Duty to Notify an Impending Disaster on Earth and in Outer Space: Obligation on Third-Party States*

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Abstract

Famously, the International Court of Justice in the *Corfu Channel* case affirmed Albania's international obligation to notify was based on its knowledge, but the Court was silent on the third-party States' duty to notify impending disasters based on their knowledge. Applying analytical and doctrinal methods, this paper argues that the third-party States' duty to notify the international community of impending disasters occurring on Earth or in outer space is an emergent norm and should be an *erga omnes* obligation. Firstly, relying on general international law provisions, including those in

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environmental and human rights treaties, soft law instruments, principles of cooperation, historical responsibility, and common but differentiated responsibility, this article concludes that the third-party States' obligation to notify an impending disaster is an emerging norm. Secondly, to support our claim, this article examines the duty to notify provisions in international disaster law and international space law documents. This paper is timely, as both Earth and outer space are becoming increasingly vulnerable to disasters due to human activities, and disaster risks can be prevented and minimized through knowledge-sharing, which should be mandatory. Such obligation on third-party States to notify the international community regarding impending disasters also aligns with global interconnectedness and helps in realizing sustainable development goals.

I. Introduction

1. In the *Corfu Channel* case, the International Court of Justice (ICJ) famously noted Albania's obligation to warn the United Kingdom of the dangers its ships were exposed to in Albania's territorial waters.[1] Considering that the sovereignty of States is one of the main governing principles of international law, how far does this duty to notify for transboundary harm extend? Usually, under the principle of transboundary harm, the State of origin from where the harm emanates has the obligation to notify the affected State about the impending harm. However, another State other than the State of origin, may be aware of a potentially harmful event. The question is whether the duty to notify about a potentially harmful event should extend to any State with information about such an event. For example, if a State has the means to monitor seismic activity or if a State has the ability to uncover an upcoming earthquake at the border, these States would be third-party States possessing knowledge about the impending disaster of the earthquake. Currently, such information is often exchanged between the States, and no explicit treaty provision mandating the sharing of such information exists. Hence, this paper addresses the question whether the duty to notify an impending harm extends to a third-party State, and if so, whether that State is legally bound to inform the international community, particularly any State which can be potentially affected by the disaster and other States that have the ability to mitigate and prevent an impending disaster either on Earth or in space.

1 Corfu Channel (United Kingdom v. Albania), Merits, Judgment, ICJ Reports 1949, 22.

2. As in any emerging field, the definition of "disaster" in international law is not settled. However, there is a growing consensus that disasters should be viewed comprehensively to include both natural and human-made disasters as well as single-event and complex disasters.[2] Hence, disaster means "a serious disruption of the functioning of the society, causing significant, widespread human, material, or environmental loss", and often armed conflict is excluded from the definition.[3] Disasters may result in loss of life, economic impact, displacement of people, environmental damage, infrastructure, and property damage, disproportionately affecting vulnerable populations. In the twentieth century, major disasters such as droughts, floods, and famine each led to a death toll in the millions in a short span of years.[4] Today, even with technological advancements and better national and international responses to disasters, the death toll reaches hundreds of thousands in the fatal years.[5] For example, around 250,000 people were killed worldwide in the 2004 tsunami, and about 140,000 people died in the 2010 earthquake in Haiti.[6] Between 2005 and 2015, over 700,000 people died, more than 1.4 million were injured, 23 million lost their homes, and over 1.5 billion were affected by natural disasters, resulting in an economic impact exceeding $1.3 trillion.[7] Between 2030 and 2050, it is estimated that climate change will cause approximately 250,000 additional deaths each year.[8] As late as 2023, a twin earthquake of magnitudes 7.8 and 7.5 struck southern Turkey near the Syrian border in February. This disaster affected an estimated 14 million

2 Susan C. Breau and Katja L.H. Samuel, Introduction, in: Susan C. Breau and Katja L.H. Samuel (eds.), Research Handbook on Disasters and International Law (2016), 3-5.

3 ILC, The Special Rapporteur's (E Valencia-Ospina) Second report on the protection of persons in the event of disasters, UN Doc. A/CN.4/615 (7 May 2009), draft art. 2.

4 Hannah Ritchie and Pablo Rosado, Natural Disasters, Our World in Data (ourworldindata.org/natural-disasters).

5 Hannah Ritchie, A century of global deaths from disasters (2022), (ourworldindata.org/century-disaster-deaths).

6 Sonali Deraniyagala, Economic Recovery after Natural Disasters, UN Chronicle, (www.un.org/en/chronicle/article/economic-recovery-after-natural-disasters#:~:text=Human%20capital%20is%20depleted%20due,and%20droughts%20decrease%20soil%20fertility).

