CURRENT ISSUES OF INTERNATIONAL ENVIRONMENTAL AND CLIMATE LAW

CAUSATION PUZZLES IN INTERNATIONAL CLIMATE LITIGATION

André Nollkaemper*

Abstract

The multiplicity of causes of climate change makes it difficult to establish causal connections between individual States' greenhouse gas emissions and harmful effects of climate change. Several States and companies have invoked this causation puzzle as a defence against claims that they would be responsible for harmful effects. However, in recent opinions and judgments, the International Tribunal for the Law of the Sea, the European Court of Human Rights, and national courts have shown that this causation puzzle does not necessarily preclude a determination of the responsibility of States contributing to climate change. This paper examines how courts have (partially) solved puzzles of cause-effect relations by relying on normative standards based on the imperative to prevent global risks of climate harm. It also articulates possible solutions to the main causation puzzle that courts have not yet cracked: allocating compensation for climate change harm.

Keywords: State responsibility; climate change; climate litigation; causation; national courts.

1. Introduction

International law plays a pivotal role in guiding the global transition to climate neutrality and the phasing out of fossil fuels. It sets the long-term targets of this transformation and coordinates States' regulatory approaches to reducing greenhouse gas emissions. International law also provides persons negatively impacted by climate change with principles and procedures to hold States and companies that fail to perform reduction obligations accountable, instilling a sense of justice in the fight against climate change.

To use international law more effectively to mitigate greenhouse gas emissions by public and private sectors, it is crucial to understand the factors hindering international climate law development and application. While these factors are mainly historical, political, economic, and societal, there are also principles and processes internal to international law that complicate the effective use of international law to address climate change. The United Nations Framework Convention on Climate

* University Professor of International Law and Sustainability, University of Amsterdam.

Change (UNFCCC),[1] its Kyoto Protocol,[2] and the 2015 Paris Agreement[3] were not developed in a vacuum but are part of an existing international legal system that pulls in many directions. While some international laws support reduction emissions policies, others facilitate practices that increase rather than reduce climate change and may legitimize continuing emissions and global injustices.

This article delves into one of the most intricate parts of international law that complicates the application of international climate law: the principle of causation. In its simplest form, causation refers to "the relationship between something that happens and the reason for it happening".[4] The principle of causation is well-established in international law but was developed to address problems very different from the complex global issue of climate change. The question is whether the traditional principles of causation are suited for cause-effect situations concerning climate change, characterised by an infinite number of contributors, largely outside international law's reach.

Over the past decades, the Intergovernmental Panel on Climate Change (IPCC) has clarified some causation problems regarding climate change. It found that "observed increases in well-mixed GHG concentrations since around 1750 are unequivocally *caused by* GHG emissions from human activities".[5] The IPCC also confidently concluded that "[c]limate change has *caused* substantial damages, and increasingly irreversible losses, in terrestrial, freshwater, cryospheric and coastal and open ocean ecosystems".[6] These causal connections are foundational for the entire body of international climate law. They are echoed in the preambles of the UNFCCC and the Paris Agreement. Both the International Tribunal for the Law of the Sea (ITLOS)[7] and the European Court of Human Rights (ECtHR)[8] considered the IPCC's findings authoritative, and States did not contest these findings in various international proceedings.

However, the IPCC's findings on *general* causation may not solve *specific* causation problems that arise when injured persons rely on international law in proceedings against particular States or companies that (allegedly) have contributed to harmful effects of climate change on people, property, and ecosystems. Where multiple States and other entities contribute to such harmful effects, it will be difficult, if not impossible, to establish that a specific harm would not have occurred without that contribution or that the particular actions of any one State or entity are the "direct

[1] United Nations Framework Convention on Climate Change (UNFCCC), 9 May 1992, entered into force 21 March 1994.

[2] Kyoto Protocol to the United Nations Framework Convention on Climate Change, 11 December 1997, entered into force 16 February 2005.

[3] Paris Agreement, 12 December 2015, entered into force 4 November 2016.

[4] Oxford Learner's Dictionaries, <www.oxfordlearnersdictionaries.com>.

[5] Lee and Romero (eds.), "IPCC Climate Change 2023: Synthesis Report", IPCC, p. 42 (emphasis added).

[6] *Ibid*., p. 5 (emphasis added).

[7] *Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law*, Advisory Opinion of 21 May 2024.

[8] *Verein KlimaSeniorinnen Schweiz and Others v. Switzerland*, Application No. 53600/20, Grand Chamber, Judgment of 9 April 2024, para. 436.

and certain" causes of the harm.[9] Although climate science has made significant progress in the past few years, allowing for a better understanding of the relations between drivers of climate change, weather events, and damage,[10] it does not (yet) allow for specific findings that a particular State caused a particular harm.

These causation problems have practical consequences. In the over 2000 climate cases that worldwide have been initiated,[11] several defendant States and companies have argued that the difficulty of establishing causal connections would preclude a determination that they are responsible for climate change harm.[12] A common challenge "that seems to trip such litigation is establishing a causal link between the injury cited and the conduct of the defendant".[13]

In the past decades, international and national courts have suggested that the causation problem created by traditional causation principles need not be insurmountable. The ITLOS, in its Advisory Opinion of May 2024, the ECtHR in the *KlimaSeniorinnen* judgment of April 2024, and several national courts have combined obligations that incorporate less demanding causal tests with evidence of general causation. This combination has precluded the need to rely on evidence of specific causation between a particular conduct or emission and a particular harm. Also recent scholarly contributions have articulated proposals for causal pathways that might be attuned to the complexity of causation in relation to climate change.[14]

Against the background of these developments, this article seeks to answer how courts have approached causation puzzles in situations where injured persons seek to hold individual States or companies responsible for climate change harm. It will

---

[9] Peel, "Climate Change", in Nollkaemper and Plakokefalos (eds.), *The Practice of Shared Responsibility in International Law*, Cambridge, 2017, p. 1009 ff., pp. 1041-1042.

[10] James et al., "Attribution: How Is It Relevant for Loss and Damage Policy and Practice?", in Mechler et al. (eds.), *Loss and Damage from Climate Change: Concepts, Methods and Policy Options*, Cham, 2019, p. 113 ff.

[11] UNEP, "Global Climate Litigation Report: 2023 Status Review", 2023.

[12] See *infra* Section 2.

[13] Wewerinke-Singh, "The Rising Tide of Rights: Addressing Climate Loss and Damage through Rights-Based Litigation", Transnational Environmental Law, 2023, p. 537 ff., p. 552; Toussaint, "Loss and Damage and Climate Litigation: The Case for Greater Interlinkage", RECIEL, 2020, p. 16 ff.

[14] Lanovoy, "Causation in the Law of State Responsibility", BYIL, 2022, p. 1 ff.; Ollino, "A 'Missed' Secondary Rule? Causation in the Breach of Preventive and Due Diligence Obligations", in Kajtár, Çali and Milanovic (eds.), *Secondary Rules of Primary Importance in International Law: Attribution, Causality, Evidence, and Standards of Review in the Practice of International Courts and Tribunals*, Oxford, 2022, p. 105 ff.; Nollkaemper et al., "Guiding Principles on Shared Responsibility in International Law", EJIL, 2020, p. 15 ff.; Verheyen, "Loss and Damage Due to Climate Change: Attribution and Causation – Where Climate Science and Law Meet", International Journal of Global Warming, 2015, p. 158 ff.; Craik, Mackenzie and Davenport, *Liability for Environmental Harm to the Global Commons*, Cambridge, 2023, pp. 95-132; Rodríguez-Garavito, "Litigating the Climate Emergency: The Global Rise of Human Rights-Based Litigation for Climate Action", in Rodríguez-Garavito (ed.), *Litigating the Climate Emergency: How Human Rights, Courts, and Legal Mobilization Can Bolster Climate Action*, Cambridge, 2022, p. 9 ff.; Plakokefalos, "Causation in the Law of State Responsibility and the Problem of Overdetermination: In Search of Clarity", EJIL, 2015, p. 471 ff.; Sulyok, *Science and Judicial Reasoning: The Legitimacy of International Environmental Adjudication*, Cambridge, 2020.

also articulate possible solutions for the main causation puzzle that courts have not (yet) cracked: the allocation of compensation for climate change harm.

The main conclusion drawn from the analysis is that, in some cases, courts have solved puzzles of factual cause-effect relations by relying on normative standards based on the imperative to prevent global risks combined with evidence of general causation. This presents a significant shift in thinking about causation in international law. While traditionally, legal (or "normative") causation served to restrict the responsibility consequences of factual causation, in recent climate change practice, normative causation extends rather than narrows responsibility. This conclusion confirms earlier research findings that substantive principles are relevant considerations in forming the causal policies of courts.[15] The analysis also shows that, so far, this approach is more helpful in determining responsibility than in allocating reparation obligations.

The analysis is primarily based on the case law of international and national courts addressing climate change. Of course, from the perspective of international law, decisions of national courts should be treated with caution. Significant differences exist vis-à-vis the principle of causation between international law and national legal systems, and approaches by courts in one State are not always comparable to those in other States.[16] However, solutions to causation puzzles identified by a national court may, even if they are not easily transposable to different national legal systems or international law, enhance our understanding of the paths available to courts to address causation-related claims for the complex global problems of climate change that straddle domestic and international legal systems.

The article is divided into six sections. Section 2 explains the key causation puzzle and how that may preclude the effective application of international climate law. Sections 3-6 identify (partially overlapping) strategies courts may use to solve this causation puzzle. Section 3 identifies decisions of courts that have individualised causation, bypassing problems of cumulative causation. Section 4 explores how judicial decisions have relied on a "contribution as causation" theory, under which the mere contribution to climate change, combined with general evidence of causation and obligations of conduct, can be sufficient for determining responsibility, bypassing complex factual causation questions. Section 5 explores solutions to the puzzle that arises when injured persons seek a determination that States not just failed to take preventative measures but actually caused (significant) climate change harm. Section 6 explores the main unanswered puzzle of causation: apportioning of causal contributions in determining damages. Section 7 concludes.

---

[15] Sulyok, *cit. supra* note 14, p. 315.

[16] For instance, the approach of the Netherlands Supreme Court in *Urgenda* on causation was positively cited by courts in some States, see e.g. Belgium, Court of Appeal, *VZW Klimaatzaak v. Kingdom of Belgium & Others*, 30 November 2023; New Zealand, High Court, *Sarah Thomson v. The Minister for Climate Change Issues*, 2 November 2017, para. 127. However, other courts distinguished the case and did not follow the *Urgenda* approach; see New Zealand, High Court, *Smith v. Attorney-General*, 15 July 2022, NZHC 1693, para. 194; Norway, Supreme Court, *Nature and Youth Norway and Greenpeace Nordic v. the Ministry of Petroleum and Energy*, HR-2020-2472-P, Case No. 20-051052SIV-HRET (stating that "[t]he judgment from the Netherlands has little transfer value to the case at hand").

