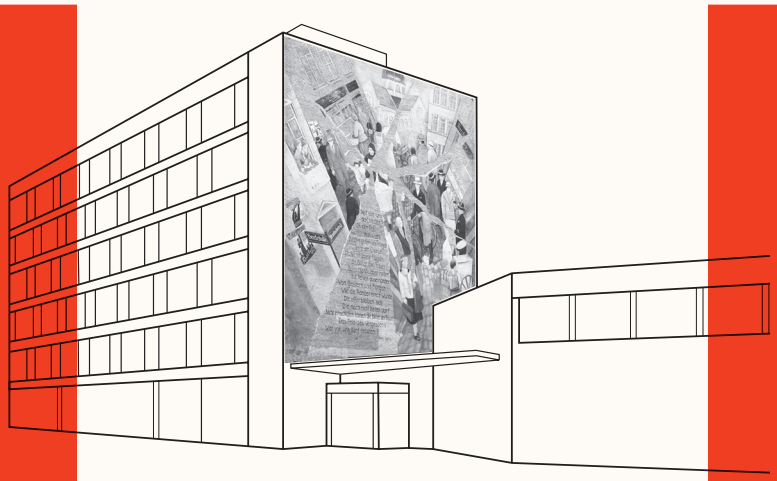

Emily Sipiorski

The Seabed and Scientific Legitimization of International Law: Transforming Narratives of Global Justice

Rechtswissenschaftliche
Beiträge der
Hamburger Sozialökonomie

Heft 37

Emily Sipiorski

The Seabed and Scientific Legitimization of International Law: Transforming Narratives of Global Justice

Rechtswissenschaftliche
Beiträge der
Hamburger Sozialökonomie

Heft 37

Dr. Emily Sipiorski is a senior researcher and lecturer in the Department of Law at the School of Socio-Economics, University of Hamburg. She is also an affiliated researcher at the Centre for Research and Development on Law and Society (CEDIS) at the Faculty of Law, NOVA University, Lisbon.

Impressum

Kai-Oliver Knops, Marita Körner, Karsten Nowrot (Hrsg.)
Rechtswissenschaftliche Beiträge der Hamburger Sozialökonomie

Emily Sipiorski
The Seabed and Scientific Legitimization of International Law:
Transforming Narratives of Global Justice
Heft 37, August 2020

Bibliografische Information der Deutschen Bibliothek
Die Deutsche Bibliothek verzeichnet diese Publikations in der
Deutschen Nationalbibliografie;
detaillierte bibliografische Daten sind im Internet unter
http://dnb.dnb.de abrufbar.
ISSN 2366-0260 (print)
ISSN 2365-4112 (online)

Reihengestaltung: Ina Kwon
Produktion: UHH Druckerei, Hamburg
Schutzgebühr: Euro 5,–

Die Hefte der Schriftenreihe „Rechtswissenschaftliche Beiträge der Hamburger Sozialökonomie“ finden sich zum Download auf der Website des Fachgebiets Rechtswissenschaft am Fachbereich Sozialökonomie unter der Adresse:

https://www.wiso.uni-hamburg.de/fachbereich-sozoek/professuren/koerner/fiwa/publikationsreihe.html

Fachgebiet Rechtswissenschaft
Fachbereich Sozialökonomie
Fakultät für Wirtschafts- und Sozialwissenschaften
Universität Hamburg
Von-Melle-Park 9
20146 Hamburg

Tel.: 040 / 42838 - 3521
E-Mail: Beate.Hartmann@uni-hamburg.de

Contents

A. Introduction

The seabed is largely unknown,[1] full of resource potential,[2] and one of the final frontiers on earth.[3] These realities leave a heavy burden on the law drafted to regulate it. The United Nations Convention on the Law of the Sea (UNCLOS)[4] ensures that the "Area" remains outside of states' jurisdiction.[5] It is protected as the "common heritage of mankind",[6] and with that, the economic benefits should be equitably shared among mankind.[7] In that conceptualization of the "Area", flagrant contradictions have emerged: in particular, the difficult balance between intragenerational and intergenerational equity in sustainable development is exposed.[8] Renewable energies often require the use of minerals that are now in short supply on land, yet the extraction of those minerals from the seafloor may cause damage and changes in the ecosystem that may not be fully understood for centuries.[9]

Currently in the phase of drafting several vital regulations for the exploitation of the resources on the seabed,[10] a narrative has emerged in the normative frameworks that looks beyond the traditional approaches of fundamental rights and "fair and equitable" standards characteristic of international law, and instead turns toward scientific knowledge as a mechanism for neutralizing and legitimizing the exploitation of the "Area" in alignment with the established principles towards its use. Scientific knowledge has reached a height of deference within society and that power impacts the legal realm in unexpected ways: it is applied to legitimize in a broader sense. A discourse is established between scientists and policy makers.[11] The era of

1 National Oceanic and Atmospheric Administration, United States Department of Commerce, How much of the ocean have we explored? (11 July 2018), available under: < https://oceanservice.noaa.gov/facts/exploration.html> (last accessed 3 August 2020).

2 *Heffernan*, Nature (24 July 2019), available under: < https://www.nature.com/articles/d41586-019-02242-y> (last accessed 3 August 2020).

3 *Trethewey*, The Guardian, 30 June 2020, available under: < https://www.theguardian.com/environment/2020/jun/30/earths-final-frontier-the-global-race-to-map-the-entire-ocean-floor > (last accessed 3 August 2020).

4 1833 United Nations Treaty Series 397 (1982).

5 UNCLOS, Articles 1 and 137(1).

6 UNCLOS, Article 136.

7 UNCLOS, Article 140.

8 *Brown Weiss*, American University International Law Review 8 (1992), 19; *Fitzmaurice*, in: Attard/Fitzmaurice/Ntovas (eds.), The IMLI Treatise On Global Ocean Governance, (Volume II) UN Specialized Agencies and Global Ocean Governance, 357; *cf*. *Lowe*, in: Boyle/Freestone (eds.), International Law and Sustainable Development: Past Achievements and Future Challenges, 27 (36).

9 *Heffernan*, Nature (24 July 2019), available at < https://www.nature.com/articles/d41586-019-02242-y > (last accessed 3 August 2020).

10 Draft Regulations on the Exploitation of the Seabed and Draft on the Conservation, ISBA/25/C/WP.1; Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction, UN Doc. A/CONF.232/2019/6.

11 European Commission, SINAPSE: Providing scientific information for policy-making, MEMO/05/86 (9 March 2005) ("Scientific expertise is increasingly becoming a critical element in the design, implementation and assessment of public policies. This means that policy-makers must be able to consult the scientific community. Scientists should have an opportunity to share their concerns and knowledge. This will ensure that decisions are objective and based on sound scientific evidence."); *Jasanoff*, Texas Law Review 93 (2015), 1723 (1724) ("explor[ing] how the two institutions [law and science] could operate more effectively as partners in the central projects of governance in modern democracies: how to exercise power with reason, how to make good decisions in the face of epistemic as well as normative uncertainty, and how to strike an accountable balance between the sometimes conflicting pressures of knowledge and norms."). As a contemporary example: the COVID-19 pandemic has been transfixing the world, and a subtle acceptance in the approach to the relationship between science and law has manifested simultaneously and publicly. Epidemiologists and statisticians have become key policy advisors to governments. Their opinions have resulted in the suspension of certain constitutional protections: freedom of movement in the European Union, the United States, and elsewhere. Tracking apps, further potential violations of personal freedoms, have been justified and necessitated based on models that demonstrate how the virus spreads. See for example, European Commission, COVID-19: Commission launches European team of scientific experts to strengthen EU coordination and medical response (17 March 2020), available under: < https://ec.europa.eu/commission/presscorner/detail/en/IP_20_481 > (last accessed 3 August 2020)

climate change has tightened the necessary linkages between law and science, particularly in international law as treaties are crafted to address the transboundary nature of human impacts on the environment.[12] The growing relevance of environmental laws and broader conceptualizations of climate change in the normative frameworks[13] have advanced a narrative specifically reliant on science and environmental assessments as a means of legitimizing actions of both states and private actors. This indicates a transformation of the narratives of rule of law and the global justice in international legal jurisprudence.[14] This adherence to science is impacting the very language of law.[15]

This scientific impact on law is most notable in developing systems of international law that involve the environment. The following paper explores the growing dependence on scientific knowledge within international law and the resulting creation of a newly-formed narrative of justice in the era of the Anthropocene, as epitomized by the developing law of the seabed. These laws are being structured on this narrative of science to achieve conceptions of morality and justice. The paper first identifies the burgeoning relationship between international law and science with respect to reliance on scientific data, and then builds on this basis in proposing an evolutive understanding of global justice within science. The analysis then turns to the development of normative frameworks regulating the seabed as an example of a growing integration between the law and scientific knowledge. In particular, the Draft Regulations on Exploitation of Mineral Resources in the Area exemplifies the use of environmental impact studies and continued reliance on structures of the sovereign state to develop a rule of law narrative where environmental and economic interests converge. This analysis of the regulations supporting the exploitation of seabed minerals is not meant as an end in and of itself, rather it is applied to illustrate a broader movement within the system of international law towards legitimization through science. The paper analyses the relevance and dangers of this reliance for the legitimacy of international law and the future of global rule of law.