7 GA Res 69/283, UN Doc. A/RES/69/283 (3 June 2015) (This resolution adopted the Sendai Framework for Disaster Risk Reduction 2015-2030).

8 World Health Organization, Climate Change (www.who.int/news-room/fact-sheets/detail/climate-change-and-health).

people, i.e., about 16% of Turkey's population; 50,783 deaths were confirmed in Turkey and 8,476 in Syria.[9] Disasters can wreak havoc on Earth and outer space, which has become congested and competitive due to increased operational satellites and space debris. Events such as the 2009 Iridium 33 and the Cosmos 2251 collision created more than 1800 debris of 10 cm and larger.[10] In December 2021, China sent a note verbale to the UN Secretary-General stating that the China Space Station had two close encounters with the USA's Starlink, forcing the China Space Station to implement "preventive collision avoidance control" to ensure the safety of its astronauts.[11] Space disasters can also hinder daily functioning on Earth, as satellites help carry out several activities on Earth, such as communications, remote sensing, navigation, etc.

3. Considering the harmful impact of disasters on Earth and in outer space, this paper analyzes international disaster law and international space law to explore how far the duty to notify should extend to third-party States for transboundary harm. At present, no comprehensive treaty exists that compels third-party States to share information with affected States in case of Earth or space disasters. The international law that governs information-sharing in instances of disasters comprises soft law instruments (often in the form of UN General Assembly Resolutions) and hard law provisions of a piecemeal fashion. This paper argues that these soft law instruments and piecemeal hard law provisions on the duty to notify in cases of disasters, if read together, point towards an emerging norm under customary international law of a duty to notify on the third-party States for all disasters, either on Earth or in outer space. This paper claims that the third-party State's duty to notify an impending disaster, in cases they have knowledge about the impending disaster, is vital for disaster prevention and should become a customary norm of international law.

9 Natural disasters that plagued the world in 2023 (December 2023), (www.aljazeera.com/gallery/2023/12/27/natural-disasters-that-plagued-the-world-in-2023).

10 NASA, The Collision of Iridium 33 and Cosmos 2251: The Shape of Things to Come (ntrs.nasa.gov/citations/20100002023).

11 China, Note verbale to UN, UN Doc. A/AC.105/1262 (3 December 2021), (www.unoosa.org/oosa/en/oosadoc/data/documents/2021/aac.105/aac.1051262_0.html).

II. Duty to notify transboundary harm

4. International law on transboundary harm provides that while a State of origin has the freedom to carry out any project in its territory according to the principle of territorial sovereignty, the equal sovereignty of other States means that the State of origin should consider the potential environmental impact of its project on other States. This principle, however, does not give every potentially affected State the right to veto every project by the State of origin that may potentially cause transboundary harm. This principle of transboundary harm was articulated in the famous *Trail Smelter* case which laid down that States have a duty to prevent transboundary harm.[12] In this case between the USA and Canada, the arbitral tribunal held that Canada should compensate the USA for the transboundary air pollution in the USA caused by a Canadian entity. The arbitral tribunal in that case held as follows:

> [N]o State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.[13]

5. The International Law Commission's Draft Articles on Prevention of Transboundary Harm from Hazardous Activities 2001,[14] which codifies and develops the law on the matter, provides that transboundary harm means "harm caused in the territory of or in other places under the jurisdiction or control of a State other than the State of origin, whether or not the States concerned share a common border".[15] The said draft articles also provide that "[t]he present articles apply to activities not prohibited by international law which involve a risk of causing significant transboundary harm through their physical consequences."[16] The definition of transboundary harm goes beyond harm caused in the territory of a State and includes harm caused "in other places under the jurisdiction or control of a State". This definition explicitly consists of the instances of harm in places under the jurisdiction and

12 Trail smelter case (United States, Canada), 3 UNRIAA 1952, 1905.

13 Ibid.

14 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities, UN Doc. A/56/10 (2001). In 2001, the Draft Articles on Prevention of Transboundary Harm from Hazardous Activities was adopted by ILC and was submitted to the General Assembly.

15 Ibid.

16 Ibid., art. 1, 149-151.

control of a State but not constituting the territory of a State, such as its space objects.[17] These draft articles provide that they apply to "activities not prohibited by international law", but this criterion allows a State that is likely to be affected by an activity causing transboundary harm, as well as the State already affected to demand the State of origin to prevent that harm? even though that activity of the State of origin per se is not prohibited under international law.[18] Similar language regarding transboundary harm prevention can also be found in earlier documents, such as the Rio Declaration, which lays down the following:

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.[19]

Therefore, several international instruments address the duty of a State to prevent transboundary harm by activities within its jurisdiction or control.