The article is written, and the research concluded, before the International Court of Justice (ICJ) gave its Advisory Opinion on the obligations of States concerning climate change. The Opinion may well be relevant to understanding causation puzzles. The General Assembly asked the Court to determine the "legal consequences under these obligations for States where they, by their acts and omissions, *have caused significant harm to the climate system* and other parts of the environment".[17] The question presupposes that it can be determined that an individual State has caused significant harm to the climate system. Under the prevailing approach of States to causation, that is not an easy argument. Given that there are no facts before the Court that would allow it to draw any conclusion on *specific* causation, the Court could take the easy path, presuming in the abstract that it is possible that the causation test can be passed and discuss on that basis the legal consequences. However, it could also address the causation problem head-on and clarify if causation for climate harm needs to be determined in line with the traditional doctrine and the position of States explained in Section 2, or whether it could be construed in a way that aligns better with the cumulative and complex nature of climate change, as discussed in Sections 3-6 below.

2. The Causation Problem in International Climate Law

Courts will use international law to address causation in the context of climate change in a narrow set of situations. International law is not concerned with all contributions to climate change by all people and legal entities worldwide; it can only be used to solve questions of causation in situations where States have acted illegally. Given the relatively undemanding standards of international law, this significantly reduces and simplifies causation puzzles: many causes are either entirely below the radar of international law or only indirectly within the purview of international law, namely via the acts or omissions of States.

Once the wrongfulness of an act of State has been established, the role of causation is to trace a particular harm to that State, making it responsible for the outcome.[18] The causal link between the State's activity, the climate event that causes the damage, and the damage itself determines the scope of international legal responsibility for climate change damages.[19] To establish such a causal link, courts will need to choose a standard of causation. A strict (or "high") standard of causation may restrict what a State is responsible for, whereas a wide (or "low") standard may bring more harm within the ambit of a State's responsibility.

---

[17] General Assembly, Request for an Advisory Opinion of the International Court of Justice on the Obligations of States in Respect of Climate Change, UN Doc. A/77/L.58 (2023), emphasis added.

[18] Orakhelashvili, *Causation in International Law*, Cheltenham/Northampton, 2022, p. 113.

[19] Voigt, "Climate Change and Damages", in Carlarne, Gray and Tarasofsky (eds.), *The Oxford Handbook of International Climate Change Law*, Oxford, 2016, p. 464 ff.; ILC, Articles on the Responsibility of States for Internationally Wrongful Acts (ARSIWA), 2001, Art. 31 (stating that a responsible State has to make full reparation for any moral or material damage caused by the internationally wrongful act).

The choice for a causation standard is not only a legal-technical operation. Causation is a core part of the system of international law, is influenced by the historical and political dynamics that have shaped that system, and serves the interests of the States that make international law. The principle of causation is coloured by a legal system premised on State sovereignty and bilateralism. In that system, States and courts have opted to restrict States' responsibility to the consequences they directly cause. Unsurprisingly, these standards are not particularly amenable to the aims of civil society groups and other persons who seek, through the judicial system, to fast-track mitigation measures for climate change.

International courts have used different standards to express the causal standard, and it is often said that there is no dominant standard.[20] The International Law Commission's (ILC) Articles on the Responsibility of States for Internationally Wrongful Acts (ARSIWA)[21] only state (in the context of reparation) that a responsible State must make full reparation for any moral or material damage *caused* by the internationally wrongful act; it does not indicate the causation standard that decision-makers must apply in this context.[22] The precise standard would have to be determined on a case-by-case basis.[23] National law is of little help here. Given the diversity of national legal systems, no identifiable general principle of law may be inferred from them. Christina Voigt writes that, in the absence of an agreed approach in international law on the determination of causation, it is unclear how a court or tribunal would deal with the issue of complex and cumulative causes.[24]

Nonetheless, two causation standards have been dominant in the ICJ's case law. The application of these standards may differ between situations where causation needs to be determined to establish responsibility, on the one hand, and situations where a court needs to determine compensation, on the other hand. A standard that applies to the former need not, in identical form, apply to the latter, and vice versa.

The first dominant standard is the *conditio sine qua non* test. This standard pertains to factual causation, or "causality-in-fact". According to Draft Article 23 of the ARSIWA, adopted by the ILC on first reading, "[w]hen the result required of a State by an international obligation is the prevention, by means of its own choice, of the occurrence of a given event, there is a breach of that obligation only if, *by the conduct adopted*, the State does not achieve that result".[25] The ICJ has applied this test in several cases, sometimes implicitly and sometimes expressly.[26] In national legal systems, this standard is dominant: "[f]ar and away the most prevalent account of causation in

---

[20] Sulyok, *cit. supra* note 14, p. 53.

[21] ARSIWA, *cit. supra* note 19.

[22] *Ibid.*, Commentary on Art. 31, para. 10.

[23] Crawford, *State Responsibility: The General Part*, Cambridge, 2013, p. 559; Santulli, "Travaux de la Commission du droit international (cinquante-deuxième session)", AFDI, 2000, p. 403 ff., p. 406; Lanovoy, *cit. supra* note 14, p. 4.

[24] Voigt, *cit. supra* note 19, p. 485.

[25] Report of the ILC on the Work of Its Forty-Eighth Session, UN Doc. A/51/10 (1996), p. 174.

[26] *Application of the Convention on the Prevention and Punishment of the Crime of Genocide* (*Bosnia and Herzegovina v, Serbia and Montenegro*), Judgment of 26 February 2007, ICJ Reports 2007, p. 43 ff., para. 462.

the law, regularly invoked both in courtroom practice and in legal writings, is a necessity approach: the 'but for' or *sine qua non-test*".[27]

The second standard pertains to legal causation. The idea is that a State should not be held responsible for "any and all consequences flowing from an internationally wrongful act"[28] and that principles of legal causation should limit the consequences that factually may flow from a wrongful act for which a State is responsible.[29] In the ICJ's case law, the dominant test of legal causation is the standard of a sufficiently direct and certain causal nexus. In *Certain Activities Carried Out by Nicaragua in the Border Area* (*Costa Rica v. Nicaragua*), the Court had to determine whether activities by Nicaragua had caused significant harm to a waterway in Costa Rica and set out to assess "whether there is a sufficiently direct and certain causal nexus between the wrongful act and the damage".[30] The ITLOS adopted the standard for damages to the deep seabed.[31] One can speak of direct causation if no intervening event can break the causal chain;[32] only then would a State be responsible for consequences that may be linked to that State based on a test of factual causation.

The combination of the *sine qua non*-test and the direct and certain nexus test will make it very difficult to hold individual States that have committed a wrongful act responsible for climate harm. In a relatively simple bilateral setting, where Costa Rica argued that the building of a road by Nicaragua caused harm to waters in Costa Rica, the ICJ explained that causation is complex since damage may be due to several concurrent causes, "or the state of the science regarding the causal link between the wrongful act and the damage may be uncertain".[33] These difficulties are multiplied in situations of complex causation, where the number of States and other actors contributing to harm is enormous and where the natural processes connecting cause and effect are infinitely more complicated than in the dispute between Nicaragua and Costa Rica.[34] All States contribute to climate change by allow-

---

[27] Holton, "Causation and Responsibility", in Tasioulas (ed.), *The Cambridge Companion to the Philosophy of Law*, Cambridge, 2020, p. 237 ff.

[28] ARSIWA, *cit. supra* note 19, Commentary on Art. 31, para. 9.

[29] See further discussion in Jarrett, "Depolluting the Doctrine on Causation in International Investment Law: The Case for Extracting 'Legal Causation'", in Kajtár, Çali and Milanovic (eds.), *cit. supra* note 14, p. 124 ff.; Lanovoy, *cit. supra* note 14; Sulyok, *cit. supra* note 14, p. 54.

[30] *Certain Activities Carried Out by Nicaragua in the Border Area* (*Costa Rica v. Nicaragua*) and *Construction of a Road in Costa Rica along the San Juan River* (*Nicaragua v. Costa Rica*), Judgment of 16 December 2015, ICJ Reports 2015, p. 665 ff.

[31] Seabed Disputes Chamber, *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area*, Advisory Opinion of 1 February 2011, ITLOS Reports 2011, p. 10 ff.

[32] Rudall, *Compensation for Environmental Damage Under International Law*, London/New York, 2020, p. 49.

[33] *Certain Activities Carried out by Nicaragua in the Border Area* (*Costa Rica v. Nicaragua*), *Compensation Owed by the Republic of Nicaragua to the Republic of Costa Rica*, Judgment of 2 February 2018, ICJ Reports 2018, p. 15 ff., para. 34; See also on the scientific uncertainty in such cases Sulyok, *cit. supra* note 14, pp. 55-56.

[34] Voigt, *cit. supra* note 19, p. 484 (noting that "the near impossibility of attributing emissions of a specific country to specific damages, due to the complex and synergetic effect of the diverse pollutants and polluters and the non-linearity of climate change, is problematic"); ECtHR, *Duarte Agostinho and Others v. Portugal and 32 Others*, Application No. 39371/20, Decision of 9 April 2024, para. 207.

ing emissions of greenhouse gases from within their territory, and the number of contributing causes within States is infinite. The complexity is further increased by the influence of natural causes,[35] soil erosion, zoning and planning laws, or unlawful development in vulnerable areas.[36] Moreover, most GHGs accumulate over time and mix globally.[37]

While demanding, it need not be entirely impossible to use these tests to determine a causal connection between a State and climate harm. A recent report indicated that the top 10 emitters (China, the United States, India, the EU, Russia, Japan, Brazil, Indonesia, Iran, and Canada) contribute over two-thirds of all emissions.[38] None of those States will have caused the entirety of harmful effects in a vulnerable State that suffers from climate change. However, a State that causes a substantial part of overall significant harm still causes significant harm. One need not conclude that the State's omissions are the entire cause of harm; it may be sufficient to determine that they cause a significant proportion. I will return to this construction in Sections 5 and 6 below.

Leaving that construction to the side for the moment (so far, no court has relied on it), the causation standards identified above will have practical consequences for determining responsibility and allocating reparation. The difficulty of establishing causation could leave climate change victims seeking redress empty-handed, as respondents could argue that it is scientifically impossible to determine which State is responsible for climate harm. They could rely on the drop-in-the-ocean argument:[39] the greenhouse gas emissions of a particular State, company, project, or activity would be too small to be considered significant or substantial in the context of overall global GHG emissions that cumulatively cause rising global average temperatures and associated climate impacts.[40]

Several defendant States and companies in climate change litigation have relied on this argument.[41] Before the ECtHR, respondent States in *Duarte Agostinho* said in a joint statement that "[i]n view of the global causes of climate change, the causal link between any activities of the respondent Governments and the alleged effects on the applicants had not been established in this case". [42] They advanced this argument in relation to the admissibility of the claim,[43] but it would also apply to the merits of a climate change case. Similarly, in *KlimaSeniorinnen*, Switzerland argued that given its current low GHG intensity, "the omissions imputed to Switzerland were not of such a nature as to cause, on their own, the suffering claimed by the applicants and to have

[35] Sulyok, *cit. supra* note 14, p. 97.

