of the energy accumulated between 1971 and 2010 (*high confidence*), with only about 1% stored in the atmosphere. [ocean warming is largest near the surface]
- ❖ Arctic sea-ice extent has decreased in every season and in every successive decade since 1979
- ❖ **Strong evidence that ocean properties of relevance to climate have changed during the past 40 years**, including temperature, salinity, sea level, carbon, pH, and oxygen.
- ❖ Since the beginning of the industrial era, oceanic uptake of CO₂ has resulted **in acidification of the ocean**; the pH of ocean surface water has decreased by 0.1 (*high confidence*)

National Oceanic and Atmospheric Administration (NOAA)

- ❖ The biggest source of uncertainty within this range is the contribution of water from melting ice sheets and glaciers in Greenland and West Antarctica.

The Arctic



The Arctic

- ❖ The area covered by sea ice in the Arctic at the end of summer has shrunk by about 40% since 1979.
- ❖ **September 2015 Arctic ice at its fourth lowest level-less 240,000 miles since 2014**
- ❖ Northern Sea Route, along the coast of Russia, and Roald Amundsen's route through the Northwest Passage are open (September 2015 National Snow and Ice Data <http://nsidc.org/arcticseaicenews/>)
- ❖ **Expected that by 2040 Arctic ocean will be ice-free periodically**

Sea-Level Rise

- ❖ 1 meter or more by 2100
- ❖ 17% of Bangladesh's land mass would be flooded. Loss of island States (Maldives, Kiribati, Tuvalu...)
- ❖ Climate Central study conducted found that **147 to 216 million people live on land that will be below sea level or regular flood levels by the end of the century**, if business as usual (BAU) continues.

Top 20 Most At-Risk Countries

By Total

Country	Population Exposed (thousands)	Percent of National Population Exposed
1. China	50,465	4%
2. Vietnam	23,407	26%
3. Japan	12,751	10%
4. India	12,643	1%
5. Bangladesh	10,230	7%
6. Indonesia	10,157	4%
7. Thailand	8,176	12%
8. Netherlands	7,793	47%
9. Philippines	6,205	7%
10. Myanmar	4,742	9%
11. United States	3,087	1%
12. United Kingdom	2,574	4%
13. Brazil	1,737	1%
14. Germany	1,665	2%
15. France	1,256	2%
16. Malaysia	1,171	4%
17. Taiwan	1,032	4%
18. Korea, Republic of	1,028	2%
19. Nigeria	848	1%
20. Italy	842	1%

