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AN ALTERNATIVE APPROACH FOR ADDRESSING CO₂-DRIVEN OCEAN ACIDIFICATION

by Verónica González*

The oceans have absorbed over twenty-five percent of the anthropogenic carbon dioxide (“CO₂”) released to the atmosphere since pre-industrial times.¹ As a result, naturally alkaline oceans are becoming more acidic.² The projected increase in CO₂ emissions absorbed by the oceans will cause changes in water chemistry that may affect “biodiversity, trophic interactions, and other ecosystem processes.”³ Elevated CO₂ will lower the availability of carbonate ions, which calcifying organisms need to create their shells and skeletons.⁴ In the case of corals, it is likely to induce bleaching.⁵ High CO₂ concentrations will reduce larval fish survival,⁶ as it impairs their ability to detect predators and find adequate habitat.⁷ It is clear that “[a]cidification impacts processes so fundamental [that it] could have far-reaching consequences for the oceans of the future and the millions of people that depend on its food and other resources for their livelihoods.”⁸

To date, no international instrument addresses ocean acidification as a stand-alone concern. Two important and widely accepted instruments, however, do offer avenues to deal with the issue: the U.N. Framework Convention on Climate Change⁹ (“UNFCCC”) and the U.N. Convention on the Law of the Seas (“UNCLOS” or “Convention”).¹⁰ Both instruments have distinct advantages and disadvantages when it comes to addressing ocean acidification. While the UNFCCC is the preeminent instrument to deal with emissions of CO₂, UNCLOS presents a viable alternative outside the frequently challenging UNFCCC context.¹¹


UNCLOS is a comprehensive framework for the use of the seas that covers a wide array of subjects ranging from maritime boundaries¹² to protection of the marine environment.¹³ Parties to UNCLOS have a general obligation “to protect and preserve the marine environment.”¹⁴ They also have a responsibility to take “all measures . . . necessary to prevent, reduce and control pollution^[15] of the marine environment from any source.”¹⁶ This obligation includes taking necessary measures to avoid pollution from or through the atmosphere¹⁷ as well as from land-based sources.¹⁸

Since ocean acidification is an important threat to the marine environment, Parties to UNCLOS are already obligated to take action to control and reduce its impacts. Given its principle mandate to protect the marine environment, the framework established to address pollution could logically be interpreted as to include CO₂ as a pollutant and its most important sources, including land-based sources, as regulated by the Convention.¹⁹ Another advantage is its wide acceptance and broad subject matter.²⁰ UNCLOS was adopted as a package deal, precisely to encourage that the greatest number of States ratified the convention based on the perceived advantage of having a majority of States bound to all provisions.²¹ Furthermore UNCLOS has binding dispute resolution mechanisms that can be used to

resolve environmental disputes.²² These mechanisms have been favorably compared with that of the World Trade Organization because of its jurisdiction, authority, and implementing powers.²³

On the other hand, UNCLOS lacks provisions on how States should fulfill their obligation to protect and preserve the marine environment.²⁴ The Convention provides a legal basis for marine space protection under Article 207, which emphasizes Parties’ obligations to take into account the marine environment protection measures agreed upon under different instruments.²⁵ UNCLOS can therefore be perceived as an “umbrella agreement that brings other international rules, regulations and implementing bodies under its canopy.”²⁶ Consequently, diplomatic conferences and international organizations can supplement this “framework for marine pollution control through specific regulatory instruments.”²⁷ However, there are no international instruments to supplement UNCLOS on this issue. The general obligation to take measures to reduce and control pollution from land-based and atmospheric sources²⁸ is debilitated by the fact that the provision refers State Parties to instruments outside the Convention that fail to adequately address the a serious threat to the marine environment. Even in the case that an appropriate instrument addressing ocean acidification was to arise, UNCLOS only requires that internationally agreed regulations and practices be taken into consideration.²⁹

Some authors have proposed using the dispute resolution mechanisms provided in UNCLOS to address climate change, particularly in the context of its impacts to fisheries.³⁰ Since States do not have concrete obligations to fulfill and enforce rules to control or reduce ocean acidification or to regulate CO₂ as a pollutant to the marine environment, using UNCLOS dispute resolution mechanism would prove difficult.