[36] Voigt, *cit. supra* note 19.

[37] IPCC, Climate Change 2014 Synthesis Report, Summary for Policymakers, 2014, p. 17.

[38] Friedrich et al., "This Interactive Chart Shows Changes in the World's Top 10 Emitters", World Resources Institute, 2 March 2023 (in the report, the EU is considered as a "country").

[39] Peel, "Issues in Climate Change Litigation", Carbon and Climate Law Review, 2011, p. 15 ff.

[40] Id., "The Living Wonders Case: A Backwards Step in Australian Climate Litigation on Coal Mines", Journal of Environmental Law, 2024, p. 125 ff.

[41] See also Nedeski and Nollkaemper, "A Guide to Tackling the Collective Causation Problem in International Climate Change Litigation", EJIL: Talk!, 15 December 2022.

[42] *Duarte Agostinho*, *cit. supra* note 34, para. 82.

[43] *Ibid.*, para. 89.

serious consequences for their lives and private and family life". There was, therefore, not a sufficient link between polluting emissions and the respondent State "to raise the question of its positive obligations under Articles 2 and 8 of the Convention".[44]

Defendant States before UN human rights treaty bodies have made similar arguments. In *Billy*, Australia argued before the Human Rights Committee that climate change "is a global phenomenon attributable to the actions of many States" and that "it is not possible to trace causal links" between Australia's "contribution to climate change, its efforts to address climate change and the alleged effects of climate change on the enjoyment of the authors' rights".[45] In *Sacchi,* Argentina similarly invoked causal complexity to absolve itself of responsibility before the Committee on the Rights of the Child.[46]

Before national courts, defendant States similarly advanced the argument that, given the multiplicity of causes, harm could not be traced to them individually. Even though the causation standards are drawn from domestic rather than international law, the construction of the argument is comparable. In *Urgenda*, the Netherlands argued that it could not solve the global climate problem on its own,[47] that

> the Dutch emissions of greenhouse gases in absolute terms, compared to the emissions worldwide are extremely small in magnitude and that an emission reduction by the Netherlands of 25-40% by 2020 has no measurable effect, or at least a negligible effect, on the concentration level of greenhouse gases and the average global warming.[48]

Belgium relied on a comparable argument in the *Klimaatzaak*, arguing that "the federal State and the federated entities are only some of the many players involved in the fight against global warming, that their action is limited to emissions emanating from Belgian territory, and that the impact of these emissions is minimal on a global scale".[49] Finally, in the *Living Wonders Case*, the Australian Minister for the Environment and Water, in deciding on reconsideration requests for two coal mining proposals, said that contributions to global GHG emissions in the range of 0.042-0.043% were "very small" and that these projects could not be said to be a "substantial

[44] *Verein KlimaSeniorinnen*, *cit. supra* note 8, para. 346.

[45] Human Rights Committee, *Daniel Billy and Others v. Australia* (*Torres Strait Islanders Petition*), Communication No. 3624/2019, Views adopted on 21 July 2022, para. 4.3.

[46] Committee on the Rights of the Child, *Sacchi et al. v. Argentina et al.*, Communication No. 104/2019 (Argentina), Communication No. 105/2019 (Brazil), Communication No. 106/2019 (France), Communication No. 107/2019 (Germany), Communication No. 108/2019 (Turkey), Decisions of 22 September 2021.

[47] The Netherlands, Supreme Court, *Urgenda v. State of the Netherlands*, ECLI:NL:HR:2019:2007, 2019, para. 3.4; Nollkaemper, "A New Classic in Climate Change Litigation: The Dutch Supreme Court Decision in the Urgenda Case", EJIL: Talk!, 6 January 2020.

[48] Submission of the Netherlands to the Supreme Court, 8 January 2019, para. 4.4.

[49] *Klimaatzaak*, *cit. supra* note 16, paras. 232 and 259.

cause" of the physical effects of climate change on world heritage-listed areas like the Great Barrier Reef.[50]

While in the above cases the courts did not accept the "drop-in-the-ocean" argument, courts in other States concluded otherwise. The Norwegian Supreme Court found no adequate link between ten production licences on the Norwegian continental shelf and the possible loss of human lives. It said that it was uncertain whether or to which extent the decision to grant these licenses would lead to greenhouse gas emissions and that "the impact on the climate will be discernible in the more distant future. Although the climate threat is real, the decision does not involve, within the meaning of the ECHR, a 'real and immediate' risk of loss of life for citizens in Norway".[51]

The District Court for the Northern District of California rejected claims by a native Inupiat village in Alaska that had sued oil, power and coal companies for their contributions to climate change and the impacts on the village. In *Native Village of Kivalina v. Exxon Mobil,* the Court determined that "the injury has to be fairly traceable to the challenged action of the defendant" and that there should be "proof of a substantial likelihood that the defendant's conduct caused plaintiff's injury in fact". It found that the plaintiffs could not demonstrate "which emissions – emitted by whom and at what time in the last several centuries and at what place in the world – 'caused' Plaintiffs' alleged global warming-related injuries".[52]

The New Zealand Court of Appeal relied on the but-for test in a tort claim brought by Michael Smith against large greenhouse gas emitters. It concluded that there was "no physical or temporal proximity and no direct relationship or causal proximity, so [the claim] failed on reasonable foreseeability and proximity".[53] Specifically, regarding the but-for test, it said that "the class of possible contributors [...] was virtually limitless, and it could not be said that Mr Smith would not have been injured but for the negligence of the named defendants viewed globally".[54]

In Germany, a Peruvian national demanded that the multinational energy company RWE pay a share of the costs for the protective measures required in Peru. The District Court of Essen, applying a version of the but-for test, found that "the contribution of individual greenhouse gas emitters to climate change is so small that any single emitter, even a major one such as the defendant, does not substantially increase the effects of climate change".[55]

Finally, the Australian Land and Resources Tribunal rejected a claim directed against the grant of a mining lease in view of the greenhouse gas emissions that were likely to result from the mining, transport and use of coal. It was not satisfied that there was "a demonstrated causal link between this mine's GHG emissions and any discern-

---

[50] Australia Federal Court, *Environment Council of Central Queensland Inc v. Minister for the Environment and Water* (*No.* 2), [2023] FCA 1208; Peel, "The Living Wonders", *cit. supra* note 40.

[51] *Nature and Youth Norway*, *cit. supra* note 16.

[52] United States, District Court for the Northern District of California, *Native Village of Kivalina v. ExxonMobil Corp.*, 30 September 2009.

[53] *Smith*, *cit. supra* note 16, para. 96.

[54] *Ibid.*, para. 97.

[55] The case is now on appeal; the Higher Regional Court of Hamm admitted the case and moved to the evidentiary phase.

ible harm [...] caused by global warming and climate change" and that "even if this mine's GHG emissions were eliminated completely, [the applicants] failed to show that that would have the slightest effect on global warming or climate change".[56]

In all these cases, defendants use a causation standard to argue that their contribution to the eventual harm was small and insignificant and that claims should be dismissed. These cases support the proposition that "[o]n very large-scale problems, such as ocean plastics pollution or ocean acidification from greenhouse gas emissions, the inability of legal doctrine to address cumulative causation issues effectively insulates states, international organisations and operators from liability".[57]

The positions of States and courts in these cases are relevant for understanding the status and contents of climate change obligations. It would be too easy to dismiss them as efforts to escape the reach of the law and deny plaintiffs their legitimate entitlements. When standards of causation are unsettled, the positions of States and the interpretations they support are relevant for determining the substance and the applicable causation standards of international climate change law.

Against the background of this practice of States and courts, this article now reviews strategies that international and national courts have used to circumvent or reduce the causation problem. The common denominator of these strategies is that they replace a factual causation standard that may make determining responsibility for climate change harm very difficult with a normative approach based on international obligations to prevent climate change, combined with reliance on general causation. Whereas legal (normative) causation traditionally has been used to *limit* the scope of the consequences of wide factual causation, this normative approach to causation *enables* rather than limits the determination of responsibility and its consequences.

3. Individualizing Causation

The first step in curtailing the impact of the causation puzzle on climate change litigation addresses a vital aspect of the drop-in-the-ocean argument: the argument that climate change is caused collectively and that this would stand in the way of determining individual causation of harm. This argument underlies the defendants' and courts' arguments referred to in the previous section. While in national courts, the legal weight of drop-in-the-ocean arguments will differ between legal systems depending on the applicable law, under international law, there is good authority for the proposition that a State cannot absolve itself from responsibility by arguing that its contribution is too small or that the contribution by others was more significant.

The premise of the system of international obligations and international responsibility is that the responsibility of each State is based on its own conduct and by

[56] Decision of the Land and Resources Tribunal, cited in Australia, Supreme Court of Queensland, *Queensland Conservation Council Inc. v. Xstrata Coal*, 12 October 2007, [2007] QCA 338, para. 26.

[57] Craik, Mackenzie and Davenport, *cit. supra* note 14.

reference to its own international obligations.[58] The non-performance by other States of their obligations and the factual consequences flowing from non-performance in causal terms, in principle, is immaterial. That may differ for the determination of compensation; the question of whether and to what extent the obligation to provide compensation has to take causation by other States into account is contested.[59] But that question has no relevance to the determination of responsibility. The ICJ said in the *Bosnian Genocide case* that it was irrelevant to the determination of Serbia's breach of the Genocide Convention that Serbia, by its conduct alone, would not have been able to prevent the Srebrenica genocide; it underlined the importance of Serbia's individual contribution to what could have been a collective effort.[60]

This principle applies fully to responsibility for climate change. In *KlimaSeniorinnen,* the ECtHR noted: "each State has its own share of responsibilities to take measures to tackle climate change and [...] the taking of those measures is determined by the State's own capabilities rather than by any specific action (or omission) of any other State".[61] It added that "a respondent State should not evade its responsibility by pointing to the responsibility of other States, whether Contracting Parties to the Convention or not".[62] This is even more so since under the European Convention, jurisdiction under Article 1 is principally territorial; it follows that "each State has its own responsibilities within its own territorial jurisdiction in respect of climate change".[63] Similarly, in *Duarte,* the Court said that, while climate change is undoubtedly a global phenomenon which should be addressed at the global level by the community of States, "each State has its own share of responsibilities to take measures to tackle climate change and that the taking of those measures is not determined by any specific action (or omission) of any other State".[64] The Committee on the Rights of the Child considered in *Sacchi* that "the collective nature of the causation of climate change does not absolve the State party of its individual responsibility that may derive from the harm that the emissions originating within its territory may cause".[65]

---

[58] ARSIWA, *cit. supra* note 19, Commentary on Art. 47, paras. 6 and 8.