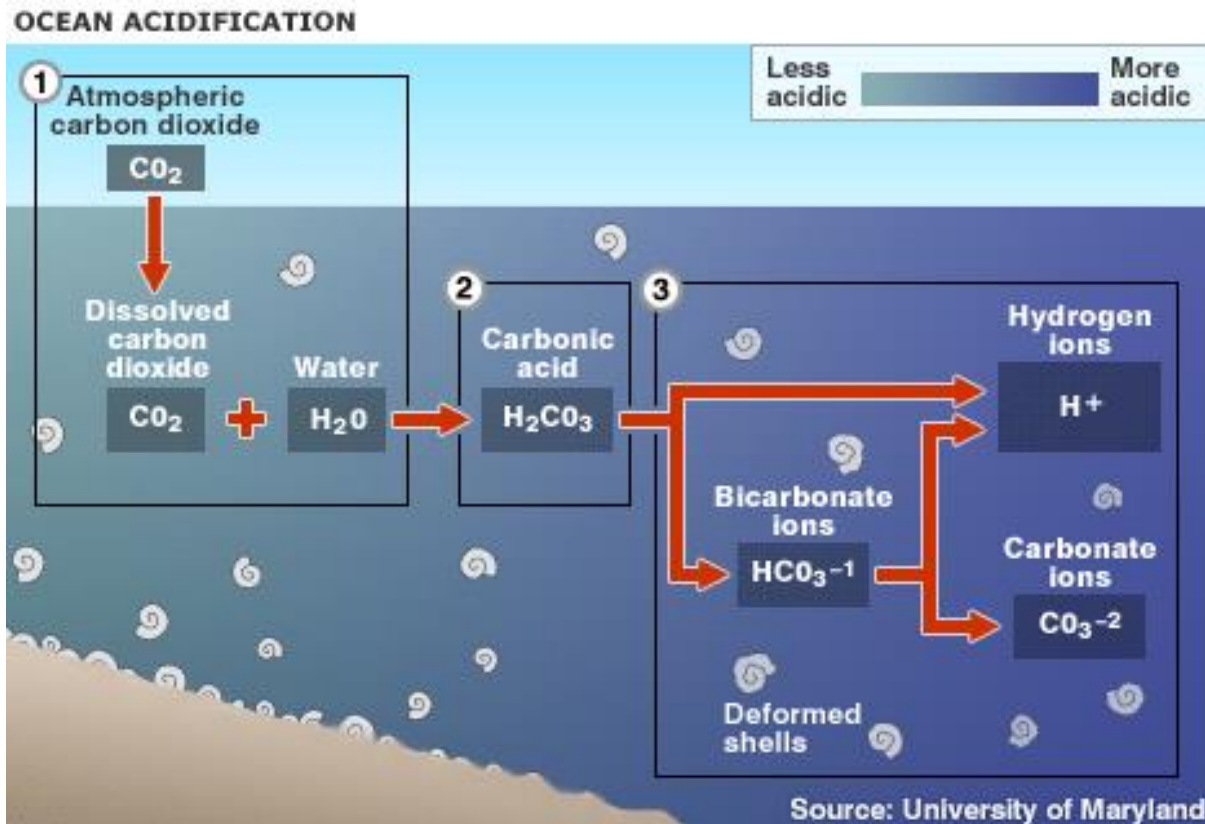
By Percent

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3. Thailand	8,176	12%
4. Japan	12,751	10%
5. Myanmar	4,742	9%
6. Bangladesh	10,230	7%
7. United Arab Emirates	570	7%
8. Philippines	6,205	7%
9. Bahrain	80	6%
10. Belgium	619	6%
11. Oman	148	5%
12. Taiwan	1,302	4%
13. Indonesia	10,157	4%
14. Denmark	232	4%
15. United Kingdom	2,574	4%
16. Malaysia	1,171	4%
17. China	50,465	4%
18. Hong Kong	241	3%
19. Cambodia	449	3%
20. Ireland	133	3%

Ocean Acidification

- Up to 50% of the carbon dioxide (CO_2) released by burning fossil fuels over the past 200 years has been absorbed by the world's oceans.
- Oceans absorbed over 80% of the heat
- **Oceans are CO_2 satiated**
- **Absorbed CO_2 in seawater (H_2O) forms carbonic acid (H_2CO_3), lowering the water's pH level and making it more acidic.**
- **This has negative impact on marine life**
- Marine creatures cannot build shell or skeletons out of calcium carbonate making them vulnerable.
- The decrease in available carbonate ions means that organisms, such as plankton, coral and mollusks, struggle to build or maintain their protective or supportive structures.
- Destruction of coral reefs

Ocean Acidification



Ocean Acidification

- **National Geographic**

“For tens of millions of years, Earth's oceans have maintained a relatively stable acidity level. It's within this steady environment that the rich and varied web of life in today's seas has arisen and flourished. But research shows that this ancient balance is being undone by a recent and rapid drop in surface pH that could have devastating global consequences...”

“Over the past 300 million years, ocean pH has been slightly basic, averaging about 8.2. Today, it is around 8.1, a drop of 0.1 pH units, representing a 25-percent increase in acidity over the past two centuries.”

Ocean Acidification

OCEAN ACIDIFICATION

HOW WILL CHANGES IN OCEAN CHEMISTRY AFFECT MARINE LIFE?

CO₂ absorbed from the atmosphere

The diagram illustrates the process of ocean acidification. At the top, four red test tubes show an increasing amount of red liquid, representing CO₂ absorbed from the atmosphere. Below this, a horizontal arrow points from left to right, showing the progression of the chemical reaction. On the left, a green, healthy shell is shown in a blue circle. On the right, a yellow, corroded shell is shown in a grey circle. Below the shell images, the chemical equation is shown: $\text{CO}_2 + \text{H}_2\text{O} + \text{CO}_3^{2-} \rightarrow 2 \text{HCO}_3^-$. Underneath the equation are molecular models for each species: carbon dioxide (one black carbon atom, two red oxygen atoms), water (one red oxygen atom, two white hydrogen atoms), carbonate ion (one black carbon atom, three red oxygen atoms), and two bicarbonate ions (one black carbon atom, two red oxygen atoms, one white hydrogen atom). At the bottom, the text reads: "consumption of carbonate ions impedes calcification".