6. Furthermore, in its 1996 advisory opinion on the *Legality of the Threat or Use of Nuclear Weapons*, the ICJ held that "existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or areas beyond national control is now part of the corpus of international law relating to the environment".[20] Thus, transboundary harm by a State means activities within the jurisdiction and control of one State that may affect other States. State practice, too, points towards a duty to prevent and reduce the harmful consequences of transboundary damage. For example, when the Soviet satellite Cosmos-954 fell into Canadian territory in 1978, causing severe radioactive contamination, the Canadian claims against the Soviet Union were based not only on the Convention on Liability for Damage Caused by Space Objects 1972[21] but

17 Ibid., 148, 151.

18 Ibid., 150.

19 Rio Declaration on Environment and Development, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Principle 2.

20 Legality of the Threat or Use of Nuclear Weapons, advisory opinion (UNGA Request), 1CJ Reports 1996, 226, para. 29.

21 Convention on International Liability for Damages Caused by Space Objects (Liability Convention), 24 UST 2389, TIAS 7762.

also on the general international law principle of "duty to take the necessary measures to prevent and reduce the harmful consequences of the damage".[22] Similarly in the *Pulp Mills* case, the ICJ noted that the principle of prevention as a customary rule has its origins in due diligence and includes the duty to notify and inform.[23] A State's obligation to prevent the harmful effects of activities in its territory or under its jurisdiction and control should include the duty to notify a potentially affected State as well as other States with the ability to mitigate and prevent said disaster.

7. This paper investigates the concept of duty to notify in case of transboundary harm as an international responsibility of third-party States. Primarily, this responsibility flows from the general obligation to prevent transboundary harm. In cases of transboundary harm, though, the onus is on the State of origin to prevent said harm and, as a corollary, the State of origin has the duty to notify the potentially affected State. We understand, however, that there may be States that know about the impending harm even though they are not the State of origin. An example of this can be a third-party State gaining knowledge of an impending earthquake in another country that might occur due to natural causes. Another example could be a State having knowledge through its space situational awareness network or astronomy facilities, that the space objects of two other States have the probability of colliding with each other. Hence, in this paper, we explore whether this duty to notify should only be limited to the States responsible for causing the transboundary harm and should instead extend to all the States who possess information regarding the impending disaster. Expanding the ambit of the duty to notify would be a positive development of international law and such expansion would flow from the principle of mutual cooperation. Mutual cooperation is one of the governing principles of modern international law. At the moment, information sharing amongst the States in cases of impending disaster takes place but not always as a matter of obligation, apart from well-established obligations on the State of origin in cases of transboundary harm. All States have a legal interest in upholding the duty to notify an impending disaster. This article, thus, argues that this duty to notify an impending disaster should be an *erga omnes* obligation of international law and the responsibility to notify the potentially affected State and other States with the ability

22 Statement of Claim, The Protocol on Settlement of Canada's Claim for Damages Caused by "Cosmos 954", 20:3 ILM 1981, 689, para. 17.

23 Pulp Mills on the River Uruguay (Argentina v. Uruguay), Merits, Judgment, ICJ Reports 2010, 14, paras. 101, 102, 113.

to mitigate and prevent disasters should not just be limited to the State of origin in cases of transboundary harm.

III. Duty to notify disasters as an *erga omnes* obligation

8. Third-party States' duty to notify an impending disaster to a potentially affected State and other States with the capacity to prevent and mitigate disaster should be an *erga omnes* obligation. An impending disaster may occur within the territorial control of a State or group of States, in the high seas, Antarctica, or outer space. Additionally, disasters may affect the environment in general. In any case, disasters do not respect boundaries. The effect of a disaster often extends to the international community at large. Hence, when a State knows about an impending disaster, it should be legally bound to share such information with all States, particularly the potentially affected States, as well as those States that have the ability to mitigate the effects of said disaster.

9. The ICJ famously noted the concept of "*erga omnes*" in the *Barcelona Traction* case in its 1970 judgment.[24] In that case, the ICJ stated that there are "obligations of a State towards the international community as a whole"—as distinguished from obligations of a state "arising vis-à-vis another State." The Court asserted that "by their very nature," the former kinds of obligations "are the concern of all States. Given the importance of the rights involved, all States can be held to have a legal interest in their protection; they are obligations *erga omnes*." The ICJ gave examples of what would constitute an *erga omnes*, which include self-determination, laws outlawing acts of genocide and aggression, and the "principles and rules concerning the basic rights of the human person". Thus, the ICJ specified two elements that characterize obligations *erga omnes*: firstly, the importance of norms and secondly, the non-reciprocal or non-bilateral sable character of obligations.[25] The Court, however, did not explain the relationship between the two elements and whether the two elements must co-exist or whether one element is sufficient.[26] Arangio Ruiz, who focuses on the non-reciprocal character of *erga omnes* norm, states that these obligations are legally indivisible, i.e., obligations which simultaneously bind each and every State concerned with respect

24 Barcelona Traction, Light and Power Company, Limited (Belgium v. Spain), Judgment, ICJ Reports 1970, 32, paras. 33-35.