(quoting President von der Leyen as stating "All governments have to take well-informed and appropriate decisions for the people of Europe every day. That is why scientific expertise and good advice is now more valuable than ever.").

12 *Murase*, International Law: An Integrative Perspective on Transboundary Issues, 168; *Murase*, in: Crawford/Koroma/Mahmoudi/Pellet (eds.), The International Legal Order: Current Needs and Possible Responses, Essays in Honour of Djamchid Momtaz, 41.

13 See for example, Paris Agreement to the United Nations Framework Convention on Climate Change (12 December 2015), United Nations Publication No. 54113; Kyoto Protocol to the United Nations Framework Convention on Climate Change (10 December 1997), 2303 United Nations Treaty Series 162; United Nations Framework Convention on Climate Change (9 May 1992), 1771 United Nations Treaty Series 107.

14 For a description of the close connection between rule of law and science on a domestic, constitutional level, see *Hodas*, Widener University Delaware Law School Legal Studies Research Paper Series No. 16-11, 135 (137 and 152) ("We may have lost sight of the [United States] Constitution's fundamental assumptions about science and the law; they must be relearned in light of modern society and technology. They teach that the Constitution, and ultimately the rule of law, requires that all laws be rationally related to a legitimate government purpose and that at its core, rationality requires adherence to the fundamental laws of science. […] Underlying the Constitution was the founders' deep commitment to science and reason, and to the rule of law based on science and reason."); *Cohen*, Science and the Founding Fathers: Science in the Political Thought of Jefferson, Franklin, Adams, and Madison, 19.

15 This discussion should be distinguished from the parallel conversation on whether law is a science. In this regard, see for example, *Oppenheim*, American Journal of International Law 2 (1908), 313; *Rovira*, The Project of Positivism in International Law; *Duarte/Lopes/Sampaio*, Legal Interpretation and Scientific Knowledge; *Orford*, European Journal of International Law 25 (2014), 369 (370 *et seq.*).

B. The Basis for Science and Law

Science evolves with society: "Science cannot be perceived as a discrete, empirically based discipline that operates in isolation from other social activities; rather, it feeds into social and institutional activity. Science and social activity are intertwined, and they reinforce and shape each other."[16] Law similarly evolves.[17] *Montesquieu* provided that law interacts with elements of society in order to be built in a coherent way: "legal process cannot be realistically studied in isolation from its larger context of social process."[18] Both law and science are influenced by external factors as well as one another.[19] This paper does not attempt to define science, but rather explores how science—in the form of reports and impact studies—is being incorporated into the international legal frameworks as well as soft law instruments.

There are the obvious relationships between law and science that necessarily exist: intellectual property law,[20] environmental regulations,[21] discovery and evidence,[22] and resource conservation.[23] These systems of law demand a relationship and recognition of science—their very existence has grown out of scientific disciplines. The relationship between law and science is growing, and it extends well beyond these obvious examples.[24] It is inherent in the green transitions dominating the public dialogue on climate change.[25] Sometimes the relationship is tumultuous.[26] These interactions between law and science are complicated and augmented by the inherent uncertainty in science[27]—balancing off the necessary ambiguities

16 *Čavoški*, Transnational Environmental Law 9 (2020), 263 (266).

17 *Tamanaha*, Washington University in St. Louis Legal Studies Research Paper No. 18-03-03 (2018), 1 (38) ("holism holds that law cannot be abstracted from or understood without attention to surrounding social, economic, cultural, political, technological and ecological conditions."); *Ruhl*, Vanderbilt Law Review 29 (1996), 1407 (1408-1409).

18 *McDougal/Lasswell*, University of Pittsburgh Law Review 37 (1976), 465 (469).

19 Science has also played a role in the development of legal language. In this respect, see *Hodas*, Widener University Delaware Law School Legal Studies Research Paper Series no. 16-11, 135 (150) ("The phrase 'self-evident' comes from Greek geometry. The Founders all studied Euclid's geometry, which uses 'self-evident' as meaning an axiom or incontestable statement.").

20 *Pottage*, Social Studies of Science 41 (2011), 621 (tracking the development of patent law in the courts of the United States prior to the creation of the United States Patent Office); *Swanson*, Social Studies of Science 37 (2007), 357; *Clifford/Peltz-Steele*, Chicago-Kent Journal of Intellectual Property 14 (2015), 553 (558-560) (identifying the constitutional foundations for design patent laws and the underlying constitutional issues).

21 *Murase*, in: Crawford/Koroma/Abdul/Pellet (eds.), The International Legal Order: Current Needs and Possible Responses, Essays in Honour of Djamchid Momtaz, 2017, 41 (41) (providing that "[i]nternational environmental lawmaking is one area where science has played and will continue to play a crucial role."); *Čavoški*, Transnational Environmental Law 9 (2020), 263 (285 *et seq.*) (detailing the close relationship between science and European environmental policy); see also *Rimkute/Haverland*, Comparative European Politics 13 (2015), 430.

22 *Lynch/Jasanoff*, Social Studies of Science 28 (1998), 675 (addressing the public display of the evidentiary process during the O.J. Simpson murder trial); *Cole*, Suspect Identities: A History of Fingerprinting and Criminal Identification, 32 *et seq*.

23 See generally, *Carden*, Harvard Environmental Law Review 30 (2006), 165 (182 *et seq*.); *Ruckelshaus/Levin/Johnson/Kareiva*, Annual Review of Ecological Systems 33 (2002), 665 (693); United States, Environmental Species Acts, 16 U.S.C. §§ 1531-1544 (2005).

24 *Breyer*, Judicature 82 (24 April 1998), 24 (24) ("the law itself increasingly requires access to sound science. This need arises because society is becoming more dependent for its well-being on scientifically complex technology, so, to an increasing degree, this technology underlies legal issues of importance to all of us." And, further noting that "science itself may be highly uncertain and controversial with respect to many of the matters that come before the courts.").

25 See for example, The European Green Deal, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, COM/2019/640 final (2.1.7). The United States Supreme Court has similarly been requested to decide on key elements of, for example, climate change—interacting substantially with foundational understanding of atmospheric pollution. *Massachusetts v. EPA*, 549 U.S. 497, 559 (2007).

26 *Faigman*, Laboratory of Justice: The Supreme Court's 200 Year Struggle to Integrate Science and the Law, 346 et seq.

27 *Tai*, Journal of Constitutional Law 11 (2009), 671 (673); *Adelman*, Environmental Law 37 (2007), 935 (935).

in the language of law.[28]

In the context of the United States Constitution, *David Hodas* questions whether "the due process clauses prohibit, as arbitrary and irrational, constitutional doctrines, court decisions, and statutes inconsistent with the laws of science." He examines this issue from the perspective of the use of language (by the drafters of the Constitution) reliant and relevant on a deeper understanding of science as part of the era of the Enlightenment. He considers individuals such as Thomas Jefferson and Benjamin Franklin to be "deeply influenced by the ideals, concepts, principles, and laws of science of Newton and others in physics, life sciences, and medicine."[29] Thus, he considers the US Constitution to be profoundly influenced by this type of scientific thought and, as such, necessarily reliant on it despite a growing lack of scientific understanding by judges.

This research examines the use of scientific knowledge working in a similar direction: namely, the use of science to create just protections in the emerging fields of international law. Instead of relying on analogies to science, however, as was executed in the case above, the drafting and reasoning is relying overtly on science. This section begins with a discussion of the manner in which scientific knowledge has been applied in the context of environmental disputes at the International Court of Justice (ICJ), identifying subtle changes in the approach by the Court and the limitations presented with such close asymmetry to scientific knowledge. The second part considers the methods applied to evaluate the veracity of scientific submissions to the Court.

I. International Tribunals

In the 1893 *Bering Fur Seals* case, the arbitral tribunal *inter alia* approached the issue of species preservation and shared resources.[30] The relevance of science has increased over time as more environmental disputes have been brought to international tribunals.[31] In the past years, international legal jurisprudence has begun more profoundly interacting and relying on scientific knowledge in taking decisions. A notable narrative shift has accompanied the decisions of the ICJ, enunciated in greater reliance on scientific evidence.

In the approach in the *Pulp Mills* judgment, the ICJ examined the relevance of science on the burden of proof and within the expert evidence.[32] The very question of what constituted "scientific research" was examined by the Court in the judgment of *Whaling in the Antarctic*.[33] In *Aerial Herbicide Spraying (Ecuador v. Colombia),* while a settlement was reached prior to the taking of a decision by the Court, the parties engaged heavily with environmental impact

28 *Kulick*, German Yearbook of International Law 59 (2016), 257; *Poscher*, in: Solan/Tiersma (eds.), Oxford Handbook of Language and Law, 128.

29 *Hodas*, Widener University Delaware Law School Legal Studies Research Paper Series No. 16-11, 145.

30 Award of the Arbitral Tribunal Established Under the Treaty Signed in Washington, on the 29th of February 1892, Between United States and Her Majesty the Queen of United Kingdom of Great-Britain and Ireland (Relating to the Rights of Jurisdiction of United States in the Bering's Sea and the Preservation of Fur Seals), Decision of 15 August 1893, Reprinted from John Basset Moore, History and Digest of the International Arbitrations to Which the United States has been a Party, Vol. I, Washington, 1898, Government Printing Office, 935.

31 *Trail Smelter* (Canada v. USA), Award, [1938 and 1941] 3 R.I.A.A. 1905; *Lac Lanoux* (France v. Spain), Award, [1957] 12 R.I.A.A. 281.