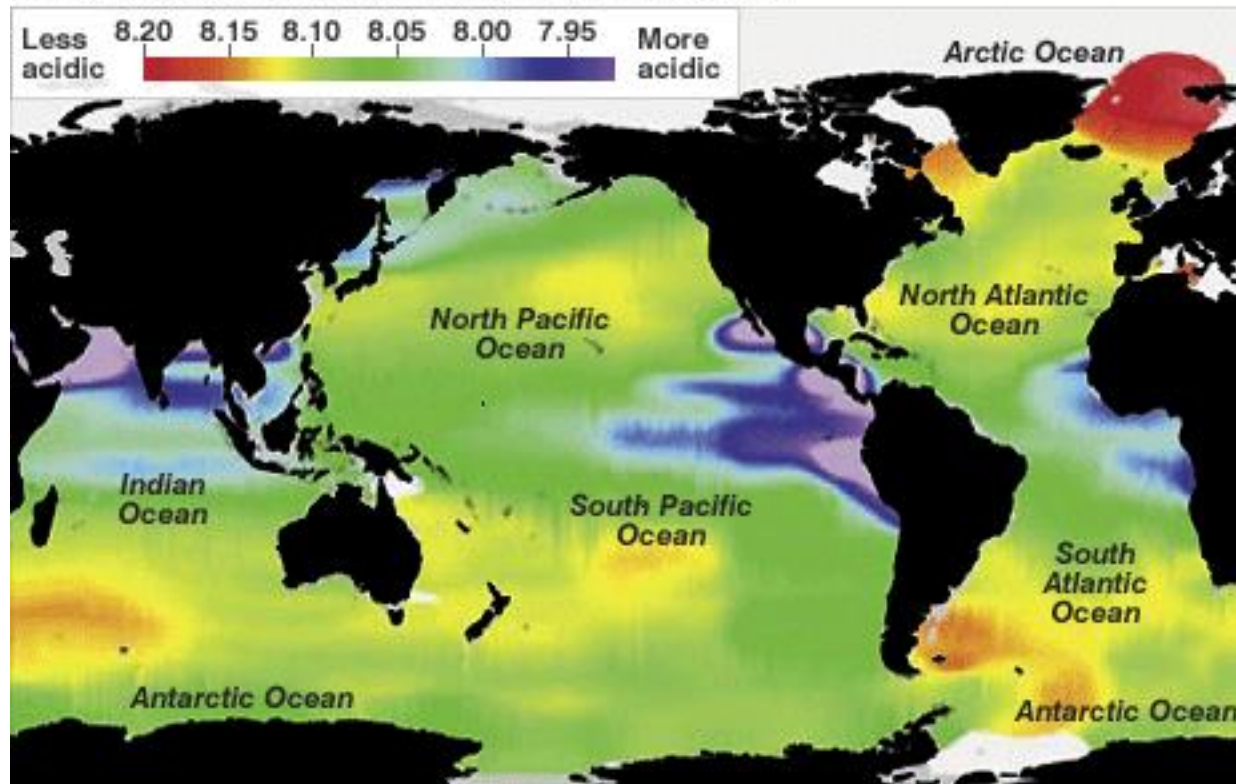
$\text{CO}_2 + \text{H}_2\text{O} + \text{CO}_3^{2-} \rightarrow 2 \text{HCO}_3^-$

carbon dioxide water carbonate ion 2 bicarbonate ions

consumption of carbonate ions impedes calcification

Ocean Acidification

VARIATION IN PH LEVELS IN THE WORLD'S OCEANS



Monaco Declaration on Ocean Acidification 2008

- ❖ Impact of ocean acidification
- ❖ Loss of coral reefs and habitats provided
- ❖ Marine food webs leading to substantial changes in commercial fish stocks (billion \$ loss)
- ❖ Threatening protein supply and global food security
- ❖ Weaken oceans ability to regulate climate

Climate Change and the Oceans

Fisheries

- ❖ “International Council for the Exploration of the Sea indicated that an **increase in sea temperature in the medium and long term could lead to changes in the migrations of major fish stocks in the North East Atlantic Fisheries Commission Convention area.** Changes in migration or spawning behaviour could affect catch rates, or cause populations to shift from areas where spatial restrictions are in place or across maritime boundaries with different quotas”

(UNGA Law of the Sea Report A/66/70/Add.1, 11 April 2011)

Part II
Protection of the
marine environment

Climate Change and UNCLOS

- ❖ **Can climate change be incorporated into the 1982 UNCLOS regime?**
- ❖ **192** - “States have the obligation to protect and preserve the marine environment”
- ❖ **194** - Duty to take measures to prevent, reduce and control pollution [CO₂ “pollution” under UNCLOS?]
 - ❖ **Article 194 (5)** Duty to protect rare or fragile ecosystems, habitat of depleted, threatened or endangered species or other form of marine life.
- ❖ **195** - Duty not to transfer damage or hazards from one type of pollution to another when taking measures
- ❖ **196** - Duty to take all necessary measures to prevent, reduce and control pollution from the use of technologies
- ❖ **197** - Duty to cooperate globally or regionally directly or through competent international bodies

Climate Change and UNCLOS

- ❖ **Article 206** - Duty to assess impact of activities under State's jurisdiction on the marine environment (impact of GHG?)
- ❖ **Article 207**- Duty of States to adopt laws and regulations to prevent, reduce and control land-based pollution (GHG emissions?)
- ❖ **Article 210** - Duty of States to adopt laws and regulations to prevent, reduce and control dumping (carbon capture & sequestration /geo-engineering?)
- ❖ **Article 211** - Duty of States to adopt laws and regulations to prevent, reduce and control vessel-source pollution through CIO (IMO)
- ❖ **Article 212** - Duty of States to adopt laws and regulations to prevent, reduce and control pollution of marine environment from atmospheric pollution (airspace and vessels)