[59] See *infra* Section 5.

[60] *Bosnian Genocide* case, *cit. supra* note 26, para. 430 (stating that "it is irrelevant whether the State whose responsibility is in issue claims, or even proves, that even if it had employed all means reasonably at its disposal, they would not have sufficed to prevent the commission of genocide. As well as being generally difficult to prove, this is irrelevant to the breach of the obligation of conduct in question, the more so since the possibility remains that the combined efforts of several States, each complying with its obligation to prevent, might have achieved the result – averting the commission of genocide – which the efforts of only one State were insufficient to produce").

[61] *Verein KlimaSeniorinnen*, *cit. supra* note 8, para. 442. The Court built on earlier cases involving a concurrent responsibility of States for alleged breaches of Convention rights, where each State can be held accountable for its share of the responsibility for the breach in question, in particular *M.S.S. v. Belgium and Greece*, Application No. 30696/09, Grand Chamber, Judgment of 21 January 2011, paras. 264 and 367, and *Razvozzhayev v. Russia and Ukraine and Udaltsov v. Russia*, Application No. 75734/12 and 2 others, Judgment of 19 November 2019, paras. 160-61 and 179-81.

[62] *Verein KlimaSeniorinnen*, *cit. supra* note 8, para. 442.

[63] *Ibid*., para. 443.

[64] *Duarte Agostinho*, *cit. supra* note 34, para. 202.

[65] *Sacchi*, *cit. supra* note 46. See also *Urgenda*, *cit. supra* note 47 (stating that "each country can be effectively called to account for its share of emissions").

Some national courts have followed this approach. The Supreme Court of the Netherlands held in *Urgenda* that the UNFCCC is based on the premise that all member countries must take measures to prevent climate change and that each country is responsible for its own share. That means "that a country cannot escape its own share of the responsibility to take measures by arguing that compared to the rest of the world, its own emissions are relatively limited in scope and that a reduction of its own emissions would have very little impact on a global scale".[66] Courts in Australia,[67] Belgium[68] and Germany[69] likewise rejected defendant authorities' drop-in-the-ocean arguments.

From these cases, it can be inferred that international law and several national legal systems do not provide a legal ground for the drop-in-the-ocean argument. Each State is responsible for its wrongs and the harm they cause. Causation is to be assessed individually, and the relative contributions need not be compared to those of other States to determine responsibility. This means that responsibility in relation to climate harm is a responsibility shared by all contributing States.[70] The question of what relatively small causal contributions mean for a State's responsibility is not determined by a freestanding standard of causation but rather by the applicable substantive rules of international law, which may incorporate causal elements.

The following sections will discuss these rules and their implications for causation in three parts: in relation to obligations to prevent climate change harm (Section 4), in relation to claims that a defendant State has actually caused significant harm and is responsible for doing so (Section 5) and in relation to claims that a responsible State should provide compensation for climate change harm (Section 6).

4. Solving Causation Puzzles in Determining Responsibility

The key to solving causation puzzles in relation to the determination of responsibility for climate change harm is that courts apply causation tests in close connection with the applicable substantive obligations. Brownlie notes: "the principles governing remoteness of damage are not constants and must be related to the substantive principles of law which have generated responsibility in the first place".[71] Whether and

---

[66] *Urgenda*, *cit. supra* note 47, paras. 5.7-5.8.

[67] Australia, Land and Environment Court of New South Wales, *Gray v. Minister for Planning and Others*, 27 November 2006, [2006] NSWLEC 720, para. 98 (stating that "[t]he fact there are many contributors globally does not mean the contribution from a single large source [...] should be ignored in the environmental assessment process").

[68] *Klimaatzaak*, *cit. supra* note 16.

[69] Germany, Constitutional Court, *Neubauer*, 24 March 2021 (stating that "[t]he fact that no state can resolve the problems of climate change on its own due to the global nature of the climate and global warming does not invalidate the national obligation to take climate action" and that "[t]he state cannot evade its responsibility by pointing to [GHG] emissions in other states").

[70] Generally: Nollkaemper and Jacobs, "Shared Responsibility in International Law: A Conceptual Framework", Michigan Journal of International Law, 2013, p. 359 ff.; Nollkaemper et al., *cit. supra* note 14.

[71] Brownlie, *System of the Law of Nations: State Responsibility*, Oxford, 1983, pp. 226-227.

how a court applies causation tests depends on the nature, scope, and contents of the applicable obligation under international climate change law (4.1) or international human rights law (4.2).

4.1. *Causation in obligations of prevention*

To understand the role of causation in international climate claims, it is useful to distinguish between two types of obligations. The role of causation is critical in relation to obligations that are only breached if an event occurs (e.g., significant harm). A court then must determine that the event occurred and that the State caused it to occur.[72] However, the role of causation is very different in relation to obligations that require a State to engage in a particular conduct, irrespective of the outcome. A court then will not need to make a causal assessment of the relation between that conduct and eventual harm that flows from that conduct.[73]

States have preferred the second type: they have designed substantive international obligations in relation to climate change as obligations of conduct.[74] That holds for the substantive obligations under the 1992 UNFCCC,[75] the 2015 Paris Agreement,[76] the Law of the Sea Convention[77] and other international obligations pertaining to particular parts of the climate system: the oceans, the atmosphere, biodiversity, and so on.[78] Without exception, these are obligations of due diligence. The same holds for a State's obligation under customary law "to use all the means at its disposal in order to avoid activities which take place in its territory or any area under its jurisdiction, causing significant damage to the environment of another state"[79] or areas beyond national jurisdiction.[80] Even though this obligation refers to an "event" to be prevented (significant harm), it is an obligation of conduct: States must exercise due diligence

[72] UN Doc. A/51/10, *cit. supra* note 25, p. 176.

[73] Mayer, "Obligations of Conduct in the International Law on Climate Change: A Defence", RECIEL, 2018, p. 130 ff.

[74] This is different for procedural obligations; international environmental law, and the Paris Agreement in particular, increasingly rely on procedural obligations, which can be considered obligations of result (for instance the obligation to elaborate and submit NDCs).

[75] UNFCCC, *cit. supra* note 1.

[76] Paris Agreement, *cit. supra* note 3.

[77] ITLOS, *cit. supra* note 7, paras. 197 and 238.

[78] Peel, "Climate Change", *cit. supra* note 9, para. 3.

[79] *Certain Activities*, Judgment of 16 December 2015, *cit. supra* note 30, para. 118; ICJ, *Pulp Mills on the River Uruguay* (*Argentina v. Uruguay*), Judgment of 20 April 2010, ICJ Reports 2010, p. 14 ff., para. 101; ICJ, *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion of 8 July 1996, ICJ Reports 1996, p. 226 ff., para. 29.

[80] *Nuclear Weapons*, *cit. supra* note 79, para. 29 (stating that "[t]he existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment").

and take appropriate measures to regulate and prevent emissions from private actors in their territory or under their jurisdiction.[81]

The due diligence obligations of prevention under various treaties and customary international law form the core of international climate law. States themselves cause only a minority of greenhouse gas emissions, for instance, from government-owned buildings, government-run transport systems, and publicly owned corporations. It is the private sector that contributes most emissions in the major contributing sectors (e.g., energy use in buildings, transport, energy use in industry, agriculture, land use and forestry)[82] and supply chains (goods, construction, fashion, fast-moving consumer goods, electronics, automotive, professional services and freight).[83] The due diligence obligation complements the approach of the Paris Agreement, which relies on nationally determined contributions, by requiring States to regulate the conduct of companies and consumers that cause emissions leading to climate change.[84]

So far, only in a few cases courts have applied due diligence obligations of prevention in the context of climate change, which shed little light on the causal element. The Committee on the Rights of the Child considered the norm in interpreting human rights law.[85] In *Urgenda*, the Supreme Court relied on the no-significant harm principle and said that States

> can be called to account for the duty arising from this principle. Applied to greenhouse gas emissions, this means that they can be called upon to make their contribution to reducing greenhouse gas emissions. This approach justifies partial responsibility: each country is responsible for its part and can therefore be called to account in that respect.[86]

Whereas these judgments do not provide much insight into the role of causation, the Advisory Opinion of ITLOS and scholarship on due diligence obligations contain building blocks for interpreting such obligations and their relation to causation.

Based on the sparse case law, it can be concluded that causation will have a twofold role in applying due diligence obligations of prevention. First, causation will trig-

---

[81] Dupuy, "Overview of the Existing Customary Legal Regime Regarding International Pollution", in Magraw (ed.), *International Law and Pollution*, Philadelphia, 1991, p. 61 ff.; McIntyre, "The Current State of Development of the No Significant Harm Principle: How Far Have We Come?", International Environmental Agreements: Politics, Law and Economics, 2020, p. 601 ff., p. 605; Peel, "Climate Change", *cit. supra* note 9, p. 1030; Bodansky, Brunnee and Rajamani, *International Climate Change Law*, Oxford, 2017; Ollino, *cit. supra* note 14, p. 115; ITLOS, *cit. supra* note 7, para. 238 (reaching the same conclusion for Art. 194(2) of the Law of the Sea Convention).

[82] Ritchie and Roser, "Sector by Sector: Where Do Global Greenhouse Gas Emissions Come From?", Our World in Data, 18 March 2024.

[83] "Net-Zero Challenge: The Supply Chain Opportunity", World Economic Forum, 21 January 2021. See also "Just 57 Companies Linked to 80% of Greenhouse Gas Emissions since 2016", The Guardian, 3 April 2024 (reporting that 57 oil, gas, coal, and cement producers, led by ExxonMobil, Shell, BP, Chevron, and TotalEnergies, are directly responsible for 80% of the global fossil CO2 emissions since the 2016 Paris Agreement).

[84] See *supra* Section 3.

[85] *Sacchi, cit. supra* note 46, para. 10.12.