25 Ibid., para. 33.

26 Yoshifumi Tanaka, The Legal Consequences of Obligations Erga Omnes in International Law, 68.1 Netherlands ILR (2021), 8.

to all the others.[27] Regarding the importance of obligations, the ICJ in *Barcelona Traction* judgment stated that these obligations are "concern of all States", i.e., obligations that reflect the community interest of the international community but not necessarily *jus cogens*, which are hierarchically superior to other international norms.[28]

10. Later, the ICJ, in the 2020 judgment in *Gambia v Myanmar*, reaffirmed this common interest concept in international law and noted that every State has an interest in compliance with these principles and that the Gambia did not need to prove that it was "specially affected" by the alleged genocide carried out by Myanmar.[29] The Articles on Responsibility of States for Internationally Wrongful Acts also recognizes that certain obligations are owed to the "international community as a whole", and these obligations, when breached, any State is entitled to invoke the international responsibility of the State committing the internationally wrongful act.[30] While the *erga omnes* principle has primarily been used by the ICJ for determining questions of jurisdiction and admissibility in serious cases of violations of *jus cogens* norms, the application of *erga omnes* is not just limited to *jus cogens.* An example of a breach of an *erga omnes* obligation triggering a state's responsibility may be a State breaching its due diligence obligation for regulating climate change.[31] The ICJ also held in the *Wall*

27 ILC, Fourth Report on State Responsibility (rapporteur: Gaetano Arangio Ruiz), 1 ILCYB (1992), 34, para. 92.

28 Tanaka, above n.26, 9.

29 Application of the Convention on the Prevention and Punishment of the Crime of Genocide (The Gambia v. Myanmar), Provisional Measures, Order, ICJ Reports 2020, 3, para. 41; See also Application of the Convention on the Prevention and Punishment of the Crime of Genocide (The Gambia v. Myanmar), Preliminary Objections, Judgment, ICJ Reports 2022, 477, para. 106. In Application of the Convention on the Prevention and Punishment of the Crime of Genocide in the Gaza Strip (South Africa v. Israel), Provisional Measures, Order, ICJ Reports 2024, 16-17, para. 33. South Africa based its standing on a similar concept of obligations *erga omnes partes* i.e. obligations that a state party to the treaty owes to all the other States parties to the same treaty, in view of their common values and concern for compliance. ICJ in that case noted that Israel did not challenge South Africa's standing and ICJ reaffirmed that "any State party, without distinction" may sustain a claim based on obligations *erga omnes partes*.

30 ILC Articles on Responsibility of States for Internationally Wrongful Acts, 2001, GA Res A/RES/62/61 (2007), art. 48.

31 Sandrine Maljean-Dubois, The No-Harm Principle as the Foundation of International Climate Law, in: Benoit Mayer and Alexander Zahar (eds.), Debating Climate Law, (2021), 22.

case[32] that such obligations are by their very nature "the concern for all States", quoting itself from the *Barcelona Traction* case that "[i]n view of the importance of the rights involved, all States can be held to have a legal interest in their protection".[33]

11. The question that arises then is whether the duty to notify an impending disaster should be an obligation *erga omnes.* In its advisory opinion on the *Legality of the Threat or Use of Nuclear Weapons*, the ICJ held that "the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn."[34] In the *Gabčikovo-Nagymaros Project (Hungary v Slovakia)* case, the ICJ noted the importance of environmental protection and held that "in the field of environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage."[35] The ICJ also noted that new norms and standards are emerging owing to scientific insights and a growing awareness of the risks for humankind.[36]

12. The International Tribunal for the Law of the Sea (ITLOS), in its advisory opinion on the responsibility and liability for seabed mining, held that the link between an obligation of due diligence and the precautionary approach is an integral part of international law.[37] This precautionary approach is adopted in several international treaties as a working principle of international environmental law, such as Principle 15 of the Rio Declaration. The ITLOS chamber held that there is a trend towards the precautionary approach emerging as a customary principle of international law.[38] To apply the precautionary principle "according to their capabilities", the duty to notify is a necessary best practice in international law in the case of a disaster.

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32 Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory, advisory opinion (UNGA Request), ICJ Reports 2004,136, para. 155.

33 Barcelona Traction, Light and Power Company, Limited, above n.24, 32, para. 33.

34 Legality of the Threat or Use of Nuclear Weapons, above n.20, 226, para. 29.

35 Gabčikovo-Nagymaros Project (Hungary v. Slovakia), Judgment, 1CJ Reports 1997, 78.

36 Ibid., 68, 78.

37 Responsibilities and obligations of States with respect to activities in the Area, advisory opinion (International Seabed Authority request), ITLOS Reports 2011, 10, para. 132.