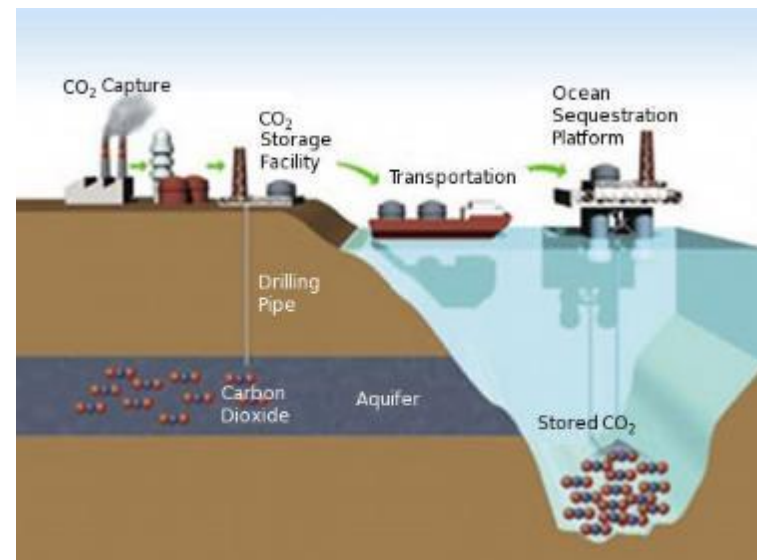
Climate Change and UNCLOS

❖ Pollution definition under UNCLOS:

...“the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, **which results or is likely to result in such deleterious effects** as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.” (Art. 1(1)(4).)

Carbon Capture and Sequestration in Sub-Sea Geological Formations

- ❖ Carbon sequestration
 - ❖ Natural sequestration
 - ❖ Trees
 - ❖ Artificial ocean sequestration
 - ❖ Dumping or mitigation?
 - ❖ Impact of CO₂ injection into deep sea? Unknown?
 - ❖ Leakage can be lethal (Lake Nyos 1986 1700 deaths)
 - ❖ Precaution?
 - ❖ Article 206 assessment?



Ocean Fertilization

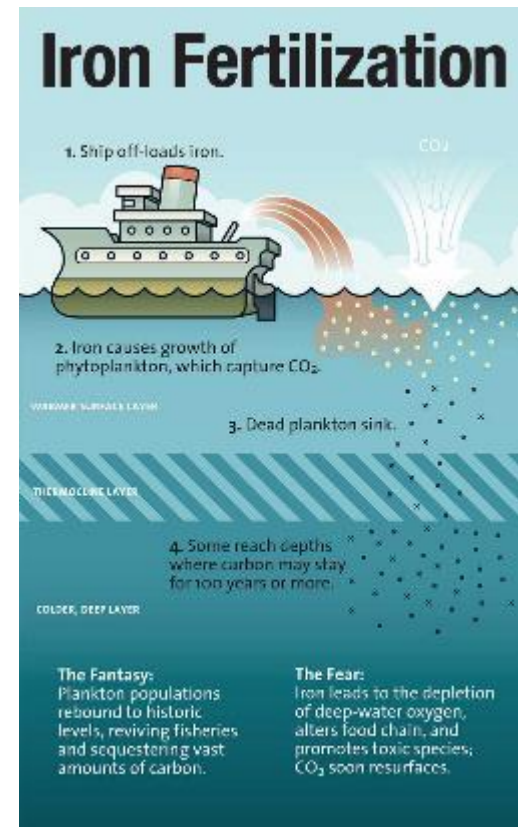
❖ Geo-engineering

❖ Iron-ore ocean fertilization

[Carbon sequestration through artificially increased phytoplankton concentration]