[86] *Urgenda, cit. supra* note 47, para 5.7.5.

ger the due diligence obligation to prevent significant harm. Both in its manifestation under customary law and the Law of the Sea Convention, this is an obligation of conduct triggered by the existence of (a risk of) significant harm;[87] it applies when a State "was, or ought to have been, aware of the risk of the harmful outcome".[88]

This determination will involve a causal assessment, but this is not a form of *specific* causation but rather of *general* causation. It is telling that the ITLOS, in its Advisory Opinion, did not spend much ink on causation in relation to due diligence obligations of prevention but rather focused on the contents of such obligations. This was also induced by the question put to the Tribunal, which presumed "deleterious effects that result or are likely to result from climate change and ocean acidification, which are caused by anthropogenic GHG emissions". The ITLOS found the state of science on such effects authoritative and, on that basis, analysed obligations that applied to such deleterious effects.[89]

Second, causation plays a role in determining that a State's failure to perform a due diligence obligation is connected to the climate change risk. When a plaintiff invokes a State's responsibility under an obligation of conduct, the question is not whether that State has caused significant harm but whether it has done enough to prevent it.[90] This is a normative test, since it will depend on an assessment of what diligence is due, considering the nature of the risk and the capacity of the States to prevent it.[91] The Paris Agreement will be relevant for determining the contents of the due diligence obligation[92] but does, as the ITLOS made clear, not replace an existing due diligence obligation.[93] However, determining the responsibility of a State for failing to exercise due diligence also will involve a factual element. A court will have to compare the risk of harm to a hypothetical world in which the contributions by the defendant State(s) are omitted.[94] This assessment will largely depend on evidence of general causation. The ITLOS noted that for this assessment, the best available science needs to be considered, demonstrating that "anthropogenic GHG emissions pose a high risk in terms of foreseeability and severity of harm to the marine environment".[95]

---

[87] *Certain Activities*, Judgment of 16 December 2015, *cit. supra* note 30, para. 154 (in which the ICJ recalled that the State's obligation to exercise due diligence in preventing significant transboundary harm requires that the State ascertains whether there is a risk of significant transboundary harm before undertaking an activity having the potential to adversely affect the environment of another State to affect the environment of another State adversely); ITLOS, *cit. supra* note 7, para. 238.

[88] Lanovoy, *cit. supra* note 14, p. 24.

[89] ITLOS, *cit. supra* note 7, para. 158.

[90] *Ibid.*, para. 248.

[91] Ollino, *cit. supra* note 14, p. 117 (noting that "failure to exercise due diligence only accrues if it is established that the state had the power to prevent, that is, the capacity to affect the situation toward which prevention was required. This clearly is a causal query"); ITLOS, *cit. supra* note 7, para. 241.

[92] Bodansky, Brunnee and Rajamani, *cit. supra* note 81, pp. 45-46.

[93] ITLOS, *cit. supra* note 7, paras. 222-224.

[94] Stapleton, "Causation in the Law", in Beebee, Hitchcock and Menzies (eds.), *The Oxford Handbook of Causation*, Oxford, 2009, p. 744 ff.

[95] ITLOS, *cit. supra* note 7, para. 242.

In its Advisory Opinion, the ITLOS clarified that determining whether a State should take preventative measures and what preventative measures it should take will depend on a requirement of continuous environmental impact assessments of planned activities that should include cumulative effects.[96] This means that a State determining whether to allow planned activities by private or public actors will need to consider the effects of emissions by other actors. This is the practical manifestation of the individualisation of causation, discussed in Section 3 above. A State will only be responsible for failing to exercise due diligence if such a failure matters in terms of climate change, but that needs to be considered in conjunction with the acts and omissions of other States.

Discussions on the scope of States' prevention obligations in relation to climate change will continue inside and outside the courtroom. Determining what preventative measures were due, beyond what States agreed to in the Paris Agreement, will raise fundamental questions about the relation between (international) judges and national political orders, particularly in view of the complex societal choices to be made on paths towards climate neutrality. However, for present purposes, it is important that the principle of causation need not restrain this discussion.

4.2. *Determining responsibility under human rights law*

The construction of causation in human rights-based litigation[97] is largely similar to the situation of obligations of prevention under international climate law, as discussed above. Since climate change falls within the scope of the right to life and respect for private and family life, States are obliged to regulate activities that result in (risks of) climate change harm. In determining the responsibility of a State that failed to regulate emissions of greenhouse gases, a court will need to make certain causal determinations, not only for the admissibility of claims of persons under the jurisdiction of a State, but also regarding the merits of a human rights-based claim.

Comparable to the situation in general international law, the role of causation in determining responsibility must be considered "in the light of the factual nature of the alleged violation and the nature and scope of the legal obligations at issue".[98] A court called upon to determine a State's responsibility in relation to climate change does not need to determine a factual causal relationship between a State's particular omission (failure to act) and a specific climate change-related harm; what is required is a determination of the existence of (a risk of) harm, a failure of a State to act in view of that risk, and a connection between that failure and the climate change risk.

First, causation will play a role in triggering an obligation under human rights law. The ECtHR held that the obligation to adopt and effectively apply regulations and measures capable of mitigating the existing and potentially irreversible future

[96] *Ibid.*, para. 367.

[97] Generally, see Wewerinke-Singh, *cit. supra* note 13; Rodríguez-Garavito, *cit. supra* note 14; Savaresi and Setzer, "Rights-Based Litigation in the Climate Emergency: Mapping the Landscape and New Knowledge Frontiers", Journal of Human Rights and the Environment, 2022, p. 7 ff.

[98] *Verein KlimaSeniorinnen*, *cit. supra* note 8, para. 435.

effects of climate change "flows from the causal relationship between climate change and the enjoyment of Convention rights".[99] In *Billy*, the HRC considered adverse climate change impacts a reasonably foreseeable threat to life.[100] Significantly, this causal relationship refers to general, not specific causation, and can be determined based on IPCC's findings rather than on a court's specific findings concerning the specific impact of a State's omissions.

Once it is determined that a State did not carry out its positive obligations under human rights law, causation will play a second role: in determining that a State's conduct under the applicable normative standard could have made a difference in relation to that climate change risk.[101] The ECtHR has not formulated a general standard of causation that would apply to such assessments because the measures required to ensure effective protection may vary considerably from case to case.[102] It did say, however, that because emissions from any given State make up only part of the causes of harm, "the causal link between the acts or omissions on the part of State authorities in one country, and the harm, or risk of harm, arising there, is necessarily more tenuous and indirect compared to that in the context of local sources of harmful pollution".[103]

On this basis, the Court made several important points that shape and restrain the role of causation. It made clear that the but-for test that applies in general international law is not applicable: because of the plurality of causes of harm, "issues of individual victim status or the specific content of State obligations cannot be determined based on a strict condition sine qua non-requirement on the basis of a strict *conditio sine qua non* requirement".[104] In assessing a State's positive obligations under the Convention, it thus needs "not be determined with certainty that matters would have turned out differently if the authorities had acted otherwise".[105] Rather than the but-for test, the applicable test for engaging the responsibility of the State is "that reasonable measures which the domestic authorities failed to take could have had a real prospect of altering the outcome or mitigating the harm".[106] The Court added that in the context of climate change, this principle should "be understood in the light of Article 3 § 3 of the UNFCCC according to which States should take measures to anticipate, prevent or minimise the causes of climate change and mitigate its adverse effects".[107] Reliance on this article to interpret the obligation of States under Article 8

---

[99] *Ibid.*, para. 545.

[100] *Billy*, *cit. supra* note 45, para. 8.3.

[101] *Verein KlimaSeniorinnen*, *cit. supra* note 8, para. 438.

[102] *Ibid.*, paras. 437-438.

[103] *Ibid.*, para. 439.

[104] *Ibid.* The Court had rejected the but-for test already in earlier cases; see Stoyanova, "Causation between State Omission and Harm within the Framework of Positive Obligations under the European Convention on Human Rights", Human Rights Law Review, 2018, p. 309 ff., p. 316.

[105] *Verein KlimaSeniorinnen*, *cit. supra* note 8, para. 444.

[106] *Ibid.* This test was already accepted in older case law, see e.g. ECtHR, *O'Keeffe v. Ireland*, Application No. 35810/09, Judgment of 28 January 2014, para. 149; Stoyanova, *cit. supra* note 104, pp. 316-317 (discussing different expressions in order to refer to the causation between the harm and any omissions).

[107] *Verein KlimaSeniorinnen*, *cit. supra* note 8, para. 444.

supports the point that States must take preventative measures to mitigate "the existing and potentially irreversible, future effects of climate change".[108]

The test of "real prospect of altering the outcome or mitigating the harm" is an alternative to the foreseeability test; a State should foresee that a particular omission contributed to harm and that terminating that omission would mitigate the harm. UN human rights treaty bodies have expressly applied this standard as a requirement for determining standing and the merits,[109] sometimes absorbing causation in a foreseeability test.[110] In *Sacchi*, the Committee on the Rights of the Child considered that the potential harm of the State party's acts or omissions regarding the carbon emissions originating in its territory was reasonably foreseeable to the State party.[111]

This second causation test, too, is one of general rather than specific causation and can largely be assessed based on IPCC reports applied to the specific factual context of the case. It follows that, comparable to the situation under general international law and under the Law of the Sea Convention, assessment of causation in climate litigation under the European Convention is partly of a factual nature, but the factual test is embedded in and constrained by a normative operation, as causation is part of States' positive obligations. While the standard position in international law is that legal causation limits the effect of a broad concept of factual causation (see Section 2), this construction reverses the relationship between factual and normative causation: the normative embedding of causation facilitates determinations of the breach, where that would not have been possible under a purely factual assessment.[112]

Shifting to a normative rather than a factual causation test comes with a price. While it prevents difficult factual assessments, it requires a court to engage in normative arguments on what States should have done and could have done to prevent a particular risk. This will inevitably touch upon complex and controversial choices that States have to make in relation to energy, transport, and food that run deep in societies. International courts will not be well-positioned to make such choices and are well-advised to defer to the national political process.[113] Both the judgments in *KlimaSeniorinnen* and *Urgenda* made clear that courts can explicitly anchor such or-

---

[108] *Ibid.*, para. 545.

[109] *Sacchi, cit. supra* note 46, para. 10.7 (stating that "[t]he Committee considers that, while the required elements to establish the responsibility of the State are a matter of merits, the alleged harm suffered by the victims needs to have been reasonably foreseeable to the State party at the time of its acts or omissions even for the purpose of establishing jurisdiction"); Joint Statement of UN Human Rights Treaty Bodies on "Human Rights and Climate Change", 16 September 2019 (stating that "[f]ailure to take measures to prevent foreseeable human rights harm caused by climate change, or to regulate activities contributing to such harm, could constitute a violation of States' human rights obligation").

[110] Ollino, *cit. supra* note 14, p. 122 (stating that "[i]n many cases, the causal relationship between state omission and the harmful event is not even broached, and it is 'absorbed' by the test of foreseeability").

[111] *Sacchi, cit. supra* note 46, para. 10.11.

[112] This is not unique for climate change and fits in a longer line of case law of the European Court; see Sulyok, *cit. supra* note 14, pp. 155-159.

[113] Stoyanova, *cit. supra* note 104, p. 332. This is also the path that the Court followed in *Verein KlimaSeniorinnen*, *cit. supra* note 8.

ders in a domestic legal framework that seeks to realise the objectives of the Paris Agreement.[114] Hereby, courts can help a regulatory floor upon which States and private sectors can build and shape the transition.[115] Striking that balance right is complex, but the important point here is that it need not be hampered by causation problems.