32 *Pulp Mills on the River Uruguay* (Argentina v. Uruguay), Judgment, [2010] ICJ Reports 14, paras. 160-168.

33 *Whaling in the Antarctic* (Australia v. Japan, New Zealand intervening), Judgment, [2014] ICJ Reports 226, paras. 74-246.

assessments in their memorials.[34]

Finally, the decision in *Gabčikovo-Nagymaros* requested that the parties attempt to settle their differences based on a continuous assessment of environmental risks.[35] The ICJ reflected on the scientific submissions and their contradictory nature: "It is clear that the Project's impact upon, and its implications for, the environment are of necessity a key issue. The numerous scientific reports which have been presented to the Court by the Parties - even if their conclusions are often contradictory provide abundant evidence that this impact and these implications are considerable."[36] The Court also explored the complexities of environmental protection, and indicated that "in the field of environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage."[37] Science, and more specifically "scientific insights", were identified by the Court as allowing for a new perspective on the interference with nature.[38] Pointedly, the Court considered the necessary balance of caution as scientific insights have developed, recognizing that "mankind has, for economic and other reasons, constantly interfered with nature."[39] The Court indicated a method to respect the impacts on the environment: "Such new norms have to be taken into consideration, and such new standards given proper weight, not only when States contemplate new activities but also when continuing with activities begun in the past."[40] The Court demonstrated a significant openness to this new manner of understanding human interaction with nature and the manner by which international legal obligations were to be observed with respect to that new knowledge.

II. Evaluating Science

In these decisions noted above, while the role of science was expressly highlighted by the Court and the decision interacted with the scientific information that has been presented, no parameters were provided for evaluating the contributions.[41] *Bruno Simma* has indicated that the differences in legal traditions can manifest in matters of evidence, in particular where scientific expertise would aid in the evaluation of evidence, with common law judges aiming to find the "relative truth" and civil legal judges an "objective" truth.[42] Highlighting the approach taken by the Court in the *Pulp Mills* dispute, *Simma* indicates that both party-appointed scientific experts as well as court-appoint "phantom experts" were used to aid in reaching "an objective assessment of the relevant scientific facts in order to decide on the adequacy *vel non* of the measures already taken or promised to be taken by Uruguay to prevent the pollution of

34 Memorial of Ecuador, 28 April 2009, paras. 2.48-2.50, especially para. 3.7 ("No environmental impact assessment was forthcoming, however. Indeed, to this day, Ecuador has not received a proper environmental impact assessment from Colombia.").

35 *Gabčikovo-Nagymaros Project* (Hungary v. Slovakia), Judgment, [1997] ICJ Rep 7, para. 112.

36 *Gabčikovo-Nagymaros Project* (Hungary v. Slovakia), Judgment, [1997] ICJ Rep 7, para. 140.

37 *Gabčikovo-Nagymaros Project* (Hungary v. Slovakia), Judgment, [1997] ICJ Rep 7, para. 140.

38 *Gabčikovo-Nagymaros Project* (Hungary v. Slovakia), Judgment, [1997] ICJ Rep 7, para. 140.

39 *Gabčikovo-Nagymaros Project* (Hungary v. Slovakia), Judgment, [1997] ICJ Rep 7, para. 140.

40 *Gabčikovo-Nagymaros Project* (Hungary v. Slovakia), Judgment, [1997] ICJ Rep 7, para. 140.

41 The United States Supreme Court has approached the necessary elements for scientific knowledge to be admitted by the courts based on Rule 702 of the Federal Rules of Evidence. See *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 597 (1993) (providing that to admit scientific knowledge into evidence, the judge must "ensur[e] that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand."); see also *Cheng/Yoon*, Virginia Law Review 91 (2005), 471.

42 *Simma*, Proceedings of the Annual Meeting ASIL 106 (2012), 230 (232).

the river."[43] By advocating for application of independent court-appointed experts pursuant to Article 50 of the Statute of the ICJ, *Simma* contends that such approach would ensure a more satisfactory understanding of the facts.[44]

This lack of a standardized approach by the Court to scientific evidence reveals a gap. While identified as useful, if not essential, for taking decisions and in legal interactions between and amongst states, there remains no rule for distinguishing the validity of scientific facts and evidence. In demonstrates both a desire to ground the law in the relevance of science and an unfinished approach as to how to accomplish that grounding.

C. Evolving Rule of Law and Justice in a Global Form

This increasing interaction between science and the law exposes a changing approach to foundations for justice in the global sense. A new element of knowledge impacts the interactions between parties. Approaching these changes in the legal narrative through the lens of global rule of law allows for an analysis of parameters of transparency and fairness. Science in fact becomes a way to guide and direct adherence to rule of law, particularly in a global forum where previously conceptualizations of morality and justice—when beyond *jus cogens* standards—bore greater divergences among the respective public and private actors involved.

The theoretical conceptualization of rule of law has been distinctly applied on the domestic level to separate politics from law,[45] eradicate corruption, create check and balances, and promote democratic institutions.[46] Rule of law requires primary and second laws to be relevant,[47] thus the hesitation to apply the concept in the international sphere.[48] Moreover, rule of law—like many of the terms relied upon in both domestic and international law to uphold a general sense of justice—is difficult to provide a singular and universally acceptable definition.[49] Yet,

43 *Simma*, Proceedings of the Annual Meeting ASIL 106 (2012), 230 (231).

44 *Simma*, Proceedings of the Annual Meeting ASIL 106 (2012), 230 (232). See also, *Sands*, in: Ndiaye/Wolfrum/Kojima (eds.), Law of the Sea, Environmental Law and Settlement of Disputes: Liber Amicorum Judge Thomas A. Mensah, 313 (315) (indicating that as the Court lacks a mechanism for the inclusion of "environmental or scientific assessors to join panels and assist in deciphering technical information, the international judge likely will often find herself in a difficult position when seeking to decide on the relative merits of a scientific claim.").

45 *Bugaric*, Hague Journal on the Rule of Law 7 (2015), 175.

46 See for example, *Barber*, Ratio Juris 17 (2004), 474; *Waldron*, Law and Philosophy 21 (2002), 137; *Shklar*, 1987 Report of the Secretary-General on the Rule of Law and Transitional Justice in Conflict and Post-Conflict Societies, UN Doc S/2004/616, para. 6 ("[...] refers to a principle of governance in which all persons, institutions and entities, public and private, including the State itself, are accountable to laws that are publicly promulgated, equally enforced and independently adjudicated, and which are consistent with international human rights norms and standards. It requires, as well, measures to ensure adherence to the principles of supremacy of law, equality before the law, accountability to the law, fairness in the application of the law, separation of powers, participation in decision-making, legal certainty, avoidance of arbitrariness and procedural and legal transparency."); *Rijpkema*, Transnational Legal Theory Volume 4 (2013), 167 (171) ("As a principle of governance, the Rule of Law is a normative, prescriptive principle claiming that all power relations within a society should be regulated by law in accordance with certain fundamental principles.").

47 See *Hart*, The Concept of Law, 79 *et seq.*

48 On the extensive discussion regarding whether international law constitutes law, see *inter alia*, *Guzman*, Proceedings of the Annual Meeting (American Society of International Law) 103 (2009), 155.

49 See generally, Report of the Secretary-General on the Rule of Law and Transitional Justice in Conflict and Post-Conflict Societies, U.N. Doc. S/2004/616, para. 5 (indicating that "[c]oncepts such as 'justice', 'the rule of law' and 'transitional justice' are essential to understanding the international community's efforts to enhance human rights, protect persons from fear and want, address property disputes, encourage economic development, promote accountable governance and peacefully resolve conflict. They serve both to define our goals and to determine our methods. Yet, there is a multiplicity of definitions and understandings of such concepts, even among our closest partners in the field. At an operational level, there is, for some, a fair amount of overlap with other related concepts, such as security sector reform, judicial sector reform and governance reform.").

from a practical approach, rule of law implies that "legal rules must be general, prospective, open and clear, stable and non-contradictory, and enforceable by institutions and procedures that are consistent and sufficiently efficient."[50]

This evolving phase of understanding the world during the era of the Anthropocene has advanced not only a desirability for a globally-relevant rule of law but also a necessity as the adequacy of the sovereign state is challenged not legally but by the realities of human interventions.[51] The United Nations has acknowledged rule of law as central to the mission of the organization.[52] The sovereign state is typically tightly bound with the creation and realization of rule of law, yet these ideals of rule of law are proving to be of increasing relevance beyond sovereign borders—in particular, in the oceans. As scientific bases emerge and expand, it is being increasingly relied upon to reinforce the application and understanding of rule of law from a global perspective. And, it is within this realm that the scientific knowledge proves significant in the creation of normative frameworks.

I. Conceptions of Global Justice beyond the State

Justice—in the global sense—has often been neglected in the scholarly conversations of international law.[53] Justice—manifested as a sense of moral rightness, fairness, and equality[54]—is an ever-present element of law in general.[55] Its relevance in international law is of a different magnitude.[56] It is not connected with the decisions of individual governing bodies within a state but rather arises out of compromise on the approach to this notion of justice and law. The

50 *Rijpkema*, Law and Philosophy 32 (2013), 793 (815) ("Despite the widely divergent descriptions of the Rule of Law, ranging from formal to substantial and from thick to thin, there appears to be wide agreement on both the essential nature of the Rule of Law and at least the most basic requirements it implies.").