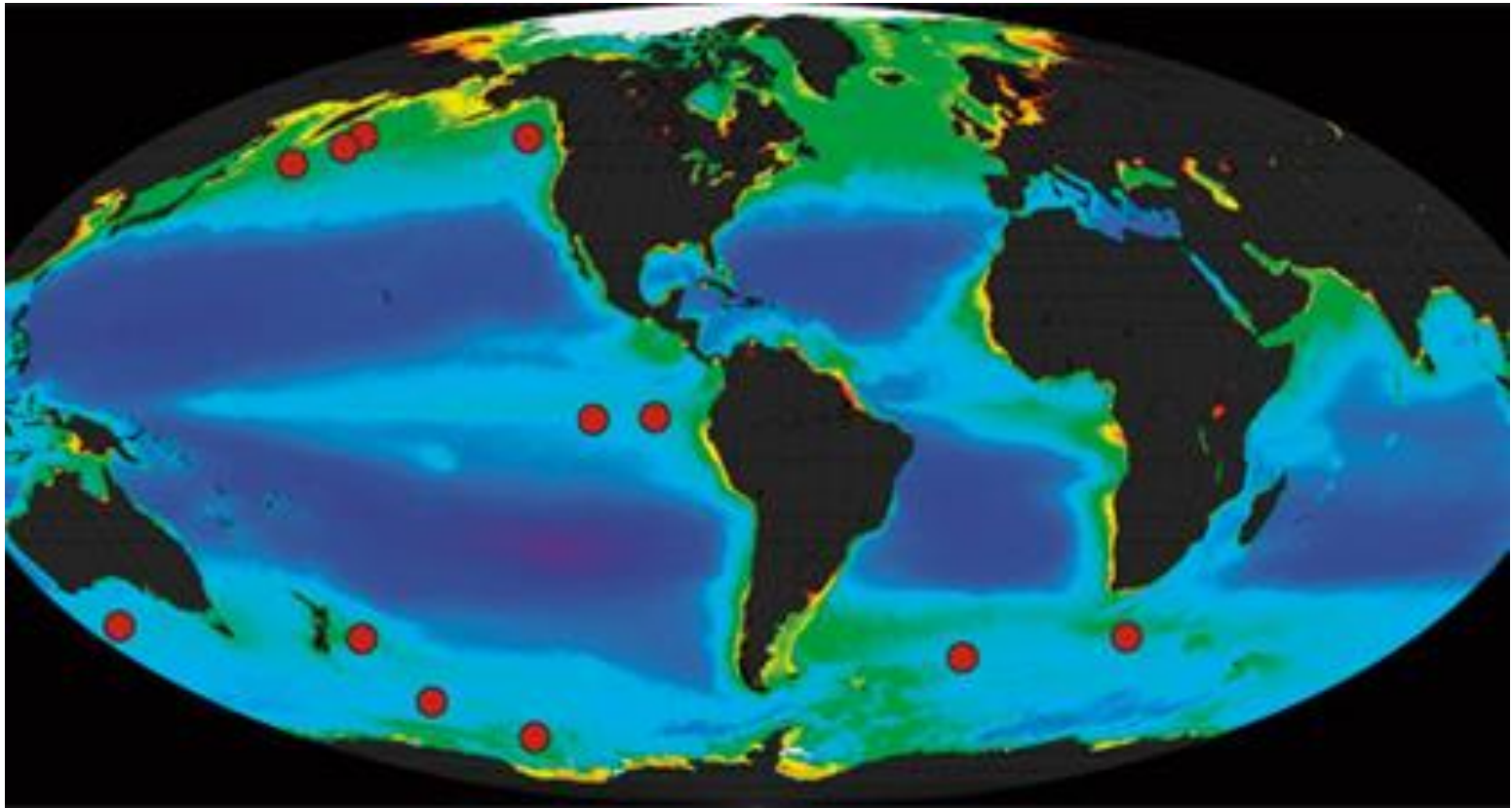
❖ Legitimate activity or dumping?

❖ Impact on marine life?



Iron Fertilization Sites

Woods Hole Oceanographic Institution



London Dumping Convention and 1996 Protocol

1972 London Convention

Dumping defined as

- Deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea

Dumping does not include:

- **Placement of matter for a purpose other than the mere disposal thereof, provided that such placement is not contrary to the aims of the Convention**
- “Wastes or other matter” means material and substance of any kind, form or description.

1996 Protocol

- ❖ CO₂ sequestration (disposal) allowed in geological formations and is not ‘dumping’ (2006 amendment in force)
- ❖ 2009 amendment to allow **export** of CO₂ subject to agreement by the countries adopted (not yet in force) (Art. 6 prohibition on transboundary export of waste)
- ❖ 2007 CO₂ Guidelines
- ❖ 2012 revised Guidelines
- ❖ 2013 new Guidelines on export

London Dumping Convention and 1996 Protocol

- ❖ 2007 "Statement of Concern regarding iron fertilization of the oceans to sequester CO₂"
- ❖ Ocean iron fertilization added to Annex 4 but only for research and with permit issued based upon *Ocean Fertilization Assessment Framework*.
- ❖ 2010 Parties adopted an *Assessment Framework for Scientific Research Involving Ocean Fertilization* -
 - ❖ Its purpose is to assess whether proposals for ocean fertilization constitute legitimate scientific research and it was developed by the Scientific Groups under the London Convention and Protocol
 - ❖ 2010 Statement of concern by the COP over introducing 100 metric tonnes of iron sulphate off the coast of Canada (10,000 km² plankton bloom?)
 - ❖ *Note:* 1992 CBD COP Dec. X/16 noting the 2007 Statement of Concern of the London Convention and Protocol and urged Parties and other Governments to act in accordance with the decision of the London Convention.

