An integrative approach to law and science in the context of the Arctic Ocean commons.

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Introduction

The warming of the ocean due to climate change has numerous environmental impacts: the polar ice is melting, sea levels are rising, ocean currents are shifting, and marine biodiversity is threatened. The rate of change is unprecedented in human history [1]. Anthropogenic greenhouse gases (GHGs) continue to accumulate in the atmosphere, the planet's global surface mean temperature is increasing, and the ocean is absorbing most of this excess heat [2].

These fundamental changes are acutely evident in the Arctic [3]. This area of the world is highly susceptible to the effects of climate change, with the regional surface temperature increasing faster than the global average. The resulting ice melt is changing the geophysical ocean environment, with legal, social, and political consequences locally and internationally, and climactic influence globally due to the change in ocean processes.

The universality, ubiquitousness and normative force of public international law mean that this legal regime offers an appropriate forum for addressing the globally disruptive problem of climate change [4]12. The effectiveness of international law is linked to its dynamic potential with respect to global issues [5], indicating that it is well placed as a versatile tool to combat the multi-faceted problem of the climate crisis. However, as the polar ice melts, the international legal structure is fundamentally unable to engage with scientific consensus around what is happening in the Arctic Ocean.

Aims and objectives

The purpose of this thesis is to demonstrate that law must respond to the present changes in the ocean system and prevent its future collapse. Specifically, this thesis proposes a legal approach that integrates science for the effective protection of the ocean commons.

This science-integrative approach to law is an argument for the contribution that law ought to make to respond to and prevent the collapse of global ocean systems. The centre of gravity of this argument is the need for this science-integrative approach for law to be effective with respect to the climate crisis. Fundamental to this argument is the necessity to indicate what changes need to occur to public international legal order for law to realise this contribution.

Global ocean governance is considered underinformed by science both historically and currently [6], and this chasm between law and science exacerbates the global climate crisis problem. The laws in place are recognised to be inadequate for current and future needs facing the ocean commons [7], and the process of adapting regulations for new challenges is too slow to meet them [8], given the rapid pace of climate change and the science explaining and forecasting it. Acknowledging that there are several reasons for these dynamics, this thesis is premised on the failure to date to successfully integrate science into international law and its interpretation is among the most critical of these.

Research questions

- How effective are the existing obligations for the integration of science in law for the Arctic Ocean commons? What language in Arctic Ocean legal text and its interpretation is useful for the science-integrative approach? What practices of institutional knowledge exchange are relevant to the law of the sea and climate science in the Arctic Ocean commons?

- How does the fragmentation of public international law provide a positive context to develop a climate science-integrative approach to the law of the sea for the Arctic Ocean? How does the role of the Arctic Council influence the impact of the climate science-integrative approach in the region?

Methodology

I am proposing a novel normative framework elaborating a continuum of opportunities that demonstrate the relationship between law and science, illustrating a range from 'absence' of science in law, where there is no consideration or reference to science, to 'exclusive', where law is based only on scientific information.

To demonstrate the value of the various approaches, I will set out examples using the Arctic Ocean legal framework and climate science reports identified that show the level of engagement (the law-science relationship), its effectiveness in addressing climate change (impact on ocean processes) and defining factors that enable the given examples (Arctic Council processes and actors).

The jurisdictional focus of this thesis is the Arctic Ocean commons. This geopolitical construct is an epicenter of the climate crisis and a uniquely devised international legal space. The Arctic is a critical location to implement and therefore justify the case for the proposed science-integrative approach to law.

The conceptual development of my thesis is informed by multiple bodies of literature: science in law, knowledge exchange in the marine environmental context, fragmentation of international law, and the processes of Arctic Ocean governance.

Legal doctrinal analysis:

- Convention on the Law of the Sea (adopted 10 December 1982, entered into force 1 November 1994) 1833 UNTS 397 (UNCLOS)
- 'Request for an Advisory Opinion Submitted By The Commission of Small Island States on Climate Change and International Law, (24 May 2024), ITLOS/Case No.31

Climate science reports:

- 2004 Arctic Climate Impact Assessment (ACIA)
- 2022 Special Report on the Ocean and Cryosphere in a Changing Climate (SROCCC)

Thesis outline

Chapter 2 – Argument that law ought to respond to science; analysis of the effectiveness of the law-science relationship in existing legal obligations; evaluation of the substantive use of language and institutional practices of knowledge exchange in the Arctic Ocean.

Chapter 3 – Argument that illustrates the legal space for a novel legal approach; analysis of the fragmentation in public international law, addressing concerns with respect to regime interaction that affects ocean governance.

Chapter 4 – Elaboration of the science-integrative approach to law as a new normative framework, demonstrating why law ought to respond to science and providing an original pathway for the law-science relationship that accounts for and builds on the multi-disciplinary considerations outline in chapters 2 and 3.

Chapter 5 – Evaluation of the science-integrative approach to law in the Arctic Ocean commons, applying the framework outline in chapter 4 to the legal doctrine of the region and clarifying the space for this novel legal approach.

Chapter 6 – Consolidation of the argument and evidence provided that the science-integrative approach to law is a proposal for the contribution that law ought to make to respond to and prevent the collapse of global ocean systems; justification of the role of law in global challenges that impact the ocean.

Impact on Society

The science-integrative approach to law will strengthen the role of scientific knowledge in informing legal obligations, thus offering a robust argument for enabling an effective legal response to the climate crisis. Academically, the resulting thesis is primarily intended to contribute to critical ocean legal studies, and by extension international environmental law addressing climate change.

This thesis will elucidate the continuum of opportunities that classify the relationship between law and science, and advocate for the ideal scenario of a science-integrative approach to law, arguably the most effective of potential interactions in terms of addressing the climate crisis through law. I will show how the law can make provision for the integration of climate science into the law of the sea for the Arctic Ocean and therefore elaborate a mechanism that is relevant to the normative governance for dynamic global events and the ocean commons generally.

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