Rallying the numerous UNCLOS Parties around an international agreement to address ocean acidification will be challenging. Nevertheless, there is definite potential to address acidification through the principal instrument of ocean governance. States might be more inclined to agree to international standards to address ocean acidification in a context where they have much to lose if they denounce the agreement. Furthermore, unlike other impacts of CO₂ that have been unjustifiably labeled as uncertain, ocean acidification is indisputable. There is no doubt that Parties to UNCLOS already have committed to protecting the marine environment from pollution, and by extension address ocean acidification, even if their commitment might not be enforceable at this point. While far from ideal, UNCLOS is a viable option to address ocean acidification. 

Endnotes on page 69

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- ¹ See Scott C. Doney et al., *Ocean Acidification: The Other CO₂ Problem*, 17 ANN. REV. MARINE SCI. 170, 172 (2009).
- ² See U.N. Ent'l. Programme [UNEP], *Emerging Issues: Environmental Consequences of Ocean Acidification: A Threat to Food Security*, 2 (2010), http://www.unep.org/dewa/pdf/Environmental_Consequences_of_Ocean_Acidification.pdf (last visited Mar. 26, 2012).
- ³ Victoria J. Fabry, *Impacts of Ocean Acidification on Marine Fauna and Ecosystem Processes*, 65 ICES J. MARINE SCI. 414 (2008).
- ⁴ *Id.* at 415.
- ⁵ See generally K. R. N. Anthony et al., *Ocean Acidification Causes Bleaching and Productivity Loss in Coral Reef Builders*, 105 PNAS 17442–17446 (2008), <http://www.pnas.org/content/105/45/17442.full.pdf+html> (detailing the impacts of ocean acidification in coral reefs); Coral bleaching refers to “the loss of color from reef-building corals because of a breakdown of the symbiosis with the dinoflagellate *Symbiodinium*.” Simon D. Donner et al., *Model-based Assessment of the Role of Human-induced Climate Change in the 2005 Caribbean Coral Bleaching Event*, 104 PNAS 5483 (2007), <http://www.pnas.org/content/104/13/5483.full.pdf+html>.
- ⁶ See Philip L. Munday et al., *Replenishment of Fish Populations is Threatened by Ocean Acidification*, 107 PNAS 12930 (2010), <http://www.pnas.org/content/early/2010/06/24/1004519107.abstract>.
- ⁷ See *id.* See also Philip L. Munday, *Ocean Acidification Impairs Olfactory Discrimination and Homing Ability of a Marine Fish*, 106 PNAS 6, 1848–1852 (2009) (detailing low pH impact on clownfish ability to find suitable habitat).
- ⁸ Doney, *supra* note 1, at 185; See also UNEP, *supra* note 2, at 6.
- ⁹ United Nations Framework Convention on Climate Change, May 5, 1992, 1771 U.N.T.S. 107, U.N. Doc. A/AC.237/18, <http://unfccc.int/resource/docs/convkp/conveng.pdf> [hereinafter UNFCCC].
- ¹⁰ U.N. Convention on the Law of the Seas, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].
- ¹¹ See e.g. John M. Broder, *At Meeting on Climate Change, Urgent Issues but Low Expectations*, THE NEW YORK TIMES (Nov. 27, 2011), <http://www.nytimes.com/2011/11/28/science/earth/nations-meet-to-address-problems-of-climate-change.html> (Last visited Mar. 26, 2012).
- ¹² UNCLOS, *supra* note 10, arts. 2-16.
- ¹³ See *id.*, arts. 192-237; see, e.g., Heidi R. Lamirande, *From Sea to Carbon Cesspool: Preventing the World's Marine Ecosystems from Falling Victim to Ocean Acidification*, 34 SUFFOLK TRANSNAT'L L. REV. 183, 192 (2011) (discussing protection of the marine environment under UNCLOS); Rachel Baird, et al., *Ocean Acidification: A Litmus Test for International Law*, CARBON & CLIMATE L. REV., 459, 464-65 (2009) (discussing international instruments that relate to ocean acidification, including UNCLOS).
- ¹⁴ UNCLOS, *supra* note 10, art. 192; Although UNCLOS does not define the term ‘marine environment’, it is generally understood to mean “the ocean space taken as a whole (i.e., the surface of the sea, the water column, the subsoil, the seabed and the atmosphere above them) and everything comprised in that space,