Part III
Climate change and
shipping

Shipping and Climate Change

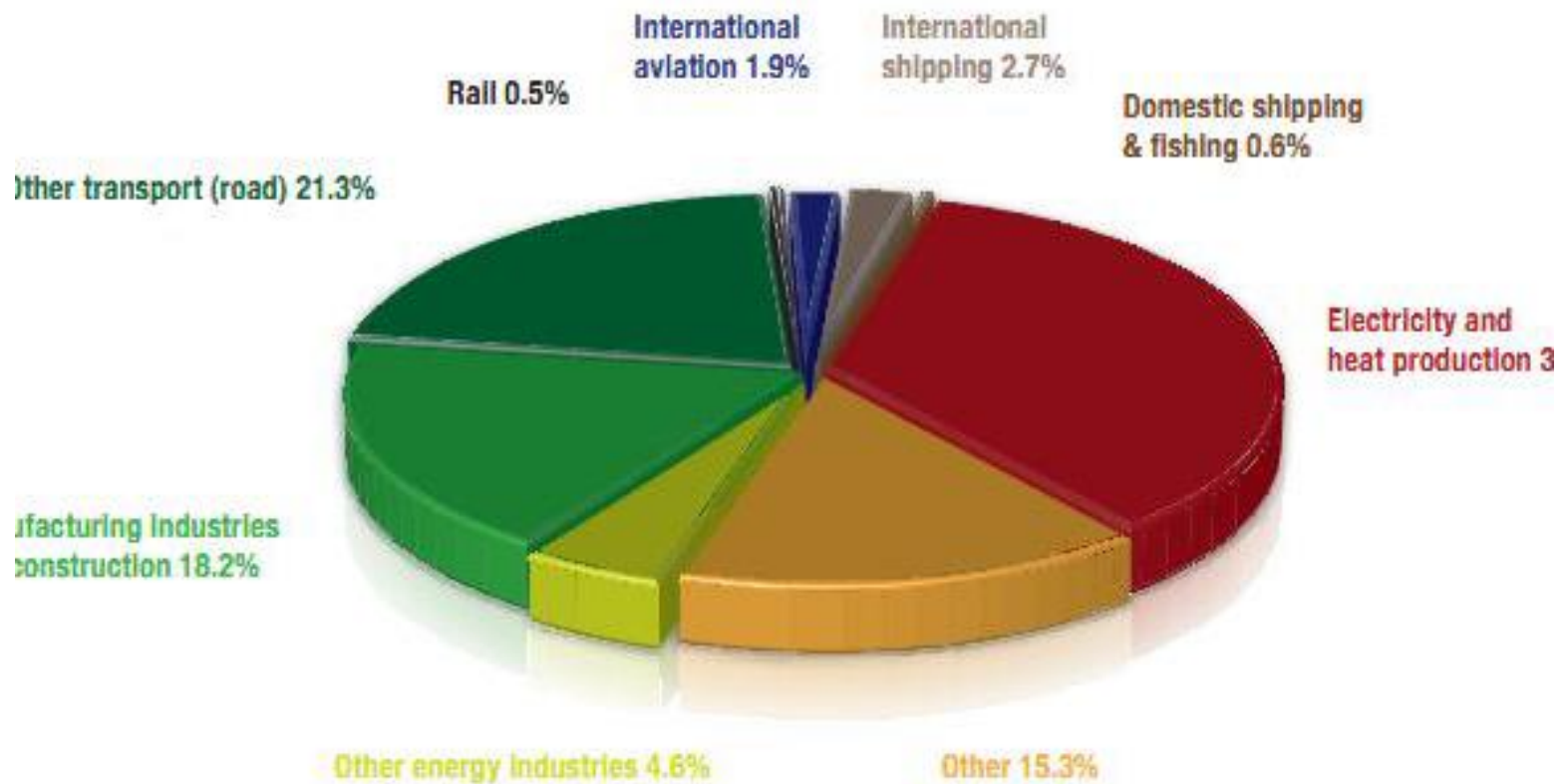
- ❖ Article 2.2 of the KP delegated responsibility to reducing GHG emissions from bunker fuels to the IMO and ICAO by requiring the **Annex I Parties** to:
 - ❖ “pursue limitation or reduction of” emissions of greenhouse gases not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organization and the International Maritime Organization, respectively.
- ❖ Bunker fuels were not made part of the Kyoto target.

Shipping and Climate Change

- ❖ Emissions from the global shipping industry amount to around 1 billion tonnes a year, accounting for 3% of the world's total greenhouse gas (GHG) emissions (EU)
- ❖ BAU = emissions doubling by 2050



IMO 2009 Study



Shipping and Climate Change

- ❖ 15 July 2011, IMO's Maritime Environment Protection Committee (MEPC) voted to introduce Energy Efficiency Design Index (EEDI) the first mandatory global system to regulate ship emissions. (Annex VI of MARPOL 73/78)
- ❖ Establishes technical standards for improving the energy efficiency of new ships.
- ❖ According to IMO
 - ❖ Anticipate to an approximate of 25-30% reduction by 2030 compared to the business-as-usual (BAU) scenario.
 - ❖ Expects to cover 70% of emissions from new ships. Cleaner, more efficient vessels are expected to cut shipping's carbon dioxide emissions by 22 million tonnes a year by 2020, while also saving the operators £3 billion a year in fuel costs
- ❖ Mandatory from 2015

Part III
Climate change
maritime boundaries

Climate Change and Maritime Boundaries

- ❖ Changing maritime boundaries as a result of sea-level rise
 - ❖ Boundary uncertainty
 - ❖ Disappearing base points and ambulatory baselines
 - ❖ Disappearing islands and EEZs

Climate Change and Maritime Boundaries

Certainty or uncertainty under UNCLOS?

- ❖ Coastal State (*Mauritius v. UK* case and question of who is the coastal state = sovereignty issue)
- ❖ Article 5 - normal baseline (use of insignificant low-water geographic features)
- ❖ Article 6 - reefs (reliance on seaward low-water line)
- ❖ Article 7(2) - deltaic baselines (foresees regression and provides for stability until changed by the CS)
- ❖ Article 13 - low-tide elevation (use as a baseline)
- ❖ Article 57 - EEZ
- ❖ Article 76(9) - Continental Shelf (provides for permanence)
- ❖ Article 121 (3) - Island or uninhabitable rock?