38 Ibid., paras. 124-127, 135.

13. This obligation to notify in case of an impending disaster should become a specific obligation without the conditions of reciprocity and bilateral commitments. In the *Corfu Channel* case,[39] the ICJ found that the minefield under the Albanian territorial waters, which impacted the United Kingdom's ships, was not laid by Albania but by unknown entities. However, the Court deduced from the circumstantial evidence that Albania knew about the minefield in its territorial waters. The Court thereby held that because Albania knew about the minefields in its territory, Albania had an obligation to notify the United Kingdom. Similarly, in the *Nicaragua* case, the ICJ referred to its *Corfu Channel* judgment and reaffirmed that the States have the duty to warn others in cases of danger.[40] In the *Barcelona Traction* case, the ICJ held that *erga omnes* obligations often relate to the fundamental rights of humans and thus have become part of general international law, or these norms emerge from international instruments of universal or quasi-universal character.[41] It is challenging to answer where the threshold lies when an obligation becomes an obligation *erga omnes* owed to the international community. Obligations protecting human rights, environmental rights, and laws for the protection of people are essential to contemporary international law and are likely to cross the threshold. It may be stated thus that an obligation should become an *erga omnes* obligation when it consists of one of the basic tenets of modern international law, and therefore, all States have a legal interest in their protection. The duty to notify in cases of disaster is essential in contemporary international law to protect human beings, infrastructure, or the environment from possible damage. Considering the effects a disaster can have on human beings and the environment, apart from its impact on social conditions and the economy, we can conclude that a third-party State's duty to notify an impending disaster should be an *erga omnes* obligation under international law. Since a disaster in one area of Earth or outer space may have direct or indirect effects on other places, in cases where a State does not notify of an impending disaster despite knowing about it, any State should have the standing to take action against the State possessing the knowledge.

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39 Corfu Channel, above n.1.

40 Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America), Merits, Judgment, ICJ Reports 1986, para. 215.

41 Barcelona Traction, Light and Power Company, Limited, above n.24, 32, paras. 33-34.

IV. The duty to notify obligation flows from the general principles of cooperation and solidarity

14. The duty to notify should flow from the general principles of cooperation and solidarity. Solidarity in international law implies an acceptance by every State that it consciously conceives of its own interests as being inextricable from the interests of the international community as a whole.[42] The law of cooperation and solidarity, as we understand today, is heavily influenced by the writing of the seventeenth-century lawyer and philosopher Emer de Vattel. According to Vattel, "Nations as obliged by nature reciprocally to cultivate human society are bound to observe towards each other all the duties which the safety and advantage of the society required."[43] He further stated that humans are social beings and need mutual assistance for preservation, happiness and a comfortable life; similarly, nations, comprised of human beings, owe to each other to do all that is in their power to assist one another.[44] Vattel clarified that this duty to assist other States should be carried out only if the assisting State can do so without neglecting the duties that it owes to itself and provided the State in need of assistance is not capable of helping itself.[45] Further, though a State is obliged to promote the perfection of other States, it may not intrude its good offices on other States without their consent; the assisting State should respect the sovereignty of other States.[46] Vattel also stated that a State's right to an office of humanity is imperfect, and one nation cannot compel another to assist.[47] As Macdonald noted, "Vattel's eighteenth-century perplexity over how to resolve the principle of solidarity as something essential, yet voluntary—basic to the law of nations, yet unenforceable—has not appreciably diminished in the past two centuries."[48]

15. The international order, though, has changed since Vattel's famous text. Since 1945, after the establishment of the United Nations, scholarship

42 R. St. J. MacDonald, Solidarity in the Practice and Discourse of Public International Law, 8:2 Pace ILR (1996), 259, 290.

43 M. D. Vattel, 2 Law of Nations; Or Principles of the Law of Nature, Applied to the Conduct & Affairs of Nations & Sovereigns (1820), 193. (First published in French in 1758).

44 Ibid., 194.

45 Ibid., 194–196.

46 Ibid., 196.

47 Ibid., 196.

48 MacDonald, above n.42, 261.

indicates that the principle of solidarity exists in the international order.[49] As in the *Corfu Channel Case*, the ICJ held that States are obliged to notify other nations in life and death situations and elementary considerations of humanity support this.[50] Furthermore, as Wolfgang Friedmann noted, international law has moved from coexistence amongst States on a reciprocal basis to cooperation amongst States for purposes of international welfare.[51] Similarly, this shift in international law has been noted by William Jenks, who wrote as follows:

> [W]e shall find that the emphasis of the law is increasingly shifting from the formal structure of the relationships between States and the delimitation of their jurisdiction to the development of substantive rules on matters of common concern vital to the growth of an international community and to the individual well-being of the citizens of its member States.[52]

Thus, the scholarly opinions denote that the international community has been moving from mere co-existence towards genuine cooperation, though this movement has been far from linear.