4.3. *Contribution as causation*

The approach of ITLOS and the ECtHR to the role of causation as part of international obligations has in common that contributions to the (risk of) climate change harm, on the one hand, trigger (positive) due diligence obligations and, on the other, bridge failure to perform such obligations with climate change risks. The responsibility of a State in relation to climate change is not based on exact assessments of factual causation; no "but for" or "direct causal nexus" tests apply. Rather, responsibility is grounded in an assessment of whether a State performed its due diligence obligation and whether that was connected to a climate change harm. In this situation, causation effectively will be reduced to contribution. Once it is determined that a State, by its act or omission, has made a (more than minimal) contribution to the risk of climate change harm,[116] responsibility is established by the nature and performance of obligations of prevention.

The "contribution-as-causation" approach is comparable to approaches in national case law. Of course, whether a court can apply such a contribution test depends on the specific factual and legal context and on what the parties plead; there will be differences between situations in which a government relies on climate change effects as a ground for regulation and situations when plaintiffs rely on such harm for purposes of environmental impact assessment, for countering a particular decision that approves an activity that leads to greenhouse gas emissions, as a ground to challenge the failure of the State to reduce greenhouse gas emissions, or, in rare cases, as a ground for a claim for reparation. However, several national courts have attached legal consequences to States' contributions to climate change, even when it cannot be determined that by that contribution a State caused climate change harm.[117]

---

[114] *Verein KlimaSeniorinnen*, *cit. supra* note 8; *Urgenda*, *cit. supra* note 47; Nollkaemper, *cit. supra* note 47.

[115] Rodríguez-Garavito, *cit. supra* note 14.

[116] A review of international case law also leads to (modest) support for the rule that in situations of indivisible injury, where the but-for test breaks down, the damage would be compensable in its entirety if "the internationally wrongful act contributed to its occurrence and such contribution was major, not marginal"; see Pusztai, "Causation in the Law of State Responsibility", Doctoral Dissertation, University of Cambridge, 2017, pp. 253-254 (stating that "[t]he suggested rule is supported by the jurisprudence of human rights courts, the UNCC and the Eritrea-Ethiopia Claims Commission. It is not supported by the practice of the Iran-US Claims Tribunal"); see also Nollkaemper et al., *cit. supra* note 14, para. 9 of commentary to Principle 2.

[117] Peel, "Climate Change", *cit. supra* note 9, p. 1042; Verheyen, *Climate Change Damage and International Law: Prevention Duties and State Responsibility*, Leiden, 2005; Verheyen, "Loss and Damage", *cit. supra* note 14.

The logic and fairness of this approach were well spelt out by the Canadian Supreme Court, which was concerned with a situation of multiple wrongdoers, where the traditional but-for causation test fell short.[118] The Supreme Court held that while, as a general rule, a plaintiff cannot succeed unless she shows as a matter of fact that she would not have suffered the loss "but for" the negligent act or acts of the defendant, exceptionally, a plaintiff may be able to recover based on "material contribution to risk of injury", without showing factual "but for" causation. Elimination of proof of but-for causation was justified in situations where "but for" causation cannot be proven against any of multiple defendants.[119] The Court stated that this deviation from the standard requirement of factual causation of harm was justified by considerations of fairness.[120]

A few examples illustrate how the "contribution-as-causation" approach can play out in national courts. In the *Klimaatzaak*, the state of Belgium and other defendant public authorities disputed a causal link between the faults they were accused of and the damage claimed by the appellants. The Court of Appeal nonetheless concluded that although Belgium could not have caused these effects alone, the contribution that Belgium had made was sufficient to find a causal link:

> Without the faults committed, the eco-anxiety would have been lower, as would the moral prejudice, the residual carbon budget would not have been dented to the same extent, Klimaatzaak's interests would have been preserved, and Belgium would be in a better position to fight effectively, in concert with other nations, against the risk of dangerous global warming.[121]

In Australia, the Land and Environment Court of New South Wales found in *Gloucester Resources v. Minister for Planning* that there was a causal link between the cumulative GHG emissions of an open-cut coal mine in New South Wales and climate change and its consequences:

> The Project's cumulative GHG emissions will contribute to the global total of GHG concentrations in the atmosphere. The global total of GHG concentrations will affect the climate system and cause climate change impacts. The Project's cumulative GHG emissions are therefore likely to contribute to the future changes to the climate system and the impacts of climate change.[122]

---

[118] Canada, Supreme Court, *Clements v. Clements*, 2012 SCC 32, [2012] 2 S.C.R. 181; the case is referred to in Peel, "Climate Change", *cit. supra* note 9, p. 1042.

[119] *Clements v. Clements*, *cit. supra* note 118, para. 43.

[120] *Ibid.*, para. 16. The Court referred to Stapleton, "Cause-In-Fact and the Scope of Liability for Consequences", Law Quarterly Review, 2003, p. 388 ff.

[121] *Klimaatzaak*, *cit. supra* note 16, para. 268.

[122] Australia, Land and Environment Court of New South Wales, *Gloucester Resources v. Minister for Planning*, 8 February 2019.

The mere contribution was sufficient to conclude that the permit should be denied, and nothing else was needed in terms of causation or evidence.

While the legal context of these cases varies significantly, they have in common that the courts were satisfied to act on a contribution that was more than minimal[123] to climate harm. This move was made possible against the background of science on general causation (the fact that human activities cause climate change) and the cumulative nature of climate change. Each contribution may have been relatively small, but the courts, expressly or implicitly, recognised that they add up to the serious harm the world is facing.[124] Similar approaches, in which contribution to climate change replaced more exacting causation tests, can be found in another Australian case,[125] the United States Supreme Court,[126] the French Administrative Court of Paris,[127] and the judgment of the Netherlands Supreme Court in *Urgenda*.[128]

While these approaches in national case law cannot easily be transposed to international law, they provide a useful background for understanding and evaluating the role of causation in prevention obligations under international law. The fact that international law has no firmly established causation standard opens a door for international courts to consider alternative standards. Even though the but-for and the directness tests have been dominant in the case law of the ICJ,[129] no fixed causation standards could be articulated[130] and the applicable standard will have to be determined on a case-by-case basis.[131] We also can recall the reasoning of the ECtHR in

---

[123] New Zealand, Supreme Court, *Michael John Smith v. Fonterra Co-Operative Group Limited*, [2024] NZSC 5, para. 168 (stating that "[p]atently, ordinary domestic activities involving individuals travelling, warming their houses and cooking food, will not do so and may be de minimis [...] Such actions undertaken by individuals may simply be a part of the price of living in society").

[124] Peel, "Climate Change", *cit. supra* note 9, p. 1044.

[125] *Gray*, *cit. supra* note 67, para. 98 (stating that "[t]he coal intended to be mined is clearly a potential major single contributor to GHG emissions deriving from NSW given the large size of the proposed mine. That the impact from burning the coal will be experienced globally as well as in NSW, but in a way that is currently not able to be accurately measured, does not suggest that the link to causation of an environmental impact is insufficient").

[126] United States, Supreme Court, *Massachusetts v. Environmental Protection Agency*, 549 US 497, 2007, (rejecting the Agency's argument that its decision not to regulate GHGs from new motor vehicles would not contribute to climate change damage in Massachusetts, noting that US motor vehicle emissions (at around 6 per cent of worldwide carbon dioxide emissions) make a "meaningful contribution" to GHG concentrations and global warming).

[127] France, Administrative Court of Paris, *Notre Affaire à Tous and Others v. France*, 14 October 2021 (stating that "[t]he ecological damage stemming from the surplus GHG emissions is of a continuous and cumulative nature to the extent that failure to comply with the first carbon budget has resulted in additional GHG emissions on top of the preceding emissions which will continue to have an effect over the life of these gases in the atmosphere, which is for around 100 years"); see also "Litigating Climate Change in France", Dentons, 3 November 2022.

[128] *Urgenda*, *cit. supra* note 47, paras. 5.7.7-5.7.8 (rejecting the argument of the State that the Netherlands' contribution was "very small and that reducing emissions from one's own territory makes little difference on a global scale", not because the contribution was not very small, but because even though it was small, the Netherlands still had to do its part).

[129] See *supra* Section 2.

[130] ARSIWA, *cit. supra* note 19, Commentary on Art. 31, para. 10.

[131] Crawford, *cit. supra* note 23, pp. 550 and 559 (noting that the "ARSIWA pragmatically avoids the issue [of causation], leaving specific determinations to the particularities of each case");

KlimaSeniorinnen, that noted that because the emissions originating from a given jurisdiction make up only part of the causes of the harm, "the causal link between the acts or omissions on the part of State authorities in one country, and the harm, or risk of harm, arising there, is necessarily more tenuous and indirect compared to that in the context of local sources of harmful pollution".[132] In view of the individualisation of causation discussed in Section 3, the "contribution-as-causation" approach is better aligned with the cumulative causation that characterises climate change.[133]

5. Causation in the Determination of Responsibility for Significant Harm

The role of causation in determining responsibility in applying the no-significant harm principle will depend on the facts, the pleadings of parties in a dispute, and the remedies they seek. When significant harm has occurred, and an injured person invokes the responsibility of a State for that harm, the contribution-as-causation approach discussed in Section 4 will not suffice. In that situation, the claim may be based not on an obligation of conduct but on an obligation to prevent a given event, which is only breached if the event (the significant harm) occurs.[134] In that scenario, a court must determine that the event occurred, that the State caused it to occur, and that it caused significant harm to the injured person.[135]

Under the causation standards discussed in Section 2, it will be challenging for a court to answer that question in the affirmative for any individual State because of the problem of cumulative causation.[136] The ITLOS acknowledged that "given the diffused and cumulative causes and global effects of climate change, it would be difficult to specify how anthropogenic GHG emissions from activities under the jurisdiction or control of one State cause damage to other States".[137] It did not attempt to resolve this complexity. However, the question is whether it is necessary to "specify how anthropogenic GHG emissions from activities under the jurisdiction or control of one State cause damage to other States", as a condition for determining that acts or omissions of a State breach the obligation under Article 194(2) of the Law of the Sea Convention.

In contrast to the situations discussed in the preceding paragraphs, no case law expressly has considered this causation puzzle in relation to situations where significant harm has actually been caused. However, based on the logic of the individualiza-

---

Santulli, *cit. supra* note 23, p. 406 (noting that "la question magnifique mais difficile de la causalité est esquivée, et le volet minuscule qui demeure est géré par l'abdication"); Lanovoy, *cit. supra* note 14.

[132] *Verein KlimaSeniorinnen*, *cit. supra* note 8, para. 439.

[133] Peel, "Climate Change", *cit. supra* note 9, p. 1042.

[134] UN Doc. A/51/10, *cit. supra* note 25, p. 176.

[135] *Certain Activities*, Judgment of 16 December 2015, *cit. supra* note 30, para. 180; Seabed Disputes Chamber, *cit. supra* note 31, para. 184.