51 *Rijpkema*, Transnational Legal Theory Volume 4 (2013), 167.

52 Report of the Secretary-General on the Rule of Law and Transitional Justice in Conflict and Post-Conflict Societies, U.N. Doc. S/2004/616: "The 'rule of law' is a concept at the very heart of the Organization's mission. It refers to a principle of governance in which all persons, institutions and entities, public and private, including the State itself, are accountable to laws that a republicly promulgated, equally enforced and independently adjudicated, and which are consistent with international human rights norms and standards. It requires, as well, measures to ensure adherence to the principles of supremacy of law, equality before the law, accountability to the law, fairness in the application of the law, separation of powers, participation in decision-making, legal certainty, avoidance of arbitrariness and procedural and legal transparency." Anthony Eden noted the desirability for global rule of law in 1951: "I am more than ever convinced that the nations of the world must submit to the rule of law and abide by it. Confidence can only be created and maintained on a basis of respect for international engagements. It is therefore the duty of all nations, as indeed it is their interest, to respect international authority and uphold it." Anthony Eden, November 1951 as cited in *Feller*, The Annals of the American Academy of Political and Social Science 282 (1952), 77 (79).

53 *Ratner*, The Thin Justice of International Law: A Morality Reckoning of the Law of Nations, 2 ("The discipline [of international law] refuses to see the obvious—that so many choices confronting international actors involved in prescribing, interpreting, and enforcing international law are ethical choices. Without ethics, the law of global justice is ad hoc or at best a matrix of bargains.").

54 *Anderson*, Ethics 109 (1999), 287; *Dworkin*, Sovereign Virtue: the theory and practice of equality.

55 *Rawls*, A Theory of Justice; *Rawls*, Philosophical Review 67 (1958), 164; *Scanlon*, What We Owe to Each Other; *Raz*, in: Raz (ed.), Ethics in the Public Domain, 370–8; *Raz*, in: Raz (ed.), Ethics in the Public Domain, 210–37; *Raz*, Archiv für Rechts und Sozialphilosophie 82 (1996), 1.

56 *Nagel*, Philosophy and Public Affairs 33 (2005), 113; *Rijpkema*, Transnational Legal Theory 4 (2013), 167. See also Report of the Secretary-General on the Rule of Law and Transitional Justice in Conflict and Post-Conflict Societies, U.N. Doc. S/2004/616, para. 7: "For the United Nations, 'justice' is an ideal of accountability and fairness in the protection and vindication of rights and the prevention and punishment of wrongs. Justice implies regard for the rights of the accused, for the interests of victims and for the well-being of society at large. It is a concept rooted in all national cultures and traditions and, while its administration usually implies formal judicial mechanisms, traditional dispute resolution mechanisms are equally relevant. The international community has worked to articulate collectively the substantive and procedural requirements for the administration of justice for more than half a century."

United Nations Charter aims to encompass this global sense of justice.[57] This, however, does not undermine its significance, and in many ways provides an elevated angle from which to observe the development of global ideals.

In some representations of global justice, the nation-state—and thereby the traditional structures of international law—are seen as impediments to the institutionalization of global justice.[58] To achieve global justice, *Thomas Pogge* proposes "a human right to political participation" beyond the state.[59] *Steven Ratner* identified the central relevance, however, of conceptualizations of global justice in the discipline of international law and the process of understanding it, recognizing that "international law transforms moral prescriptions into legally binding rules with implementation mechanisms and process."[60] He further considers international law as a window into understanding "morality and justice at the international level".[61] Moreover, he considers that "the rules and structure of international law turn out to have their own morality and represent a real-world, albeit far from ideal, incarnation of a vision of global justice."[62]

The express interactions with conceptions of justice (or global justice) in international law frequently are centralized on conflict and human rights.[63] Pushing forward a moral theory of international law, *Allen Buchanan* (writing in the early 2000s) considered it integral to the development of the system.[64] He clarified his approach, not as a grand scheme of principles, but rather "a need for self-conscious, systematic moral reasoning, the attempt to produce an interrelated, mutually supporting set of prescriptive principles that will provide substantial guidance for at least most of the more important issues which international law must deal or which it could profitably address."[65] He did not push forward a specific version of the theory.

Choudhary considers a need for the expansion of justice as global interactions expand: "The notion of justice captures an essential aspect of international system owing specifically to the fact that in the changed global context where global interactions are expanding, the idea of justice needs expansion too. Examining the inherent normative claims in the idea of justice allows uncovering the viability and desirability of considering justice as an important variable in the discipline of international relations."[66] The interactions between global justice and aspects of international law that rely on science push the discussion into aspects more difficult to conceptualize through these traditional mechanisms.

57 *Zemanek*, The Legal Foundations of the International System; *Dupuy*, Max Planck Yearbook of United Nations Law 1 (1997), 1 (31).
58 *Pogge*, Ethics 103 (1992), 48 (48 *et seq.*) (approaching the concept of institutional cosmopolitanism).
59 *Pogge*, Ethics 103 (1992), 48 (63-64).
60 *Ratner*, The Thin Justice of International Law: A Morality Reckoning of the Law of Nations, 1-2.
61 *Ratner*, The Thin Justice of International Law: A Morality Reckoning of the Law of Nations, 1-2.
62 *Ratner*, The Thin Justice of International Law: A Morality Reckoning of the Law of Nations, 1-2.
63 See generally, *Buchanan*, Justice, Legitimacy and Self-Determination: Moral Foundations of International Law, 118 *et seq*.
64 *Buchanan*, Justice, Legitimacy, and Self-Determination: Moral Foundations of International Law, 15 ("at present there is no coherent set of normative principles—no moral theory of the rule of law in international relations—capable of providing guidance for improving international law to make it more responsive to these problems [of genocide and self-determination]").
65 *Buchanan*, Legitimacy and Self-Determination: Moral Foundations of International Law, 15.
66 *Choudhary*, Jadavpur Journal of International Relations 22 (2018), 22 (22).

II. The Limitations on Global Justice

Concretizing justice, identifying and applying it as a concept, is precarious at the minimum. Realizing universal norms is tenuous.[67] Thus, global justice as a defined conceptualization of norms and, even more so, a global rule of law extending from that are subject to clear limitations.

In discussing the limitations on the establishment of the United Nations as a reconciliation between sovereignty and community, *A.H. Feller* notes that "[i]ts weaknesses are not due to lack of drafting skill or of devotion or of imagination; they are for the most part inherent in any practicable design for world order in the midst of world tension and conflict."[68] In a similar way, conceptualizations of justice are formed by the moment, limited by the realities of the moment, and evolve as a result of global realities. In that respect, the evolutions in narratives of global justice have been impacted by environmental impacts as well as limited by them. Scientific knowledge has been introduced to neutralize and give language to necessities for the creation of international law that extend beyond the scope of its more traditional parameters reliant on the sovereign state to enforce borders, human rights, or humanitarian law. The new evolutions speak a language that moves beyond these conceptualizations by employing science.

D. Law of the Seabed

Existing beyond the scope of state sovereignty, the law governing the Area demands an integrative and cooperation approach in the development of the normative frameworks supporting and regulating the economic activities that have become increasingly profitable in the oceans—in particular in the seabed.[69] This requirement for cooperation in companionship with the overarching environmental considerations with respect to the sea, reveal the importance of the developing scientific narrative of international law.[70] The normative structures that support this system are developing and many new agreements are in the drafting stage, including the Draft Regulations on Exploitation of Minerals in the Area.[71] These agreements are built in part on the ideology of "common heritage of mankind" as structurally intertwined in the UNCLOS, the social benefits to exploitation of minerals and biodiversity, and the economic interests in such development.[72]

67 *Gülgeç*, Ankara Universitesi Hukuk Fakultesi Dergisi 66 (2017), 73 (78); *Saul*, Asian Journal of International Law 5 (2015), 26; Danilenko, European Journal of International Law 2 (1991), 42 (42); *Benvenisti/Downs*, European Journal of International Law 20 (2009), 59.

68 *Feller*, The Annals of the American Academy of Political and Social Science 282 (1952), 77 (78).

69 *Scovazzi*, International Journal of Marine and Coastal Law 19 (2004), 388; *Tanaka*, Ocean Development and International Law 39 (2008), 129 (137) (highlighting certain vulnerable marine ecosystems beyond national jurisdiction that would need the "enhancement of cooperation between the contracting parties to the Convention on Biological Diversity and the Authority with a view towards determining precautionary measures.").

70 *Treves*, in: Molenaar/Oude Elferink (eds.), The International Legal Regime of Areas Beyond National Jurisdiction: Current and Future Developments, 7; *Tanaka*, Ocean Development and International Law 39 (2008), 129 (137) ("The conservation and sustainable use of the Area's genetic resources must be based on a sound scientific understanding of the marine ecosystems of the deep seabed and this will arise from marine scientific cooperation.").

71 ISBA/25/C/WP.1 (25 March 2019). In parallel, and also of relevance, is the Draft Text on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction. U.N. Doc. A/CONF.232/2019/6 (19 May 2019).