16. Contemporary international law has moved "far beyond" the minimal bilateralism[53] in which state-societies act as closed systems internally and as territory owners externally with each other.[54] Under traditional international law, international legal obligations exist at the level of "relations between States individually" and do not generally oblige States to adopt certain conduct in absolute terms but only in relation to particular entities to which a specific obligation is owed.[55] The principle of non-intervention in a State's affairs is "designed to protect not only a State's internal but also its external affairs against interference by third parties"; however, it stands as a severe

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49 Ibid., 262.

50 Corfu Channel, above n.1, 22, 25.

51 Wolfgang Friedmann, The Changing Dimensions of International Law, 62:7 Columbia LR (1962), 1147, 1148, 1154, 1155 (as Friedmann noted, "[t]o some extent, this corresponds to the distinction between "the international law of reciprocity" and "the international law of co-ordination" as formulated by Dr. Schwarzenberger in various works").

52 C. Wilfred Jenks, Common Law of Mankind (1958), 17.

53 Bruno Simma, From Bilateralism to community interest in international law, 250 RCADI (1994), 229-230.

54 Philip Allott, Eunomia: New Order for a New World (1990), 324.

55 Simma, above n.53, 230.

obstacle to stronger solidarity.[56] Even though international law is still based on bilateralism, community interest has permeated into international law as we view it today and has made it a more "socially conscious legal order".[57]

17. A momentum shift of international law from coexistence to cooperation specifically took place with the adoption of the Charter of the United Nations (UN Charter). One of the purposes of the UN is as follows: "[t]o achieve international *cooperation* in solving international problems of an economic, social, cultural, or humanitarian character, and in promoting and encouraging respect for human rights and for fundamental freedoms for all without distinction as to race, sex, language, or religion"[58] (emphasis added). Similarly, the Declaration on Friendly Relations notes:

> *[S]tates have the duty to co-operate with one another*, irrespective of the differences in their political, economic and social systems, in the various spheres of international relations, in order to maintain international peace and security and to promote international economic stability and progress, the general welfare of nations and international cooperation free from discrimination based on such differences [emphasis added].[59]

The Declaration on Friendly Relations explicitly provides that cooperation among States is an obligation. Some jurists argue that based on the UN Charter, the Declaration on Friendly Relations, and general international law, the duty to cooperate is not just a moral obligation but also a legal one, though the legal and moral aspects are co-extensive and correlated.[60] Whereas the law of coexistence, which prevailed in traditional international law, is based on an obligation to abstain and the predominance of egoistic interests of the States, the law of cooperation is based on the realization of community values such as equality, justice, order, and peace.[61] The movement of international law from coexistence to cooperation does not mean that one has been substituted by the other but instead means that the law of

56 Ibid., 230-233.

57 Ibid., 234.

58 UN Charter, art. 1.

59 GA Res 2625 (XXV), UN Doc. A/RES/2625 (XXV) (24 October 1970) (The Declaration on Principles of International Law concerning Friendly Relations and Co-operation among States).

60 V.S. Mani, The 1970 Declaration on Friendly Relations: A Case Study in Law Creation by the UN General Assembly, 18:3 International Studies (1976), 308.

61 Flavia Zorzi Guistiniani, International Law in Disaster Scenarios- Applicable Rules and Principles (2021), 95.

cooperation has added some layers of solidarity to the existing law. As Emile Durkheim states, people bond together because of their interdependence,[62] and States, constitutive of people, are also interdependent in today's world and bonded together.

18. The world has recently witnessed the rise of populism, nationalistic tendencies, xenophobia, and unilateral actions by States. The COVID-19 pandemic accelerated intolerance and exposed the existing prejudices and close-minded attitudes. Hence, during the COVID-19 pandemic, we witnessed the closing of the national borders, restrictions on individual freedoms, inequitable national policies, vaccine nationalism, and lack of cooperation between States and jurists have felt that "notions of global community, solidarity, fairness are far removed from the reality that we have seen unfolding in the actions of states responding to the pandemic".[63] Despite the apparent shift from globalism to statism in today's world characterized by numerous conflict situations, failure of governance mechanisms, and intense adverse effects of climate change, solidarity is the tool that can protect "society from the lawlessness, the injustice, the isolation, the vulnerability and after all from the disintegration".[64] Thus, we are faced with a paradox – while it has never been more urgent to implement the principle of solidarity, it has never been more challenging to implement it.