- both physical and chemical components, including marine life.” VERONICA FRANK, THE EUROPEAN COMMUNITY AND MARINE ENVIRONMENTAL PROTECTION IN THE INTERNATIONAL LAW OF THE SEA: IMPLEMENTING GLOBAL OBLIGATIONS AT THE REGIONAL LEVEL 10 (2008).
- ¹⁵ For the purposes of UNCLOS, pollution of the marine environment refers to 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. See UNCLOS, *supra* note 10, art. 1(4).
- ¹⁶ UNCLOS, *id.*, art. 194(1).
- ¹⁷ See *id.*, art. 212(1).
- ¹⁸ See *id.*, art. 207(1).
- ¹⁹ See William C.G. Burns, *Potential Causes Of Action For Climate Change Impacts Under The United Nations Fish Stocks Agreement*, 7 SUST. DEV. L. & POL'Y No. 3, 36 (WINTER 2007) (arguing that CO₂ is pollutant under the meaning of UNCLOS).
- ²⁰ UNCLOS has been ratified or acceded to by 162 countries. It should be noted that of the largest emitters of CO₂, to date only the United States of America has not ratified UNCLOS. See United Nations Division for Ocean Affairs and the Law of the Sea, *Status of the United Nations Convention on the Law of the Sea, of the Agreement relating to the implementation of Part XI of the Convention and of the Agreement for the implementation of the provisions of the Convention relating to the conservation and management of straddling fish stocks and highly migratory fish stocks*, (as of September 2011), http://www.un.org/depts/los/reference_files/status2010.pdf (Last visited Mar. 26, 2012).
- ²¹ See generally Barry Buzan, *Negotiating by Consensus: Developments in Technique at the United Nations Conference on the Law of The Sea*, 75 A.J.I.L. 324 (1981).
- ²² See UNCLOS, *supra* note 10, arts. 279-299.
- ²³ See Jonathan L. Hafetz, *Fostering Protection of the Marine Environmental and Economic Development: Article 131(3) of the Third Law of the Sea Convention*, 15 AM. U. INT'L L. REV. 583, 596 (2000).
- ²⁴ See Frank, *supra* note 14, at 10.
- ²⁵ UNCLOS, *supra* note 10, art. 207 (“internationally agreed rules, standards and recommended practices and procedures”).
- ²⁶ Lakshman Guruswamy, *The Promise of the United Nations Convention on the Law of the Seas (UNCLOS): Justice in Trade and Environment Disputes*, 25 ECOLOGY L.Q. 189, 208 (1998).
- ²⁷ ROBIN WARNER, PROTECTING THE OCEANS BEYOND NATIONAL JURISDICTION: STRENGTHENING THE INTERNATIONAL LAW FRAMEWORK 49 (2009).
- ²⁸ See UNCLOS, *supra* note 10, art. 212.
- ²⁹ See Frank, *supra* note 14, at 10.
- ³⁰ See Burns, *supra* note 19.

Endnotes: CAN GOVERNMENTS ENSURE ADHERENCE TO THE POLLUTER PAYS PRINCIPLE IN THE LONG-TERM CCS LIABILITY CONTEXT?

- ⁴⁰ See 10 C.F.R. § 40.28.
- ⁴¹ Environmental Protection: Storage of CO₂ (Termination of Licenses), 2011, S.I. 2221/8, § 7(2) (U.K.); Environmental Protection: Storage of CO₂ (Termination of Licenses), 2011, S.I. 2221/8 Schedule I, 4(1) (U.K.).
- ⁴² *Id.* § 15(3)(b).
- ⁴³ *Id.* § 14–15.
- ⁴⁴ See, e.g., Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of CO₂ and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006, art. 20, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0114:01:EN:HTML>; B.O.E. 2010, 317, Art. 23(5); C. Env. Art. L 519-1 (Fr.).
- ⁴⁵ Environmental Protection: Storage of CO₂ (Termination of Licenses), 2011, S.I. 2221/8, § 10(1) (U.K.); Environmental Protection: Storage of CO₂ (Termination of Licenses), 2011, S.I. 2221/8 Schedule I, 4(1) (U.K.).

- ⁴⁶ Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of CO₂ and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006, art. 20, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0114:01:EN:HTML>.
- ⁴⁷ *Id.*
- ⁴⁸ B.O.E. 2010, 317, art. 23(5); C. Env. Art.L 519-1 (Fr.).
- ⁴⁹ *Id.*
- ⁵⁰ B.O.E. 2010, 317, art. 23(5).
- ⁵¹ B.O.E. 2010, 317, art. 24(6).
- ⁵² C. Env. Art.L 519-1 (Fr.).
- ⁵³ C. Env. Art.L. 229-47-II (Fr.).
- ⁵⁴ 10 C.F.R. § 40.28.
- ⁵⁵ See Uranium Mill Tailings Radiation Control Act of 1978, 42 U.S.C. § 7901 (West 2012).