[136] Sulyok, *cit. supra* note 14, p. 100 (noting that "the lack of requisite causation precluded finding a breach of substantive obligation not to cause environmental harm in every liability claim states have presented to the Court").

[137] ITLOS, *cit. supra* note 7, para. 252.

tion of causation (Section 3) and the normative embedding of causation (Section 4), a few observations can be made on solutions to this causation puzzle.

First, determining causation between a State's individual conduct and significant climate change harm is not impossible, even under the "but for test". A court can ground such a determination in the premise that a contribution to significant harm can be a cause of such harm if the result, in its specific form, would not occur without it. It can plausibly be argued that an act or omission of a State is "still a cause even if it in itself could not result in the damage but only in combination with the actions of another".[138] The question is whether significant climate change harm in its specific form would have existed without the emissions of a defendant State. In particular for the States that have contributed the largest (historical) emissions, the answer is unlikely to be a binary "yes-no but [would rather be] probabilistic".[139] This will give courts leeway to determine cause-effect relations, even when individual contributions fall short of the significant harm an injured person suffers.

Second, a court must base determinations of States' responsibility for causing significant harm on a failure to perform obligations to prevent such harm. Ollino notes that "the assessment of the 'event' goes hand in hand with evaluating 'conduct' adopted by the state to prevent".[140] If significant climate harm has occurred and a court is asked to assess whether a State breached its obligation to prevent that harm, the court must evaluate State conduct based on the applicable obligation.[141] Whether a State caused, by its omission, significant harm can only be answered with reference to the contents of the obligation of that State to prevent such harm; the interpretation of the due diligence obligations by the ITLOS is relevant here.[142]

Third, a court must establish a causal link between the omission and the significant harm.[143] Similar to the assessment of obligations to prevent, this assessment is necessarily hypothetical, as it asks whether the significant harm would not have existed, in its specific form, if the State had acted in conformity with the obligation. Thus, it always involves a normative standard.[144] The question of whether an individual State is responsible for a significant harm suffered by, e.g., a small island State will then be a function of its (historical) emissions combined with the conduct required under the applicable due diligence standard. Ollino captures this twofold test by stating that the query should be "whether a state's action could have had, at least, a real prospect of altering the outcome".[145] This approach aligns with the interpretation of the obligation of prevention and the approach of the ECtHR, discussed in Section 4.[146]

---

[138] Verheyen, "Loss and Damage", *cit. supra* note 14.

[139] *Ibid.*, pp. 163-164.

[140] Ollino, *cit. supra* note 14, p. 120.

[141] *Ibid.*

[142] ITLOS, *cit. supra* note 7, paras. 239-243.

[143] Ollino, *cit. supra* note 14, p. 120.

[144] *Ibid.*, p. 122 (stating that "[t]he 'but for' test requires proving that but for the omission of the state, the harmful outcome would have been avoided. In practice, this is a challenging task since causality in omissions is always normative and hypothetical").

[145] *Ibid.*

[146] See *supra* Section 4.2.

It cannot be stated in the abstract what contributions to climate change are sufficient to meet the standard "causing significant harm". It will be certainly more than any contribution. The prospect that a major historical contributor like the United States will meet the standard obviously is much higher than will be the case for a small State in the Global South with relatively limited energy production and consumption. What contributions will be sufficient will need to be determined on a case-by-case basis, considering the contents of obligations to prevent significant harm, the performance of such obligations, and the scope of (historical) emissions of the State(s) concerned. However, the important point is that, in this complex of factors, the difficulty to determine exact causal contributions need not to be prohibitive for determining responsibility.

6. Causation and the Apportionment of Damage

The approaches identified in Sections 3-5 open the possibility that, despite cumulative causation, individual States can be held responsible for breaching an international obligation requiring reduction of greenhouse gases and for their contribution to climate change harm. Such a breach can have several legal consequences, depending on what the parties to a dispute have pleaded and depending on the powers of a court. These include cessation of the wrongful act, a declaratory judgment, or an order to set or implement reduction targets.[147]

The open question is whether such findings could also result in compensation obligations. While much speculation on the desirability and modalities of such compensation can be found in literature, particularly in a North-South context and concerning multinational corporations, this has remained beyond the reach of judicial practice.[148] Of course, litigation is not the best path to compensation for injured persons – a negotiated scheme recognising a collective responsibility for climate change would be preferred.[149] However, if the loss and damage fund established by COP 27[150] will not succeed in satisfying the legitimate entitlements of the Global South, the question of compensation will likely come up in national and/or international courts.

If compensation claims reach the courts, causation will be a central focus of inquiry. The causation standards used for determining responsibility (see Sections 4-5) are not necessarily useful here. Using a low causation standard to determine a State's responsibility or to order a State to do more to achieve reduction targets is one thing. It is entirely something else to order a State to pay substantial amounts of compensa-

[147] This is what the European Court opted for in *Verein KlimaSeniorinnen*, *cit. supra* note 8.

[148] D'Argent, "Reparation, Cessation, Assurances and Guarantees of Non-repetition", in Nollkaemper and Plakokefalos (eds.), *Principles of Shared Responsibility in International Law: An Appraisal of the State of the Art*, Cambridge, 2014, p. 208 ff., p. 220.

[149] Craik, Mackenzie and Davenport, *cit. supra* note 14; Bodansky, Brunnee and Rajamani, *cit. supra* note 81, p. 46.

[150] Decision 2/CP.27, Funding Arrangements for Responding to Loss and Damage Associated with the Adverse Effects of Climate Change, Including a Focus on Addressing Loss and Damage.

tion for climate change harm when the causal contribution of the State that has acted in breach of an international obligation cannot be determined.[151] By definition, the question of compensation is never fully answered by reference to a determination of responsibility and any assessment of causation made in that context.

The question then is what principles a court should apply to determine what compensation is due by a responsible State. The prospect of allocating compensation will, in part, depend on the further developments of attribution science, which can help quantify the contribution of a State's GHG emissions to specific events such as storms, droughts, heatwaves, or floods.[152] However, for now, this science has not been advanced to the extent that it could be used to divide climate change harm, and such harm thus has to be treated as indivisible harm. In the absence of any case law that addresses this question specifically for climate change, a few observations can be made on the options to address causation puzzles that may arise in this process. These observations apply primarily to proceedings that may unfold in interstate litigation but, depending on the specific legal context, may also be relevant for compensation questions in domestic courts.

The critical starting point of any consideration of reparation, including compensation, has to be that an obligation to provide reparation only will arise if it first has been determined that a State has committed an internationally wrongful act by its acts or omissions that contribute to climate change. For the obligation to prevent a given event (significant harm) discussed in Section 5, causation will not provide an additional barrier for the determination of reparation. But that will be different for the obligations of prevention discussed in Section 4. For these obligations, and wrongful acts, it is useful to recall that contributions by States' omissions to climate change harm can be considered to be causes of harm, even when they do not cause the entire harm. An act or omission of a State is "still a cause even if it in itself could not result in the damage but only in combination with the actions of another".[153] But it still will need to determined that a contribution was sufficient to speak of a cause of significant harm; what was said on this point in Section 5 is applicable here.

Assuming that a wrong has been committed and that it can be determined that a State has caused harm, the open question is how courts can address the problem of cumulative causation in relation to compensation. Based on the few cases that have addressed compensation in situations with multiple wrongdoers (even if they do not address climate change) and related scholarship, two main paths can be identified. The first path channels an obligation to provide full reparation to individual States

---

[151] I leave aside here the question what could be the measure of compensation; see e.g. Farber, "Basic Compensation for Victims of Climate Change", University of Pennsylvania Law Review, 2007, p. 1605 ff. (referring to "monitoring, protecting, restoring, or providing substitutes for existing resources"); see generally ARSIWA, *cit. supra* note 19, Commentary on Art. 36.

[152] Stuart-Smith et al., "Filling the Evidentiary Gap in Climate Litigation", Nature Climate Change, 2021, p. 651 ff.; Burger, Wentz and Metzger, "Climate Science and Human Rights: Using Attribution Science to Frame Government Mitigation and Adaptation Obligations", in Rodríguez-Garavito (ed.), *cit. supra* note 14, p. 221 ff.; see also Burger, Wentz and Horton, "The Law and Science of Climate Change Attribution", Columbia Journal of Environmental Law, 2020, p. 57 ff.

[153] Verheyen, "Loss and Damage", *cit. supra* note 14.

(6.1); the second path apportions compensation based on relative shares of contributions (6.2).

6.1. *Approaches to full compensation*

The starting point in determining compensation in international law is the principle that a State that is responsible for a breach of an international obligation is under an obligation to make *full reparation for any moral or material damage caused* by the internationally wrongful act[154] and to compensate for the damage caused thereby.[155] This constitutes a major dilemma for compensation in climate change cases. Since no single State will have caused the entire damage, allocating an obligation to provide full compensation to any single State may seem unfair to that State. On the other hand, it would be extremely taxing (if not outright impossible in view of the jurisdictional limitations of international courts) for injured States to bring together all responsible States that could provide full compensation.

In the literature on reparation, three normative constructions have been developed that could be used to strike this balance in favour of injured States, and to oblige a single State to provide full compensation. Theoretically, each of these constructions could apply to climate change.

The first construction is the adequate cause theory, which allows a court, despite the cumulative nature of the question, to identify one cause as being the most important and deciding one. On that basis, a court could order the entity responsible for that adequate cause to bear alone the obligation to make full reparation vis-à-vis the injured party.[156] This theory would reduce a highly complex cumulative process of climate change harm to a single State's responsibility for the entire harm. This construction could apply to the group of largest (historical) emitters that could be considered an adequate cause and should provide full reparation, even though they have not caused the entire harm suffered by the injured party.[157]

The second construction is that one State's causal wrongful act must be put on the same footing as all other wrongful acts by other States (and even factual contributions by other States that are not wrongful) because the injury (e.g. flood damage in a small island State) would not have occurred, as it occurred, without each of these contributions. The wrongful acts then can be said to be "equivalent" to one another. Since the harm would not have occurred as it occurred without all contributions, each contribution satisfies the but-for test and thus is a *conditio sine qua non* of the injury.[158] This argument can be considered a consequence of the individualisation of

---

[154] Art. 31 ARSIWA, *cit. supra* note 19; this also is grounded on *Factory at Chorzów* (*Germany v. Poland*), Judgment of 13 September 1928, PCIJ Reports, Series A, No. 13, p. 4 ff., p. 47 (stating that "reparation must, as far as possible, wipe out all the consequences of the illegal act and re-establish the situation which would, in all probability, have existed if that act had not been committed").

[155] Art. 36(1) ARSIWA, *cit. supra* note 19.

[156] D'Argent, *cit. supra* note 148, p. 229.

[157] See *supra* Section 4.