72 In that respect, Part II of the Draft on the Conservation and Sustainable Use of Marine Biological Diversity provides

The International Seabed Authority, as an autonomous organization under the United Nations system, has a mission to "adopt and uniformly apply rules, regulations and procedures"[73] in the "Area"[74]—that is, the parts of the sea and the seabed not subject to national jurisdiction. While its competencies remaining in some degree of uncertainty,[75] it intends to achieve the objective "by developing and maintaining a comprehensive regulatory mechanism for commercial deep seabed mining that incorporates the highest practicable standards of protection of the marine environment and human health and safety and allows for the full participation of developing States consistent with the principle of the common heritage of mankind."[76] Seabed minerals provide a developing and relevant insight to the application of scientific knowledge into the creation of rule of law from a globally-relevant perspective. The thematic foundation for Ambassador Pardo's "common heritage of mankind",[77] seabed minerals reveal the conflicting approaches between economic interests[78] and environmental concerns.

The creation of these normative frameworks is driven to a large extent by the advancements in technology which have enabled the exploitation of previously inaccessible regions of the sea as well as the green transitions. In the case of seabed minerals, the batteries for electric cars require minerals that are no longer readily available on land.[79] The seabed offers an opportunity for these minerals. The initial interest in the minerals was strong during the 1960s, and then as the price of the minerals fell and the reality of costs of exploitation remained high, the subject was temporarily dropped.[80] Now, the interest has been renewed as a result of urbanization and growing desires for sustainable infrastructure.[81] The seabed mining of coastal waters

that such activities shall "contribute to the realization of a just and equitable international economic order." U.N. Doc. A/CONF.232/2019/6 (19 May 2019).

73 UNCLOS, Annex III, Article 17.

74 See generally, International Seabed Authority, Strategic Plan for the International Seabed Authority for the Five-year Period 2019-2023, available under: < https://www.isa.org.jm/files/documents/EN/SPlan/SP-en.pdf > (last accessed 3 August 2020).

75 *Proelss*, in: Scheiber/Paik (eds.), Regions, Institutions, and Law of the Sea: Studies in Ocean Governance, 145 (146); ("The diversity of opinions and approaches towards the role and competences of the ISA becomes more manifest in the particular context of the hotly debated issue of marine genetic resources located beyond the limits of national jurisdiction.").

76 International Seabed Authority, Strategic Plan for the International Seabed Authority for the Five-year Period 2019-2023, available under: < https://www.isa.org.jm/files/documents/EN/SPlan/SP-en.pdf > (last accessed 3 August 2020); *Hardy*, International Organization 31 (1977), 313 (318) ("As the guardian of the "common heritage," the Authority has to consider not only the issues of efficiency and of maximizing production, but the question of optimum utilization. How is the resource, regarded as a whole, to be best managed? What are the social goods to be pursued, assuming choices have to be made in this as in any other sphere of economic activity?").

77 *Pardo*, Speech to the First Committee of the United Nations General Assembly, 1 November 1967, para. 91. See also *Franckx*, International Journal of Marine and Coastal Law 25 (2010), 543 (557); Resolution 2749 (XXV), 17 December 1970. For the many controversies regarding the meaning of "common heritage of mankind", see *inter alia*, *Goldie*, Syracuse Journal of International Law and Commerce 10 (1983), 69; *Hislop*, in: Hislop/New/Bender (eds.), Protecting the Antarctic and Southern Ocean, 1.

78 *Hardy*, International Organization 31 (1977), 313 (341); Statement by Expert Panel, The American Journal of International Law 82 (1988), 363 (363).

79 As resources on land are diminishing, there have become the subject of several trade disputes. See for example, China - Measures Related to the Exportation of Rare Earths, Tungsten, and Molybdenum, Reports of the Appellate Body, Documents WT/DS431/DS432/DS433, AB/R, 7 August 2014; China - Measures Related to the Exportation of Various raw Materials, Reports of the Appellate Body, Documents WT/DS394/DS395/DS398/AB/R, 30 January 2012.

80 *Heffernan*, Nature (24 July 2019), available under: < https://www.nature.com/articles/d41586-019-02242-y > (last accessed 3 August 2020).

81 *Lodge*, UN Chronicle, available under: < https://www.un.org/en/chronicle/article/international-seabed-authority-and-deep-seabed-mining > (last accessed 3 August 2020) ("Terrestrial mineral deposits are coming under increasing pressure because of the need to serve a continuously growing global population, an expanding middle class that is driving urbanization and the need for renewable, low-carbon infrastructure. Easily mined, high-grade ore deposits are quickly declining. Although new resources are likely to exist in the deep subsurface or in remote locations, mining these terrestrial deposits will require large amounts of energy and have significant social and environmental consequences. Increased recycling of metals will provide some relief but will never be sufficient to satisfy the anticipated

has garnered substantial interest and further demonstrates the potential for additional resources in the seabed.[82] There is a noted interest in exploitation for the purpose pushing forward many of the renewable energy technologies—technologies that require these minerals to function. On the other hand, the consequence of exploiting these minerals is little understood.

I. Draft Regulations on the Exploitation of Mineral Resources in the Area

The Regulations entail a duty to cooperate and exchange information[83] and detail the approval of work plans, providing for the various responsibilities of the Seabed Authority[84] and sponsoring states.[85] Part IV of the Draft Regulations sets out the standards for the protection and preservation of the marine environment. The role of the sponsoring state remains prominent in the approach to the regulations despite the central role of private parties involved in the exploitation of the resource. The regulations as they are provided for in the section rely heavily on best environmental practices and environmental assessments. Harm is intended to be controlled via available mechanisms in international law: namely, the parties shall "[a]pply the precautionary approach, as reflected in principle 15 of the Rio Declaration on Environment and Development, to the assessment and management of risk of harm to the Marine Environment from Exploitation in the Area."[86] Draft Regulation 46(c) provides that the relevant parties shall "(c) [i]ntegrate Best Available Scientific Evidence in environmental decision-making, including all risk assessments and management undertaken in connection with environmental assessments, and the management and response measures taken under or in accordance with Good Industry Practice."

Draft Regulation 46 *bis* details the requisite environmental impact statements to be provided by relevant parties. "The purpose of the Environmental Impact Statement is to document and report the results of the environmental impact assessment process, which identifies, predicts, evaluates and mitigates the biophysical, social and other relevant effects of the proposed mining operation." The impact assessment, according to the standards provided should be "(a) Inclusive of a prior environmental risk assessment; (b) Based on the results of the environmental impact assessment; (c) In accordance with the objectives and measures of the relevant regional environmental management plan, if any; and (d) Be prepared in accordance with the applicable Guidelines, Good Industry Practice, Best Available Scientific Evidence and Best Available Techniques."

Pursuant to Annex IV, the Environmental Impact Statement shall "[p]rovide information, in accordance with the Guidelines, corresponding to the scale and potential magnitude of the activities, to assess the likely Environmental Effects of the proposed activities." The guidance further provides that the discussion must reflect the proportion of the effects, and even "[w]here an applicant considers an effect to be of no significance, there should be

long-term growth in demand. Deep seabed minerals are therefore increasingly likely to make an important contribution to sustainable development, particularly for those countries that lack secure sources of supply on land, as well as small island developing States that lack opportunities for economic development.").

82 *Hylton*, The Atlantic (January/February 2020), available under: < https://www.theatlantic.com/magazine/archive/2020/01/20000-feet-under-the-sea/603040/ > (last accessed 3 August 2020).

83 Draft Regulation 3.

84 See for example, Regulation 7, *inter alia* 7(2)(c) (Each applicant shall "[p]rovide the Authority with a written assurance that its obligations under its contract will be fulfilled in good faith.").

85 Regulation 6.

86 Draft Article 46(a).

sufficient information to substantiate such conclusion, or a brief discussion as to why further research is not warranted."[87] The Assessment should further include a non-technical summary "to facilitate understanding of the nature of the activity by Stakeholders."

II. Transparency in the Exploitation Phase?

Transparency in the process is included in the frameworks: "transparency is an essential element of good governance and is therefore a guiding principle for the [Seabed] Authority in the conduct of its business as a publicly accountable international organization."[88] In addition, the Draft Regulations contain requirements for environmental assessments at various stages of the exploitation process, with provisions that require the cessation of activities should the harm be considered too great.[89] The current draft acknowledges this limitation but also attempts to override it by applying cautious scientific interventions throughout the process of a private party's process of exploiting minerals.[90] The economic reality of such safeguards, however, namely independent experts paid by private contracts to neutrally comment on the viability of exploitation, limits the accountability without an *ex officio* review.[91]

III. Moral dimension of seabed minerals

Concern about the potential environmental damage associated with deep sea mining lingers despite the movements forward to develop the Regulations on the Exploitation of Mineral Resources in the Area.[92] Some of the concern lies in the nature of mining and the inevitable unsustainable consequences of extracting a resource.[93] This moral dimension of the seabed also

87 Draft, Annex IX.

88 International Seabed Authority, Strategic Plan for the International Seabed Authority for the Five-year Period 2019-2023, available under: < https://www.isa.org.jm/files/documents/EN/SPlan/SP-en.pdf > (accessed on 3 August 2020) 7.