Article 13

❖ *Low-tide elevations*

- ❖ 1. A low-tide elevation is a naturally formed area of land which is surrounded by and **above water at low tide** but submerged at high tide. Where a low-tide elevation is situated wholly or partly at a distance not exceeding the breadth of the territorial sea from the mainland or an island, the low-water line on that elevation may be used as the baseline for measuring the breadth of the territorial sea.
- ❖ 2. Where a low-tide elevation is wholly situated at a distance exceeding the breadth of the territorial sea from the mainland or an island, it has no territorial sea of its own.

Article 5

❖ *Normal baselines*

- ❖ Except where otherwise provided in this Convention, the normal baseline for measuring the breadth of the territorial sea is the **low-water line** along the coast as marked on large-scale charts officially recognized by the coastal State

Article 6

❖ *Reefs*

- ❖ In the case of islands situated on atolls or of islands having fringing reefs, the baseline for measuring the breadth of the territorial sea is the **seaward low-water line of the reef**, as shown by the appropriate symbol on charts officially recognized by the coastal State.

Article 7(2)

❖ *Straight Baselines*

- ❖ (2) Where because of the presence of a delta and other **natural conditions** the **coastline is highly unstable**, the appropriate points may be selected along the furthest seaward extent of the low-water line and, notwithstanding **subsequent regression of the low-water** line, the straight baselines shall remain effective until changed by the coastal State in accordance with this Convention.

Article 76

- ❖ (1) The continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, **or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured** where the outer edge of the continental margin does not extend up to that distance.
- ❖ (9) The coastal State shall deposit with the Secretary-General of the United Nations charts and relevant information, including geodetic data, **permanently** describing the outer limits of its continental shelf. The Secretary-General shall give due publicity thereto.

Article 121

❖ *Regime of islands*

- ❖ 1. An island is a naturally formed area of land, surrounded by water, which is **above water at high tide**.
- ❖ 2. Except as provided for in paragraph 3, the territorial sea, the contiguous zone, the exclusive economic zone and the continental shelf of an island are determined in accordance with the provisions of this Convention applicable to other land territory.
- ❖ 3. **Rocks which cannot sustain human habitation or economic life** of their own shall have no exclusive economic zone or continental shelf.

Article 57

- ❖ *Breadth of the exclusive economic zone*
- ❖ The exclusive economic zone shall not extend beyond 200 nautical miles **from the baselines** from which the breadth of the territorial sea is measured.

Maritime Zones under UNCLOS



Source: Patonaharal and Raviera (2013)

Climate Change and Maritime Boundaries

Baselines threatened by sea-level rise

1. Low-tide elevations (“drying rocks”)
2. Fringing reefs
3. Islands (Island states)
 - From island to uninhabitable rock?

Result: Permanent submersion = significant reduction of maritime zone

Maldives

Chain of 1190 coral islands in 26 atoll groups



Solutions?

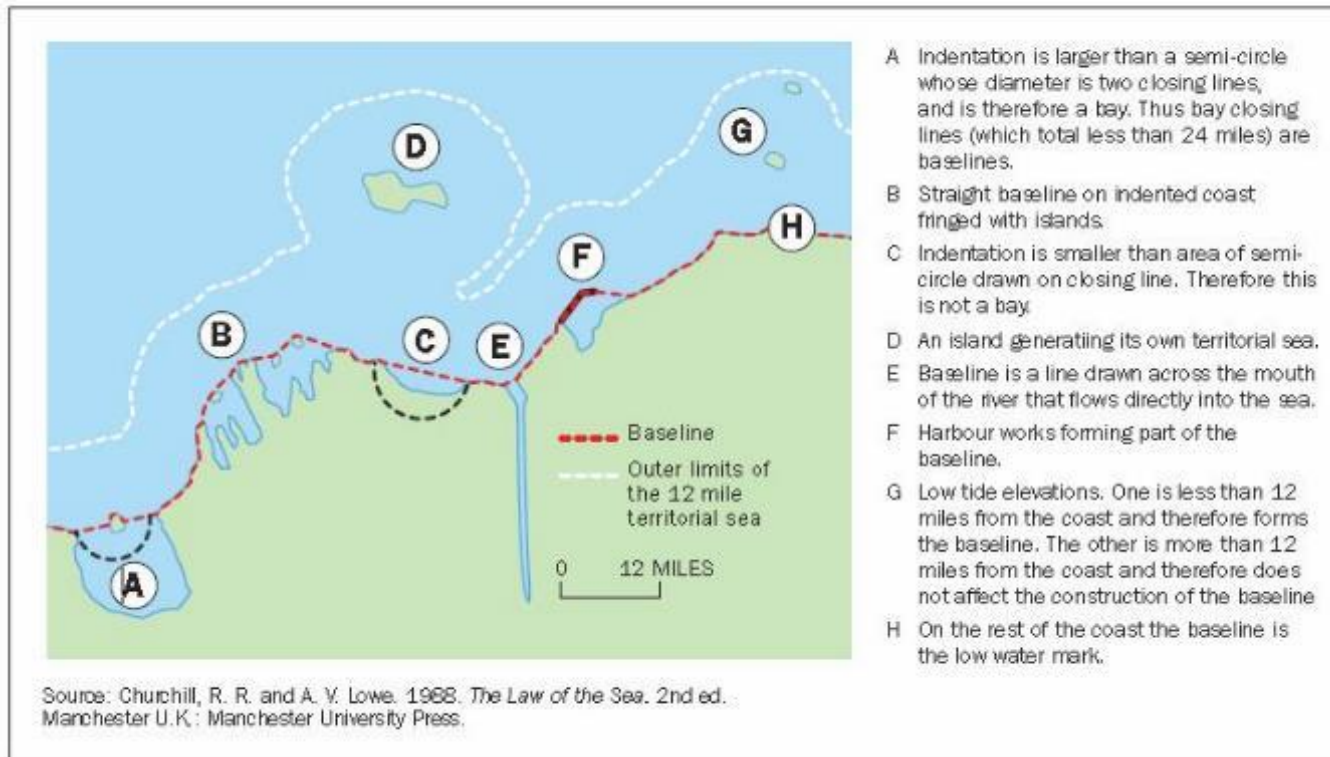
Baseline fortification?