[158] D'Argent, *cit. supra* note 148, pp. 239-230.

causation, as it is premised on the idea that even small contributions are essential causes of cumulative harm.[159] An obvious difficulty with applying this approach to climate change is that the wrongful acts obviously are *not* equivalent, considering the significant differences in emissions originating from different States.

A third approach to assigning the obligation to provide full compensation to a single State is to apply the principle of joint and several responsibility, requiring each responsible State to pay full reparation.[160] This would likewise eliminate causation concerns, although these may arise when a responsible State would have recourse to other States. In its ARSIWA commentaries, the ILC suggested with respect to concurrent causes that "unless some part of the injury can be shown to be severable in causal terms",[161] reparation should be provided for the whole injury caused. There is also support for the principle in literature.[162] It can be argued that the same should apply to situations of cumulative causation, that characterises climate change.

Each of these approaches brings significant benefits to injured States, when they would not be required to bring claims against all or even multiple responsible States, and could obtain full compensation from a single responsible States. The major drawback of each of these constructions is that full reparation to be provided by a single State for harm to an injured State may seem inequitable, in particular since jurisdictional barriers would make recourse between multiple wrongdoers difficult, if not impossible.[163]

In the absence of any judicial practice that addresses the cumulative causation problems that characterise climate change, it is difficult to assess whether international courts would be inclined to follow any of these approaches in a (for now hypothetical) compensation claim by an injured State. If such a claim would emerge, much will depend on what compensation an injured State will seek, the (historical) emissions of the defendant State and the willingness (and courage) of a court to apply any of the above approaches to climate change and order a single State to provide full reparation for climate change harm.

The important point for purposes of the present analysis is that none of these three approaches would be hindered by the factual causation problems discussed in Section 3. Each of these approaches reflect a normative choice to simplify a complex situation of causation, to the benefit of injured parties.

---

[159] See *supra* Section 3.

[160] Nollkaemper et al., *cit. supra* note 14, Principle 10.

[161] ARSIWA, *cit. supra* note 19, Commentary on Art. 31, para. 13.

[162] Bollecker-Stern, *Le préjudice dans la théorie de la responsabilité internationale*, Paris, 1973, p. 279 (arguing that in situations of cumulative causation, where none of the causes could have produced the harm in isolation, but in combination, they could produce such harm: "[t]he theory of equivalence of conditions makes it possible, in the event of the cumulative intervention of a wrongful act attributable to a State and another act not attributable to it, to retain the wrongful act as the sole legal cause of the damage and consequently to claim reparation for the entire damage from the State in question"; author's transaltion); see also the commentary, with further references, to Principle 10 of the Guiding Principles on Shared Responsibility, Nollkaemper et al., *cit. supra* note 14; Pusztai, *cit. supra* note 116, pp. 253-254.

[163] D'Argent, *cit. supra* note 148, pp. 248-249.

6.2. Dividing indivisible harm

The alternative approach is to replace the requirement of full compensation for individual States by a more fine-grained and differentiated approach to compensation. This would build on the assumption, articulated in Section 5 above, that a State's act or omission is "still a cause even if it in itself could not result in the damage but only in combination with the actions of another".[164] Support for such an approach can be found in the early work of the ILC on state responsibility. Special Rapporteur Arangio-Ruiz stated that "[w]henever the damage in question is partly due to causes other than the internationally wrongful act, including possibly the contributory negligence of the injured state, the compensation shall be reduced accordingly".[165] In its commentary, the ILC considered that in situations of multiple causes leading to an injury, to hold the author State liable for full compensation would be neither equitable nor in conformity with a proper application of the causal link criterion. The solution should be the payment of damages in proportion to the amount of injury presumably to be attributed to the wrongful act and its effects.[166] Although the ILC did not include this provision in the final reading, it is supported by some case law[167] and seems normatively preferable to full compensation.

In the absence of scientific methods to determine which State caused what part of the damage, the best ground for differentiation would be to rely on relative shares of emissions.[168] This approach has been pursued in domestic liability cases in the United States, "which have targeted the largest emitters within the most GHG-intensive industries in order to buttress the plaintiffs' claim that the defendants' activities are causally linked to global warming and climate change harms".[169] Plaintiffs also argued this approach in a German case,[170] and in a Swiss court in the *Four Islanders of Pari v. Holcim* case. The plaintiff's claim to quantify responsibility for reparations was based on entities' respective contributions to global emissions.[171]

---

[164] Verheyen, "Loss and Damage", *cit. supra* note 14.

[165] Arangio-Ruiz, Second Report on State Responsibility, UN Doc. A/CN.4/425 and Add.1, YILC, 1989, Vol. II, Part 1, para. 56.

[166] Report of the ILC on the Work of Its 45th Session, UN Doc. A/CN.4/457 (1994), Commentary on Former Draft Art. 8, para. 306.

[167] UNCC, "Fifth Instalment of 'F4' Claims (Environmental Damage)", UN Doc. S/AC.26/2005/10 (2005), para. 740 (stating that where the evidence shows that damage resulted directly from Iraq's invasion and occupation of Kuwait but that other factors have contributed to the damage for which compensation is claimed, due account is taken of the contribution from such other factors in order to determine the level of compensation that is appropriate for the portion of the damage which is directly attributable to Iraq's invasion and occupation of Kuwait); the case is also dicussed by Lanovoy, *cit. supra* note 14.

[168] Faure and Nollkaemper, "International Liability as an Instrument to Prevent and Compensate for Climate Change", Stanford Environmental Law Journal, 2007, p. 123 ff., p. 174; see also d'Argent, *cit. supra* note 148, p. 249 (stating that "[i]n a situation of cumulative wrongful acts, the apportionment will somehow be based on their respective quantitative causal influence").

[169] Peel, "Climate Change", *cit. supra* note 9, p. 1045.

[170] Germany, District Court Essen, *Saúl Ananías Luciano v. RWE*, 15 December 2016.

[171] Switzerland, Justice of the Peace of the Canton of Zug, *Complaint Filed in Four Islanders of Pari v. Holcim*, July 2022. The case is discussed by Wewerinke-Singh, *cit. supra* note 13.

Basing distribution of compensation based on relative shares of emissions may be the most fair and also most realistic proxy at hand.[172] D'Argent noted in the context of the responsibility of two or more States for the same wrongful act that, in the absence of fully quantitative causation, courts could give effect to a "qualitative appraisal of [...] the perceived gravity of the respective legal reasons triggering the responsibility of each entity for the same wrongful act".[173] Arguably, the same would apply to situations of cumulative causation; respective shares of emissions may be the best basis for determining the scope of States' respective responsibilities. Such an approach, which would rely more on fairness and climate justice considerations than on mathematical causation, would fit in with the overall trend in case law to give weight to normative considerations to protect injured parties and accept the role of courts in relation to climate change.

7. Conclusion

The overview of insights from recent case law and scholarship demonstrates that the repeatedly expressed concerns that causation problems would preclude successful claims against States that fail to regulate activities that contribute to climate change harm to some extent are overstated. While courts have dismissed claims based on lack of causation in some cases, other courts have been able to work around such limitations.

The key to solutions to causation puzzles is the connection between factual causation and normative choices, either in the form of obligations to prevent significant harm (Sections 4 and 5) or in relation to allocation of compensation (Section 6). Traditionally, in international law, determinations of causation have been based on a combination of factual causation (notably the but-for test) and legal causation; with legal causation serving to prevent a too-wide responsibility that would be based on factual causation alone. As demonstrated in Section 2, many States still rely on that construction of causation. However, induced by a mismatch of traditional principles of causation with the challenges of complex causation in the case of climate change, plaintiffs have relied on, and courts have used, normative grounds to reduce the impact of problems in factual causation, in particular in the form of due diligence obligations of prevention. This normative turn could not proceed without factual causation. The scientific support for general causation provides the basis for courts to give weight to normative considerations and circumvent specific factual causation tests.

The curtailing of the role of specific factual causation (connecting a specific actor to a specific harm) has been enabled by several interconnected factors. One is the formulation and interpretation of obligations of prevention, as we have seen in

[172] Peel, "Climate Change", *cit. supra* note 9, p. 1047 (arguing that applying this theory to the problem of climate change damage, each responsible State might be held responsible for a share of the harm, whether based on its percentage of total global GHG emissions (since industrialisation or from another given time point) or allocated according to some other equitable formula (e.g. per capita emissions, energy efficiency, or shares of a "carbon budget")).

[173] D'Argent, *cit. supra* note 148, p. 249.

the ITLOS Advisory Opinion, the judgment in *KlimaSeniorinnen* and several national court decisions. A second factor is the fact that the traditional criteria of causation do not work for the cumulative causation that characterises climate change. A third factor that can be inferred from some cases, particularly in human rights-based climate claims, is a shared concern over the urgency of the problem of climate change and its effects on injured persons. This aligns with earlier research that concluded that the causal policies of courts tended to downplay factual causation in environmental cases when there was an "overall egregiousness of factual circumstances".[174] In some of the leading climate cases at the national level (*Urgenda*, *Neubauer*, *Klimaatzaak*) and international level (*KlimaSeniorinnen*), judges made no effort to hide their concerns; it not implausible that these concerns also affected their handling of causation questions.[175]

The main open causation challenge concerns compensation. If States do not succeed in setting up a legitimate global scheme for loss and damage, courts will be asked to explore new paths based on relative shares to circumvent causation problems. These normative grounds are not uncontested. The discussion so far has been muted in international law, but that certainly will change if climate litigation moves to interstate litigation based on the no-significant harm rule. The Advisory Opinion of the ICJ, to be delivered after the finalisation of this article, may weigh in on this point.

Of course, the possibility of workarounds around causation does not determine the chances and success of climate change litigation. A range of other and perhaps more fundamental barriers stand in the way. These include the relationship between courts and political branches in States, the relationship between litigation and the multilateral political process, and, especially for international law, the relationship between States' choices to retain liberties and opt for non-demanding obligations versus the impact on existing rights. These important normative questions need to be settled outside and inside the courtroom. The takeaway from this article is that, in many cases, these discussions need not be distracted by causation puzzles.

Acknowledgments

Parts of this article develop ideas articulated in Nedeski and Nollkaemper, *"A Guide to Tackling the Collective Causation Problem in International Climate Change Litigation", EJIL: Talk!, 15 December 2022. I thank Jutta Brunnee, Nataša Nedeski, Katalyn Sulyok, and Margaretha Wewerinke-Singh for comments on an earlier draft.*

[174] Sulyok, *cit. supra* note 14, pp. 315-316. See also pp. 158-159 (concluding with respect to the European Court of Human Rights that "[o]ne is left with the impression that the legal reasoning, including the causal assessment, is tailored by the court ex post facto, according to the judges' overall impression of the gravity of the circumstance").

[175] This may be seen in the context of the wider support for a principle of prevention in international environmental law; see Duvic-Paoli, *The Prevention Principle in International Environmental Law*, Cambridge, 2018.