89 Draft Regulation 33.

90 Draft Regulation 52.

91 There is a rich body of US tort law arising from scientific misrepresentations about the dangers of activities or products. Typically these were situations in which the products were not yet fully understood, thus differing scientific opinions were part of the development of knowledge. There are currently several law suits against oil companies for misrepresentation of climate change. *ExxonMobil Corp. v. Schneiderman*, 316 F. Supp. 3d 679 (S.D.N.Y. 2018); *Complaint, City of New York v. BP P.L.C.*, 325 F. Supp. 3d 466 (S.D.N.Y. 2018) (No. 18 cv 182 (JFK)); *Ramirez v. ExxonMobil Corp.*, 334 F.Supp. 3d 832 (N.D. Tex. 2018) (No. 3:16-CV-031 II -K); *Fentress v. ExxonMobil Corp.*, 304 F. Supp. 3d 569 (S.D. Tex. 2018) (No. 16-CV-03484); *Native Village of Kivalina v. ExxonMobil Corp.*, 663 F. Supp. 2d863 (N.D. Cal. 2009) (No. C 08-1138 SBA). See also *Dellinger*, William and Mary Environmental Law and Policy Review 42 (2018), 525-551.

92 First Dog on the Moon, How bad can deep sea mining be? Coronavirus is going to look like a picnic compared with what's coming, The Guardian, 29 July 2020, available at < https://www.theguardian.com/commentisfree/2020/jul/29/how-bad-can-deep-sea-mining-be-coronavirus-is-going-to-look-like-a-picnic-compared-to-whats-coming >.

93 *Harris*, GRID-Arendal (12 June 2019), available at < https://news.grida.no/to-mine-or-not-to-mine-the-moral-dilemma-of-deep-sea-mining > ("it must be remembered that deep sea mining, like all mining, is unsustainable. Mining is the process of extracting a non-renewable resource from the earth; hence it is not logical to discuss the 'sustainable extraction of subsea minerals'. There is also a moral dimension to the mining of any non-renewable resource since once it has been mined it will not be available for future generations."); *Martin*, "Deep sea mining: is it sustainable/green enough?" (July 2020, Norton Rose Fulbright) available at < https://www.nortonrosefulbright.com/en/knowledge/publications/e37cfa1a/deep-sea-mining-is-it-sustainable-green-enough > ("The perceived irony of suggesting that deep sea mining, an activity against which many environmental groups have protested, could be considered truly green or sustainable is appreciated. However, the exploitation regulations (drafted by the International Seabed Authority, an arm of the United Nations) have been developed during a time of increasing environmental scrutiny. The regulations are on

extends to the private actors involved in the process of exploitation. Private actors have long had substantial influence in the creation of international law.[94] This impacts the legal framework supporting seabed minerals and its implications towards rule of law for private actors. The promotion and expansion of sustainability in the law of the sea exposes the expanding role of private actors in the international sphere[95] and the need for systemic integration.[96] Emerging mineral mining opportunities in the ocean lie in a complex balance of legal spheres: operating in a web of private interests, sovereign rights, and the public commons. In this piecemeal framework, the morality of the law towards the future (environmental protection) conflicts with the morality for the present (economic development and interdependence).

There are many conflicting approaches to the oceans more generally, both within the UNCLOS as well as within the developing sustainable development framework. United Nations Sustainable Development Goal 14 provides for the "conserv[ation] and sustainabl[e] use of the oceans, seas and marine resources for sustainable development", corresponding with UNCLOS Article 145 that requires an approach to activities in the Area that utilizes foresight towards the potential effects of activities "ensuring effective protection for the marine environment from harmful effects which may arise from such activities [in the Area]."[97] From the economic arm of sustainable development and ocean conservation, UNCLOS Article 150 provides for "foster[ing] healthy development of the world economy and balanced growth of international trade" as well as "ensuring the development of the resources of the Area". The Convention provides that these activities are accomplished in line with "the development of the common heritage for the benefit of mankind as a whole".[98]

It is in this sense that the environmental impact assessments and the guiding scientific knowledge is applied to regulate the use, neutralizing one objective over another with the accompanying knowledge. It thus legitimizes the application of the law without overtly prioritizing, rather science takes on the role of the decision-maker.

their third iteration with open public consultation at each stage, including governments, private bodies, stakeholders and NGOs.").

94 *Anghie*, Harvard International Law Journal 40 (1999), 1 (36 *et seq*.); *Stephan*, Virginia Law Review 97 (2011), 1573 (1575) ("international law increasingly depends on private actors"); *Alvarez*, Santa Clara Journal of International Law 9 (2011), 1.

95 *Trevisanut*, International Journal of Marine and Coastal Law 29 (2014), 645 (645).

96 *Trevisanut/Giannopoulos*, Journal of World Investment and Trade 19 (2018) 789 (816).

97 UNCLOS, Article 145.

98 UNCLOS, Article 150(i).

E. Conclusion

The use of science within the law is hardly novel, but the seabed demonstrates a growing reliance: the wisdom of science is capable of trumping other forms of decision making. That in fact, science creates justice. It operates as a stable fact-finder (at times incorrectly)[99] next to the often ambiguous language of law.[100] How is this burgeoning role of science impacting the narrative of justice in a global sense? Or, is it enabling a global narrative on rule of law—law distinguished from culturally-structured narratives of justice and instead imbedded in the more universal narrative of science? How is the language of science applied to achieve these broader ends?

While the Draft Regulations on the Exploitation of Mineral Resources approach a delicate aspect of the future of the planet, their addition to the system of international law is integral and revealing. These regulations confront unregulated spaces. They are also amongst the first to knowingly interact with the complexities in implementing sustainability in environmental policy: the ability to harvest minerals for renewable energy sources confronts the possibility of ecosystem damage. Environmental impact assessments are prevalent. Yet, these assessments are rarely subject to clear scrutiny, potentially undermining the role of science in upholding a higher standard, instead resulting in a lowering. Science lacks certainty;[101] instead, science is the continual building of knowledge.[102] This lack of certainty is undesirable in normative frameworks, and as such, has been ignored as unstable, and instead taken as a more final way of considering the issue. Moreover, lack of knowledge of science by both policy makers and lawyers results in a blind acceptance of information brought forward, rather than an intelligently critical approach. A harmonious relationship instead exists when law and policy operate alongside scientific knowledge.[103]

As such, the Regulations on Exploitation of Mineral Resources in the Area attempts to free itself from typical moral approaches to this complex balance of obligations by relying instead on contracts and sponsorship (as provided for earlier in the approach to the seabed) and environmental impact assessments. It is difficult to construct any system that adequately satisfies all parties[104]—particularly as the revelations of scientific data from one side contrast the current global economic framework and the reality of modern society. However, the approach misaligns trust in scientific knowledge—distancing itself from reasoning that relies on less tangible conceptualizations of justice. The results remain to be seen, yet this may mark an entry in to a new narrative of international law detached from the human, reliant on numbers, statistics, and chemical analyses. It turns to science to legitimize, and in so doing may

99 *Carden*, Harvard Environmental Law Review 30 (2006), 165 (169) ("While environmental law should remain rooted in science, lawmakers must understand and provide for the data gaps and uncertainties that characterize science in general, and ecosystem-based science in particular.").

100 *Cole/Bertenthal*, Annual Review of Law and Social Science (2017), 351 (352) ("law can be critiqued for its poor understanding of scientific information. In such formulations, scientific knowledge generally is treated as stable and unambiguous; the problem lies in law's use of it. These arguments rest upon an assumption that correct scientific information can be discerned and accessed.").

101 *Wenning*, Journal of Physics Teacher Education Online (2009), 3 (4); *Black/Ayala/Saffran-Brinks*, Texas Law Review 72 (1994), 715.

102 See for example, *Massimi*, The Royal Society (21 May 2018), available at < https://royalsociety.org/science-events-and-lectures/2018/05/wilkins-bernal-medawar-prize-lecture/ >.

103 *Čavoški*, Transnational Environmental Law, 9 (2020), 263 (268) ("Co-production happens through institutionalization in which robust legal and policy processes are deployed to assess, interpret, and incorporate scientific knowledge into law.").

104 See supra Section C.II, citing *Feller*, The Annals of the American Academy of Political and Social Science 282 (1952), 77 (78).

disregard the limitations of science as a fact-finding mechanism. While there is a need for a better-defined global rule of law (both within the era of the Anthropocene and as part of the sustainable development initiatives) and scientific knowledge plays a role, the extent of that role should be necessarily tempered, its limitations understood, and considerations taken for its potential impact on justice itself.

References

Adelman, David E., The Art of the Unsolvable: Locating the Vital Center of Science for Environmental Law and Policy, Environmental Law 37 (2007), 935-962.

– Scientific Activism and Restraint: the Interplay of Statistics, Judgment, and Procedure in Environmental Law, Notre Dame Law Review 79 (2004), 497-584.

Alvarez, José E., Are Corporations "Subjects" of International Law?, Santa Clara Journal of International Law 9 (2011), 1-35.

Anderson, Elizabeth, What is the Point of Equality?, *Ethics* 109 (1999), 287–337.

Anghie, Antony, Finding the Peripheries: Sovereignty and Colonialism in Nineteenth-Century International Law, Harvard International Law Journal 40 (1999), 1-80.

Barber, N.W., Must Legalistic Conceptions of the Rule of Law Have a Social Dimension?, Ratio Juris 17 (2004), 474-488.

Benvenisti, Eyal/Downs, George W., National Courts, Domestic Democracy and the Evolution of International Law, European Journal of International Law 20 (2009), 59-72.

Black, Bert/Ayala, Francisco J./Saffran-Brinks, Carol, Science and the Law in the Wake of Daubert: A New Search for Scientific Knowledge, Texas Law Review 72 (1994), 715-802.