[Okinotorishima]



Baselines under UNCLOS

Figure 1 The construction of baselines



Disappearing EEZs

Does the coastal State lose sovereignty rights in the EEZ ?

- ❖ Rights to explore and exploit living and non-living natural resources and other for the economic exploitation such as the production of energy from the water, currents and winds
- ❖ High economic value
- ❖ Rights and obligations to protect the marine environment?

- ❖ **Does the EEZ revert to becoming high seas?**
- ❖ **Would UNCLOS be applicable to resolve this issue?**

ILA Committee on Sea-Level Rise

- ❖ 2008 - *Committee on Baselines* to study legal implications of sea-level rise
- ❖ 2012 - Committee on Baseline adopted its Final Report conclusion
 - ❖ If current predictions on sea level rise happen:
 - ❖ Some States will be completely submerged resulting in
 - ❖ Total loss of baselines and maritime zones generated
- ❖ Deterritorialization principle implications beyond LOS
 - ❖ Statehood and sovereignty
 - ❖ [*In the Matter of the Chagos Marine Protected Area Arbitration (Mauritius v. UK)* question of “coastal State” excluded from UNCLOS jurisdiction as a question of sovereignty.]
- ❖ Proposed establishment of a new Committee to address the broader range of concerns
- ❖ 2012 ILA established *Committee on International Law and Sea Level Rise*

Part V
Climate change and
the Arctic

The Arctic

- ❖ Summer-time ice-free navigation in the Arctic by 2030? 2040?
- ❖ **Regime of passage? International navigation?**
 - ❖ Internal waters?
 - ❖ International and transit passage when volume of shipping increases?
- ❖ *Northwest Passage* can save 25% from Panama Canal (Seattle-Rotterdam)/ 5,000 nm between Asia and North America
 - ❖ temporarily opened in September 2007 for the first time in recorded history and 2008 for two weeks
- ❖ *Northern Sea Route*: saves about 40% nm from Suez Canal (Rotterdam-Yokohama)
 - ❖ 2011 first Suezmax super tanker 162,000 dwt *Vladimir Tikhonov* passage
 - ❖ Russia anticipates 85 million tons of cargoes transit by 2030
 - ❖ Shanghai to Hamburg = less 6400 nm from Malacca Strait/Suez Canal

The Arctic

❖ Shipping and protection of the environment

- ❖ IMO adopted environmental part of Polar Code (15 May 2015) and made it mandatory through amendments to MARPOL
 - ❖ Prohibition of the discharge into the sea of sewage (unless performed in line with MARPOL Annex IV and requirements in the Polar Code), noxious liquid substances or mixtures containing such substances, and oil or oily mixtures; requires fuel tanks be separated from the outer shell; and restrict garbage discharge except when permitted in accordance with MARPOL Annex V and requirements in the Polar Code.
- ❖ Also adopted CDM standard for ships operating in polar regions
- ❖ Expected to become operational on 1.1. 2017

The Arctic

- ❖ Article 234 of UNCLOS on ice-covered areas
- ❖ Gives coastal States right to adopt and enforce laws to prevent, reduce control vessel-source pollution and in areas within the limits of the EEZ that are ice-covered for *most of the year*
- ❖ What is *most of the year*? How will this be impacted if Arctic Ocean and straits are ice-free in summer by 2030 or 2040?
- ❖ Canada's Arctic Waters Pollution Prevention Act ?

Arctic

- ❖ Access for offshore oil and gas activities
- ❖ 2001 USGS Report
 - ❖ estimated 90 billion barrels of oil
 - ❖ 13% of global undiscovered recoverable oil
- ❖ Impact on Arctic marine environment and biological diversity?

Thank you

