

**New International Regulation of Marine Scientific Research,
Ocean Fertilization and Marine Geoengineering:
Implications for Marine Scientists**

Oceanography Seminar

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TAKE-HOME MESSAGE

Marine scientists are crucially needed to contribute at the highest level to the negotiations of treaties by the international bodies that govern the uses of the ocean in general, and marine scientific research in particular.

Why Should You Care?

- **As Scientists: continue research under reasonable conditions**
(conditions unlikely to be reasonable otherwise)
- **As Occupants of this planet: continue to increase understanding of it**
(may mitigate negative effects of Anthropocene)

Key Treaty: 1982 UN Convention on the Law of the Sea

- >150 countries negotiated for ~10 years (1973-1982); in force from 1994**
- 167* parties, including land-locked countries**
- UN: 193* members**
- LOS Convention: >75% of UN members**
- Most comprehensive & powerful instrument governing the ocean (~70% of planet) developed by the international community**
- No comparable land equivalent**
- US not LOS Convention party or signatory; but LOSC now generally applicable to US**

- Most complex, most comprehensive and longest - in negotiation time (10 years) and size (320 Articles, 9 Annexes) - global treaty.
- **Most powerful**
- 2 implementing agreements (i.a.): fisheries and deep-sea mining
- 3rd i.a. under discussion – on areas beyond national jurisdiction: marine protected areas, marine genetic resources – **major marine scientific research issue**

LOSC Definition: Pollution of Marine Environment

- ***“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).)***

- **LOSC chapter (XII) on marine environment (ME) and chapter XIII on marine scientific research (MSR)**
- **ME and MSR provisions found throughout rest of LOSC**
- **ME provisions usually mandatory and unqualified and without exceptions**
- **LOSC Article 192: “States have the obligation to protect & preserve the marine environment.”**

- **International community involved in MSR when it (potentially) affects ME because:**
- **ALL countries must protect and preserve the marine environment.**
 - **MSR must comply with international marine environmental rules**
 - **MSR now also regulated by a second marine environmental treaty**
 - **Implications for marine scientists: research project choice, design, funding**

- **Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972" (London Convention/LC)**
- **One of the first global marine environmental conventions (other early ones in shipping); in force since 1975**
- **87* States are LC Parties, including the US**
- **Updated in 1996 by "London Protocol", will replace LC; in force since 2006**
- **45* States are Parties so far; US is signatory**
- **LC/LP operate in parallel, joint meetings**

*as of 25 April 2015

Ocean fertilization

- **Use of micro-nutrients, such as iron, or macro-nutrients, such as nitrogen, or other methods to stimulate phytoplankton growth or otherwise increase marine primary productivity**

- Ocean fertilization on LC/LP agenda in summer 2007 at annual meeting of Scientific Groups *Strong integration of science-based decision-making: only treaty with dedicated Scientific Groups; current ⁽²⁰¹⁵⁾ chair: Dr.Gi-Hoon Hong*
- First discussed at the annual meeting of parties in November 2007.
- Scientific and Legal Groups meet between annual COPs, developed options for parties to consider

Example of SG Advice

“.....urge States to use the utmost caution when considering proposals for large-scale ocean fertilization operations.given the present state of knowledge regarding ocean fertilization, such large-scale operations are currently not justified.....” (LC 29/17, paragraph 4.23)

- Parties agreed that ocean fertilization is prohibited under LP and highly dubious under LC.
- Parties asked whether even basic field research that involves addition of any substances to the ocean should be subject at least to regulation, and perhaps even prohibited
- Problem: (some) MSR must continue
- Issues: What is MSR? Which MSR to allow?
- Approach: focus on one activity at a time:

Ocean Fertilization

- To keep all research that involves adding anything to the ocean from falling within an overall prohibition, the parties carved out an exception for **“legitimate scientific research”**.
- This defines MSR for the first time in international law
- Will affect marine research project choice, design, funding

- **In October 2010 parties adopted the Assessment Framework for Scientific Research Involving Ocean Fertilization (AF).**
- **AF defines Ocean Fertilization: “any activity undertaken by humans with the principal intention of stimulating primary productivity in the ocean does not include conventional aquaculture or mariculture or the creation of artificial reefs.”**
- **AF defines “legitimate scientific research”: as an activity that must have “proper scientific attributes.” A proposed activity has the requisite “proper scientific attributes” if it meets the following criteria:**

- **The proposed activity should be designed to answer questions that will add to the body of scientific knowledge.**
- **Proposals should state their rationale, research goals, scientific hypotheses and methods, scale, timings and locations with clear justification for why the expected outcomes cannot reasonably be achieved by other methods;**
- **the proposed activity has the financial resources available before the work commences to fulfil the program of work.**

