Unravelling the Maze of Multilateral Environmental Agreements: A Macroscopic Analysis of International Environmental Law and Governance for the Anthropocene

by

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of the Australian National University

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Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university. To the best of the author’s knowledge, it contains no material previously published or written by another person, except where due reference is made in the text.

With the exception of Chapter 1 (Introduction) and Chapter 6 (Conclusions), this thesis consists of a series of manuscripts that are published in peer-reviewed journals. Each manuscript is presented here as it appears in the relevant journal with the exception of minor changes in style and formatting. Because the key chapters of this thesis are manuscripts developed for independent publication, some repetition between chapters was unavoidable.

- A variant version of Chapter 5, co-authored with Klaus Bosselmann, is published in *Transnational Environmental Law* (2013) 2:2, 285–309. (The author’s contribution to the material in Chapter 5 is 95 percent.)

The author’s name appears as **Rakhyun E. Kim** in the publications.

Rak Kim  
28 September 2013
Abstract

Earth has entered a new geological epoch, the Anthropocene, where humans have become a major driver of global environmental change. Many believe, however, that current international environmental law is a maze of international agreements, and it is unsuitable for navigating the Anthropocene. It is generally agreed that, for global sustainability, this institutional maze needs to be modelled in ways more appropriately aligned with the functioning of the Earth system itself.

For the purpose of improving the alignment, this PhD thesis explores the structural and functional dynamics of multilateral environmental agreements (MEAs) as a systemic whole in relation to Earth system dynamics. The thesis begins with a preliminary review of international environmental law through the lens of a specific systems theory called complex adaptive systems. It then provides two parallel empirical studies on the macroscopic structure and function of the MEA system. In terms of the structure, I quantitatively analysed and characterized the topological properties of the dynamic web of 747 MEAs as approximated by 1,001 cross-references found in their texts. This network analysis provided novel insights into how MEAs have self-organized into an interlocking network with complex topology and what the emergent order looks like. In terms of the function, I conducted a qualitative case study on ocean acidification to examine whether the networked system of MEAs is autonomously capable of filling the regulatory gap through mutual adjustments. Inherent weaknesses in the polycentric order were observed, which led to the conclusion that a new MEA on ocean acidification is necessary. Despite the interlocking structure, the MEA system is currently limited by its design to a piecemeal approach to global environmental governance.

The conceptual and empirical studies provided several implications for the design of international environmental law in the Anthropocene. In particular, the thesis makes a case that the absence of an international environmental grundnorm is preventing a more purposive, systemic continuum of laws, one that would ensure policy coherence across Earth’s subsystems. The thesis concludes that international environmental law needs a clearly agreed, unifying goal to which all international regulatory regimes are legally bound to contribute. I suggest that this goal should be about the protection of the integrity of Earth’s life-support systems.
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List of Treaties and Other International Instruments

The following list includes only treaties and other international instruments cited in this thesis. The complete list of 747 multilateral environmental agreements used in Chapter 3 can be found in Appendix B.

Convention on Wetlands of International Importance, especially as Waterfowl Habitat, Ramsar (Iran), 2 February 1971, in force 21 December 1975.
Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, UN Doc. UNEP(OCA)/LBA/ IG.2/7, 5 December 1995.

Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal (Canada), 16 September 1987, in force 1 January 1989.


Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean, Barcelona (Spain), 10 June 1995, in force 12 December 1999.


Universal Declaration of Human Rights, Paris (France), 10 December 1948.


List of Acronyms and Abbreviations

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>CaCO₃</td>
<td>Calcium carbonate</td>
</tr>
<tr>
<td>CAS</td>
<td>Complex adaptive system</td>
</tr>
<tr>
<td>CBD</td>
<td>Convention on Biological Diversity</td>
</tr>
<tr>
<td>CCAMLR</td>
<td>Convention on the Conservation of Antarctic Marine Living Resources</td>
</tr>
<tr>
<td>CMS</td>
<td>Convention on the Conservation of Migratory Species of Wild Animals</td>
</tr>
<tr>
<td>CO₂</td>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>COP</td>
<td>Conference of the Parties</td>
</tr>
<tr>
<td>CS-SSGF</td>
<td>CO₂ Sequestration in Sub-seabed Geological Formations</td>
</tr>
<tr>
<td>Global Programme of Action</td>
<td>Global Programme of Action for the Protection of the Marine Environment from Land-based Activities</td>
</tr>
<tr>
<td>Kyoto Protocol</td>
<td>Kyoto Protocol to the United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>LBSMP</td>
<td>Land-based sources of marine pollution</td>
</tr>
<tr>
<td>London Convention</td>
<td>Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter</td>
</tr>
<tr>
<td>Madrid Protocol</td>
<td>Protocol on Environmental Protection to the Antarctic Treaty</td>
</tr>
<tr>
<td>MEA</td>
<td>Multilateral environmental agreement</td>
</tr>
<tr>
<td>MEPC</td>
<td>Marine Environment Protection Committee</td>
</tr>
<tr>
<td>OSPAR Convention</td>
<td>Convention for the Protection of the Marine Environment of the North-East Atlantic</td>
</tr>
<tr>
<td>PhD</td>
<td>Doctor of Philosophy</td>
</tr>
<tr>
<td>ppm</td>
<td>Parts Per Million</td>
</tr>
<tr>
<td>Ramsar Convention</td>
<td>Convention on Wetlands of International Importance, especially as Waterfowl Habitat</td>
</tr>
<tr>
<td>Rotterdam Convention</td>
<td>Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade</td>
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<tr>
<td>SCAR</td>
<td>Scientific Committee on Antarctic Research</td>
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<tr>
<td>Stockholm Convention</td>
<td>Stockholm Convention on Persistent Organic Pollutants</td>
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<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
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<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
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<td>---------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>UNGA</td>
<td>United Nations General Assembly</td>
</tr>
<tr>
<td>VCLT</td>
<td>Vienna Convention on the Law of Treaties</td>
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