Breyer, Stephen, The Interdependence of Science and Law, Judicature 82 (24 April 1998), 24-27.

Brown Weiss, Edith, In Fairness to Future Generations and Sustainable Development, American University International Law Review 8 (1992), 19-26.

Buchanan, Allen, Justice, Legitimacy and Self-Determination: Moral Foundations of International Law, Oxford 2004.

Bugaric, B., The Rule of Law Derailed: Lessons from the Post-Communist World, Hague Journal on the Rule of Law 7 (2015), 175–197.

Carden, Kristin, Bridging the Divide: The Role of Science in Species Conservation Law, Harvard Environmental Law Review 30 (2006), 165-259.

Čavoški, Aleksandra, Science and Law in Environmental Law and Policy: The Case of the European Commission, Transnational Environmental Law 9 (2020), 263–295.

Cheng, Edward K./Yoon, Albert H., Does Frye or Daubert Matter? A Study of Scientific Admissibility Standards, Virginia Law Review 91 (2005), 471-513.

Choudhary, A., Justice, Morality, and International Relations: A Critical–Theoretical Reading, Jadavpur Journal of International Relations 22 (2018), 22-38.

Clifford, Ralph D./Peltz-Steele, Richard J., The Constitutionality of Design Patents, Chicago-Kent Journal of Intellectual Property 14 (2015), 553-614.

Cohen, I. Bernard, Science and the Founding Fathers: Science in the Political Thought of Jefferson, Franklin, Adams, and Madison, New York/London 1995.

Cole, Simon A./Bertenthal, Alyse, Science, Technology, Society, and Law, Annual Review of Law and Social Science 13 (2017), 351-371.

Cole, Simon A., Suspect Identities: A History of Fingerprinting and Criminal Identification, Cambridge, MA 2001.

Danilenko, Gennady M., International *Jus cogens*: Issues of Law-Making, European Journal of International Law 2 (1991), 42-65.

Dellinger, Myanna, See You in Court: Around the World in Eight Climate Change Lawsuits, William and Mary Environmental Law and Policy Review 42 (2018), 525-551.

Duarte, David/Moniz Lopes, Pedro/Silva Sampaio, Jorge, Legal Interpretation and Scientific Knowledge, Cham 2019.

Dupuy, Pierre-Marie, The Constitutional Dimension of the Charter of the United Nations Revisited, Max Planck Yearbook of United Nations Law 1 (1997), 1-33.

Dworkin, Ronald, Sovereign Virtue: The Theory and Practice of Equality, Cambridge, MA 2000.

Faigman, David L., Laboratory of Justice: The Supreme Court's 200 Year Struggle to Integrate Science and the Law, New York 2004.

Feller, A.H., The National Interest-Alone or with Others?, The Annals of the American Academy of Political and Social Science 282 (1952), 77-83.

Fitzmaurice, Malgosia, Intergenerational Equity, Ocean Governance, and the United Nations, in: Attard, David Joseph/Fitzmaurice, Malgosia/Ntovas, Alexandros X.M. (eds.) The IMLI Treatise on Global Ocean Governance, (Volume II) UN Specialized Agencies and Global Ocean Governance, Oxford 2018, 357-376.

Franckx, Erik, The International Seabed Authority and the Common Heritage of mankind: The Need for States to Establish the Outer Limits of their Continental Shelves, International Journal of Marine and Coastal Law 25 (2010), 543-567.

Goldie, L.F., A Note on Some Diverse Meanings of 'the Common Heritage of Mankind', Syracuse Journal of International Law and Commerce 10 (1983), 69-112.

Gülgeç, Yahya Berkol, The Problem of Jus Cogens from a Theoretical Perspective, Ankara Universitesi Hukuk Fakultesi Dergisi 66 (2017), 73-115.

Guzman, Andrew T., Rethinking International Law as Law, Proceedings of the Annual Meeting (American Society of International Law) 103 (2009), 155-157.

Hardy, Michael, The Implications of Alternative Solutions for Regulating the Exploitation of Seabed Minerals, International Organization 31 (1977), 313-342.

Harris, Peter, To Mine or Not to Mine-The Moral Dilemma of Deep Sea Mining, GRID-Arendal (12 June 2019), available at < https://news.grida.no/to-mine-or-not-to-mine-the-moral-dilemma-of-deep-sea-mining >.

Hart, Herbert L.A., The Concept of Law, 3rd edition, Oxford 2012.

Henricksen, Wes E., Scientific Knowledge Fraud, Oregon Law Review 97 (2019), 307-352.

Hislop, C., Two Challenges to the Creation of Non-Jurisdictional Marine Protected Areas: Freedom of the High Seas Doctrine and the Common Heritage of Mankind Principle, in: Hislop, C./New, G./Bender P. (eds.), Protecting the Antarctic and Southern Ocean, University of Tasmania Law School Press 2004, 1-18.

Hodas, David, The Laws of Science, Constitutional Law, and the Rule of Law, Widener University Delaware Law School Legal Studies Research Paper Series No. 16-11, 135-158.

Hylton, Wil S., History's Largest Mining Operation is About to Begin, The Atlantic (January/February 2020), available at < https://www.theatlantic.com/magazine/archive/2020/01/20000-feet-under-the-sea/603040/>.

Jasanoff, Sheila, Serviceable Truths: Science for Action in Law and Policy, Texas Law Review 93 (2015), 1723-1749.

Kulick, Andreas, From Problem to Opportunity? An Analytical Framework for Vagueness and Ambiguity in International Law, German Yearbook of International Law 59 (2016), 257-288.

Lowe, Vaughan, Sustainable Development and Unsustainable Arguments, in: Boyle, A./Freestone, D. (eds.), International Law and Sustainable Development: Past Achievements and Future Challenges, Oxford 1999, 27-37.

Lynch, Michael/Jasanoff, Sheila, Contested Identities: Science, Law and Forensic Practice, Social Studies of Science 28 (1998), 675-686.

Martin, Eleanor, Deep Sea Mining: Is It Sustainable/Green Enough? (July 2020, Norton Rose Fulbright) available at < https://www.nortonrosefulbright.com/en/knowledge/publications/e37cfa1a/deep-sea-mining-is-it-sustainable-green-enough >

Massimi, Michaela, Why Philosophy of Science Matters to Science, Prize Lecture, The Royal Society (21 May 2018), available at < https://royalsociety.org/science-events-and-lectures/2018/05/wilkins-bernal-medawar-prize-lecture/>.

McDougal, M.S./Lasswell, H.D., The Relation of Law to Social Process: Trends in Theories about Law, University of Pittsburgh Law Review 37 (1976), 465–485.

Murase, Shinya, Scientific Knowledge and the Progressive Development of International Law: With Reference to the ILC Topic on the Protection of the Atmosphere, in: Crawford, James/Koroma, Abdul/Mahmoudi, Said/Pellet, Alain (eds.), The International Legal Order: Current Needs and Possible Responses, Essays in Honour of Djamchid Momtaz, Leiden 2017, 41-52.

– International Law: An Integrative Perspective on Transboundary Issues, Tokyo 2011.

Oppenheim, Lassa, The Science of International Law: Its Task and Method, American Journal of International Law 2 (1908), 313-352.

Orford, Anne, Scientific Reason and the Discipline of International Law, European Journal of International Law 25 (2014), 369-385.

Pogge, Thomas, Cosmopolitanism and Sovereignty, Ethic 103 (1992), 48-75.

Poscher, Ralf, Ambiguity and Vagueness in Legal Interpretation, in: Solan, Lawrence M./Tiersma, Peter M. (eds.), Oxford Handbook of Language and Law, Oxford 2012, 128-144.

Pottage, Alain, Law Machines: Scale Models, Forensic Materiality and the Making of Modern Patent Law, Social Studies of Science 41 (2011), 621-643.

Proelss, Alexander, The Role of the Authority in Ocean Governance, in: Scheiber, Harry N./Paik, Jin-Hyun (eds.), Regions, Institutions, and Law of the Sea: Studies in Ocean Governance, Leiden 2013, 145-160.

Ratner, Steven R., The Thin Justice of International Law: A Morality Reckoning of the Law of Nations, Oxford 2015.

Rawls, John, A Theory of Justice, revised edition, Cambridge, MA 1999.

– Justice as Fairness, Philosophical Review 67 (1958), 164–94.

Raz, Joseph, On the Nature of Law, Archiv für Rechts und Sozialphilosophie 82 (1996), 1-25.

– Authority, Law and Morality, in: Raz, Joseph (ed.), Ethics in the Public Domain, revised edition, Oxford 1995, 210-237.

Rimkute, D./Haverland, M., How Does the European Commission Use Scientific Expertise? Results from a Survey of Scientific Members of the Commission's Expert Committees, Comparative European Politics 13 (2015), 430–449.

Rijpkema, Peter, The Rule of Law Beyond Thick and Thin, Law and Philosophy 32 (2013), 793-816.

– The Concept of a Global Rule of Law, Transnational Legal Theory 4 (2013), 167-196.

Rovira, Mónica García-Salmones, The Project of Positivism in International Law, Oxford 2013.

Ruckelshaus, Mary H./Levin, Phil/Johnson, Jerald B./Kareiva, Peter M., The Pacific Salmon Wars: What Science Brings to the Challenge of Recovering Species, Annual Review of Ecological Systems 33 (2002), 665-706.