- **The proposed activity should be subject to scientific peer review at appropriate stages in the assessment process.**
- **The outcome of the scientific peer review should be taken into consideration by the Contracting Parties.**
- **The peer review methodology should be stated and the outcomes of the peer review of successful proposals should be made publicly available together with the details of the project.....;**

- **Economic interests do not influence the design, conduct and/or outcomes of the proposed activity. No financial and/or economic gain may arise directly from the experiment or its outcomes. This does not preclude payment for services rendered in support of the experiment or future financial impacts of patented technology.**
- **The proponents of the proposed activity should commit to publish the results in peer-reviewed scientific publications and include a plan in the proposal to make the data and outcomes publicly available in a specified time frame.**

Bottom Line

- **Cannot pursue research if these criteria are not met.**
- **No *de minimis* exception**
- **If research is “legitimate,” must also show it will not violate LC/LP on environmental grounds.**
- **AF provides detailed criteria to show this (LC 32/15).**
- **Precautionary approach: proponent to show no harm**
- **Challenges to proposed research projects on environmental grounds are likely to increase, especially as the scale of the proposed research to be conducted in the ocean grows and the nature of the research becomes more manipulative or intrusive.**

Marine Geo-engineering

- **Marine geoengineering" means 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.“**
- **Proposals for such activities must be assessed according to an assessment framework (new annex 5 to LP)**

WHY Address Marine Geo-engineering NOW ?

- Length (2007-2013) & **complexity** of OF process
- System in place to handle future issues (e.g., liming, artificial upwelling/downwelling; CO₂ sequestration; albedo enhancement.....)

[http://www.cefas.defra.gov.uk/publications/files/20120213-Brief-Summary-Marine-](http://www.cefas.defra.gov.uk/publications/files/20120213-Brief-Summary-Marine-Geoeng-Techs.pdf)

[Geoeng-Techs.pdf](http://www.cefas.defra.gov.uk/publications/files/20120213-Brief-Summary-Marine-Geoeng-Techs.pdf) by Dr. Chris Vivian, Former Chair, LC/LP SGs; Chair: LP Marine Geoengineering Amendment Working Group

Marine Scientific Research related to Marine Geoengineering

Potential marine geoengineering techniques may require specific MSR in order to, e.g.:

- better understand the natural processes which will be affected;**
- understand their potential impacts on the marine environment;**
- understand their potential efficacy for geoengineering purposes; and**
- be able to effectively apply the assessment framework(s) to proposals for marine geoengineering**

Summary

- The international community is legally able to regulate (and even prohibit) MSR
- LOS Convention/LC/LP put MSR under same MEP requirement as any other activity in the ocean (including high seas freedoms).
- MSR not defined in the LOS Convention
- MSR now defined in LP; example for others
- Most research projects to gain information about the ocean are likely to fall in definition
- Experiments in the ocean, especially if they involve “introducing matter or energy” (LOS Convention) or “wastes or other matter” (LC/LP), BEWARE.

How Can You Help?

- Marine scientists crucial in drafting, implementing and updating marine environmental treaties
- Join delegation from non-governmental organizations (NGOs) with consultative status for the treaty of interest
- Environmental, industrial, sectoral, technical NGOs –sound science needed in the negotiations
- Sectors: Shipping, Mining, Dumping, Marine Genetic Resources, Fisheries
- Areas: Arctic, Antarctic, Equatorial Pacific ...
- Students: career opportunities here

CONCLUSIONS

- **When marine environment is thought to be at risk, the international community will get involved. This will affect your research projects, and not usually to their benefit.**

Ocean scientists are essential to help international community craft effective marine environmental protection mechanisms that do not impede marine scientific research.

- **Consider potential marine environmental effects of a marine research project from initial design to beyond its end and be prepared to monitor those effects.**

Further Reading

- **New Regulation of Marine Geo-Engineering and Ocean Fertilization. 28(4) *International Journal of Marine and Coastal Law* 729-736 (2013).**
- **The London Convention and London Protocol – Marine Scientific Research and Ocean Fertilization. *International Journal of Marine and Coastal Law* 26(1):185-194 (2011).**
- **Geo-engineering, the Law of the Sea, and Climate Change. *Carbon and Climate Law Review* 2009 (4):446-458 (2009).**
- **Experimental activities that intentionally perturb the marine environment: implications for the marine environmental protection and marine scientific research provisions of the 1982 UN Convention on the Law of the Sea. *Marine Policy* 31(2):210-216 (2007).**