19. The Pact for the Future, adopted unanimously by the States at the UN General Assembly on 22 September 2024, provides that this is a time of "profound global transformation" as we are confronted by "rising catastrophic and existential risks, many caused by the choices we make".[65] The said document acknowledges that "global transformation is a chance for renewal and progress grounded in our common humanity"[66] and there is a need for "recommitment to international cooperation based on respect for international law", and such recommitment is "not an option but a necessity".[67]

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62 Ibid., 96

63 Clare Wenham et al, The futility of the pandemic treaty: caught between globalism and statism, 98.3 International Affairs (2022), 837.

64 Edit Knoll-Csete et al, What the World needs now is solidarity, Cambridge Open Engage (www.cambridge.org/engage/coe/article-details/5f30f379c67b860019834f8f 2).

65 UNGA Res 79/1, 2024, UN Doc. A/RES/79/1 (22 September 2024) (Pact for the Future), para. 2.

66 Ibid., para. 3.

67 Ibid., para. 5.

20. Despite the movement the world has recently witnessed toward unilateralism, it is crucial to recommit to multilateralism and solidarity. In fact, in 2015, when the 17 UN Sustainable Development Goals (SDGs) were adopted to make the world a better place by 2030, the primary responsibility for implementing the SDGs and associated targets was put on each country,[68] at the same time recognizing that the ambitious SDGs and targets cannot be achieved "without a revitalized and enhanced Global Partnership".[69] Subsequently, the Pact for the Future adopted in September 2024 provides that, "Our challenges are deeply interconnected and far exceed the capacity of any single State alone. They can only be addressed collectively, through strong and sustained international cooperation guided by trust and solidarity for the benefit of all and harnessing the power of those who can contribute from all sectors and generations."[70] While political statements and declarations, including the UN General Assembly resolutions such as the Pact for the Future, should not be conflated with legally binding rules, these documents indicate what the international community perceives as important and may also be found to be reflective of *opinio juris*.

21. The principles of sovereignty and cooperation/solidarity have to be reconciled in today's world,[71] where cooperation/solidarity are matters of obligation and not simply matters of charity. That said, it must be recognized that the concept of sovereignty has been emerging, and unlike in the nineteenth and first half of the twentieth century, State sovereignty is no longer viewed as an indivisible concept. In fact, cooperation by sovereign States can be viewed as an essential manifestation of sovereignty. Solidarity is the underlying principle for cooperation and calls for the intensification of cooperation for development.[72] Whereas there is an element of mutuality in solidarity/cooperation, there may not be strict reciprocity, and the nation providing solidarity may not benefit from it directly, especially in the short term. The exact contours of the general duty to cooperate are challenging to establish in all

68 UNGA Res 70/1 (2015), UN Doc. A/RES/70/1 (21 October 2015), paras. 41, 63 (The 2030 Agenda for Sustainable Development).

69 Pact for the Future, above n.65, para. 60.

70 Ibid., para. 5.

71 The sovereign equality of States is a legal fiction. Such sovereign equality provides as a minimum level playing field for weaker States. Sovereign equality and solidarity are thus not opposed to each other; rather the two concepts are mutually reinforcing.

72 Ruüdiger Wolfrum, Cooperation, International Law of, 2 Max Planck EPIL (2010).

branches of international law, though the duty is more evident in certain branches of law, such as international environmental law and the law of protection of human rights.[73] Further, the principle of solidarity has "meaningful presence in the current international legal order" and can operate as both negative and positive obligations.[74] However, implementing the principle of solidarity in international law is not bereft of difficulties. While solidarity as a structural principle and as a marking feature of international law has found wide acceptance,[75] there is no consensus on the exact content of the principle or its operationalization. Nevertheless, the positive obligations of solidarity are more manifested in certain branches of international law, such as the international law of disaster relief, whose entire premise is based on solidarity by actors, and the international law of outer space, whose core principle is that outer space should be explored and used for the benefit of all.

22. Additionally, disaster prevention cannot be achieved if international law sticks to a bilateral understanding of preventing transboundary harm originating in the territory or under the jurisdiction and control of one State and causing damage to another State. One must remember that disasters threaten the natural basis of life for all human beings in all States. In fact, the UN Office for Disaster Risk Reduction noted in its 2022 policy brief that in this interconnected world, actions in one system can create or reduce risk in another, and the impacts of disasters can cascade across systems.[76] Risk reduction and resilience-building efforts are vital for attaining the SDGs of the 2030 Agenda. Sharing of risk knowledge helps in ensuring risk-informed decisions and is crucial for realizing the SDGs, including SDG 13 (Climate Action), 14 (Life Below Water), 15 (Life on Land), 16 (Peace, Justice and Strong Institutions) and 17 (Partnerships for the Goals). Obligating third-party States with knowledge of an impending disaster to share such

73 Ibid.

74 Abdul G. Koroma, Solidarity: Evidence of an Emerging International Legal Principle, in: Holger P. Hestermeyer, et al. (eds.), Coexistence, Cooperation and Solidarity (2012), 130.