Ruhl, J.B., The Fitness of Law: Using Complexity Theory to Describe the Evolution of Law and Society and Its Practical Meaning for Democracy, Vanderbilt Law Review 49 (1996), 1407-1490.

Sands, Philippe, Litigating Environmental Disputes: Courts, Tribunals and the Progressive Development of International Environmental Law, in: Ndiaye, Tafsir Malick/Wolfrum, Rüdiger/Kojima, Chie (eds.), Law of the Sea, Environmental Law and Settlement of Disputes: Liber Amicorum Judge Thomas A. Mensah, 313-325.

Saul, Matthew, Identifying *Jus Cogens* Norms: The Interaction of Scholars and International Judges, Asian Journal of International Law 5 (2015), 26-54.

Scanlon, Thomas M., What We Owe to Each Other, Cambridge, MA 2000.

Scovazzi, Tullio, Mining, Protection of the Environment, Scientific Research and Bioprospecting: Some Considerations on the Role of the International Sea-Bed Authority, International Journal of Marine and Coastal Law 19 (2004), 388-409.

Simma, Bruno, The International Court of Justice and Scientific Expertise, Proceedings of the Annual Meeting ASIL 106 (2012), 230-233.

Stephan, Paul B., Privatizing International Law, Virginia Law Review 97 (2011), 1573-1664.

Swanson, Kara, Biotech in Court: A Legal Lesson on the Unity of Science, Social Studies of Science 37 (2007), 357-384.

Tai, Stephanie, Uncertainty About Uncertainty: The Impact of Judicial Decisions on Assessing Scientific Uncertainty, Journal of Constitutional Law 11 (2009) 671-727.

Tamanaha, Brian Z., Law's Evolving Emergent Phenomena: From Rules of Social Intercourse to Rule of Law Society, Washington University in St. Louis Legal Studies Research Paper 18-03-03 (2018).

– On the Rule of Law: History, Politics, Theory, Cambridge 2004.

Tanaka, Yoshifumi, Reflections on the Conservation and Sustainable Use of Genetic Resources in the Deep Seabed Beyond the Limits of National Jurisdiction, Ocean Development and International Law 39 (2008), 129-149.

Trethewey, Laura, Earth's final frontier: the global race to map the entire ocean floor (The Guardian, 30 June 2020), available at < https://www.theguardian.com/environment/2020/jun/30/earths-final-frontier-the-global-race-to-map-the-entire-ocean-floor >.

Treves, Tullio, Principles and Objectives of the Legal Regime Governing Areas Beyond National Jurisdiction, in: Molenaar, Erik J/Oude Elferink, Alex G. (eds.), The International Legal Regime of Areas Beyond National Jurisdiction: Current and Future Developments, Leiden 2010, 7-25.

Trevisanut, Seline, The Role of Private Actors in Offshore Energy: Shifting Models of Participation, International Journal of Marine and Coastal Law 29 (2014), 645-665.

Trevisanut, Seline/Giannopoulos, Nikolaos, Investment Protection in Offshore Energy Production: Bright Sides of Regime Interaction, Journal of World Investment and Trade 19 (2018), 789-827.

Waldron, Jeremy, Is the Rule of Law an Essentially Contested Concept (in Florida)?, Law and Philosophy 21 (2002), 137-64.

Wenning, Carl J., Scientific Epistemology: How Scientists Know What They Know, Journal of Physics Teacher Education Online 5 (Autumn 2009), 3-15.

Zemanek, Karl, The Legal Foundations of the International System, The Hague 1997.

Rechtswissenschaftliche Beiträge der Hamburger Sozialökonomie

ISSN 2366-0260 (print) / ISSN 2365-4112 (online)

Bislang erschienene Hefte

Heft 1
Felix Boor, Die Yukos-Enteignung. Auswirkungen auf das Anerkennungs- und Vollstreckungssystem aufgehobener ausländischer Handelsschiedssprüche

Heft 2
Karsten Nowrot, Sozialökonomie als disziplinäre Wissenschaft. Alternative Gedanken zur sozialökonomischen Forschung, Lehre und (Eliten-) Bildung

Heft 3
Florian Hipp, Die kommerzielle Verwendung von frei zugänglichen Inhalten im Internet

Heft 4
Karsten Nowrot, Vom steten Streben nach einer immer wieder neuen Weltwirtschaftsordnung. Die deutsche Sozialdemokratie und die Entwicklung des Internationalen Wirtschaftsrechts

Heft 5
Karsten Nowrot, Jenseits eines abwehrrechtlichen Ausnahmecharakters. Zur multidimensionalen Rechtswirkung des Widerstandsrechts nach Art. 20 Abs. 4 GG

Heft 6
Karsten Nowrot, Grundstrukturen eines Beratungsverwaltungsrechts

Heft 7
Karsten Nowrot, Environmental Governance as a Subject of Dispute Settlement Mechanisms in Regional Trade Agreements

Heft 8
Margaret Thornton, The Flexible Cyborg: Work-Life Balance in Legal Practice

Heft 9
Antonia Fandrich, Sustainability and Investment Protection Law. A Study on the Meaning of the Term *Investment* within the ICSID Convention

Heft 10
Karsten Nowrot, Of "Plain" Analytical Approaches and "Savior" Perspectives: Measuring the Structural Dialogues between Bilateral Investment Treaties and Investment Chapters in Mega-Regionals

Heft 11
Maryna Rabinovych, The EU Response to the Ukrainian Crisis: Testing the Union's Comprehensive Approach to Peacebuilding

Heft 12
Marita Körner, Die Datenschutzgrundverordnung der Europäischen Union: Struktur und Ordnungsprinzipien

Heft 13
Christin Krusenbaum, Das deutsche Krankenversicherungssystem auf dem Prüfstand – Ist die Bürgerversicherung die ultimative Alternative?

Heft 14
Marita Körner, Age Discrimination in the Context of Employment

Heft 15
Avinash Govindjee/ Judith Brockmann/ Manfred Walser, Atypical Employment in an International Perspective

Heft 16
Cara Paulina Gries, Gesetzliche Barrieren bei der Integration von geduldeten Flüchtlingen in den deutschen Arbeitsmarkt

Heft 17
Karsten Nowrot, Aiding and Abetting in Theorizing the Increasing Softification of the International Normative Order - A Darker Legacy of Jessup's *Transnational Law*?

Heft 18
Matti Riedlinger, Das CSR-Richtlinie-Umsetzungsgesetz: Implementierung von Corporate Social Responsibility Berichtspflichten in nationales Recht

Heft 19
Karsten Nowrot, "Competing Regionalism" vs. "Cooperative Regionalism": On the Possible Relations between Different Regional Economic Integration Agreements

Heft 20
Karsten Nowrot, The 2017 EU Conflict Minerals Regulation: An Effective European Instrument to Globally Promote Good Raw Materials Governance?

Heft 21
Karsten Nowrot, The Other Side of Rights in the Processes of Constitutionalizing International Investment Law: Addressing Investors‘ Obligations as a New Regulatory Experiment

Heft 22
Karsten Nowrot/*Emily Sipiorski*, Arbitrator Intimidation and the Rule of Law: Aspects of Constitutionalization in International Investment Law

Heft 23
Karsten Nowrot, European Republicanism in (Legitimation) Action: Public Participation in the Negotiation and Implementation of EU Free Trade Agreements

Heft 24
Karsten Nowrot, Non-Recognized Territorial Entities in the Post-Soviet Space from the Perspective of WTO Law: Outreach to Outcasts?

Heft 25
Marita Körner, Beschäftigtendatenschutz im Geltungsbereich der DSGVO

Heft 26
Vladlena Lisenco/Karsten Nowrot, The 2018 Pridnestrovian Law on State Support for Investment Activities: Some Thoughts on an Investment Statute in a Frozen Conflict Situation

Heft 27
Marita Körner, Die Rolle des Betriebsrats im Beschäftigtendatenschutz

Heft 28
Nadia Kornioti/Karsten Nowrot, Looking Back to Learn for the Future?: The Work of the ILA on the Issue of Human Rights in Times of Emergency in the 1980s

Heft 29
Marita Körner, Der Betriebsrat als datenschutzrechtlich verantwortliche Stelle

Heft 30
Karsten Nowrot/Emily Sipiorski, (De-) Constitutionalization of International Investment Law?: Narratives from Africa

Heft 31
Felix Boor, Die beschleunigte Landreform Mugabes vor deutschen Gerichten - der „Hamburger Kaffeestreit“

Heft 32
Karsten Nowrot, Corporate Legal and Social Responsibility as an Issue of International Investment Agreements: A Suitable Role Model for the WTO Legal Order?

Heft 33
Julius Adler, Der Grundsatz der „Full Protection and Security“ im internationalen Investitionsschutzrecht - Bedeutung in Theorie und Praxis

Heft 34
Sebastian Barth, Gefangenenarbeit: Meilen- oder Stolperstein der Resozialisierung?
Eine rechtliche Betrachtung von Gefangenenarbeit in Bezug auf das Resozialisierungsziel

Heft 35
Karsten Nowrot, Das gesellschaftliche Transformationspotential der Sustainable Development Goals: Völkerrechtliche Rahmenbedingungen und außerrechtliche Nachhaltigkeitsvoraussetzungen

Heft 36
Karsten Nowrot, Illegal Trade in Wild Animals and Derived Products during Armed Conflicts: What Role for International Wildlife Agreements?