75 Kostiantyn Gorobets, Solidarity as a Practical Reason: Grounding the Authority of International Law, 69.3 Netherlands ILR (2022), 9-10.

76 United Nations Office for Disaster Risk Reduction (UNDRR), Towards Risk-Informed Implementation of the 2030 Agenda for Sustainable Development (2022) (www.undrr.org/publication/policy-brief-towards-risk-informed-implementation-2030-agenda-sustainable-development); Disaster risk and the 2030 Agenda for Sustainable Development (www.undrr.org/implementing-sendai-framework/drr-focus-areas/disaster-risk-and-2030-agenda-sustainable-development).

information with the international community will significantly benefit anticipatory and early actions taken to mitigate disaster risks. Needless to say, risk-informed climate action will reduce vulnerability and exposure to disasters. Such knowledge-sharing strengthens institutions' capacity to govern disaster risks, effectively prepare for and respond to disasters and reduce humanitarian needs.[77] In addition, such knowledge sharing aligns with modern international law's emphasis on cooperation and partnerships.

23. Hence, in this paper, we take the position that as disasters, including disasters in space, have the effect of wreaking havoc on a State and the world community at large, in the case that a State has information about such an impending disaster, it should notify the potentially affected States as well as those States that can prevent and mitigate the effects of said disaster. This duty to notify does not interfere with the sovereignty of the country providing information or encroach on the sovereignty of the country receiving such information. The duty to notify in case of disasters should flow from the principle of solidarity and a general obligation of cooperation and prevention of harm to the international community.

V. The duty to notify about disasters also flows from common but differentiated responsibility

24. The duty to notify about an impending disaster by third-party States to the potentially affected States and those States that can mitigate and prevent the disaster also flows to some extent from the principle of common but differentiated responsibility (CBDR). The duty to notify flows from CBDR since disasters, especially natural disasters, are often an indirect result of historical exploitation and injustices committed by technologically advanced nations. Moreover, the duty of due diligence and the duty to warn about an impending disaster should be the same for a technologically advanced State and a State with nascent technological development. As the Yokohama Message and Principles 1994 notes, "[a]ppropriate technology and data, with the corresponding training, should be made available to all freely and in a timely manner, particularly to developing countries,"[78] and

77 Ibid.

78 Yokohama Strategy and Plan of Action for a Safer World Guidelines for Natural Disaster Prevention, Preparedness and Mitigation (Yokohama Documents), UN Doc. A/CONF.172/9 (1994), message 5.

"[p]reventive measures are most effective when they involve participation at all levels…"[79]

25. The CBDR principle has primarily developed from international environmental law but has been adopted as a customary principle in general international law. The concept of CBDR emerged from applying equity and justice in international law, thus requiring a differentiated treatment of States based on their differences in technical, financial, and economic capacities.[80] Disasters, often occurring due to climate change and humankind's neglect of the environment, present a unique case of historical injustice and result in damaging effects on countries that have not historically contributed to the adverse environmental impacts.[81]

26. The CBDR principle and the historical and present factors behind it have also been recognized in the Rio Declaration.[82] The Rio Declaration provides as follows:

> In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.[83]

This principle, enshrined in the Rio Declaration, was later included in subsequent international environmental agreements and instruments.

27. This principle of CBDR has also been enshrined in the United Nations Framework Convention on Climate Change 1992 (UNFCCC),[84] which has almost universal membership. Article 3(1) of the UNFCCC states:

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79 Ibid., Principle 6.

80 Daria Shapovalova, In Defence of the Principle of Common but Differentiated Responsibilities and Respective Capabilities, in: Benoit Mayer and Alexander Zahar (eds.), Debating Climate Law (2021), 63; See generally, Wang Yong and Pan Xin, "The Application of the Principle of Common but Differentiated Responsibilities in Environmental Governance on the High Seas", 23:1 Chinese JIL (March 2024), 151–184 for nuances of CBDR principle.

81 Ibid., 64; Lukas H. Meyer and Dominic Roser, Climate Justice and Historical Emissions, 13 Critical Review of International Social & Political Philosophy (2010), 229.

82 Rio Declaration on Environment and Development, above n.19.

83 Ibid., Principle 7.

84 United Nations Framework Convention on Climate Change (UNFCCC), 1771 UNTS 107.

> The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.

Furthermore, the UNFCCC also provides that the parties' commitments will be based on their "common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances".[85]

28. The CBDR principle determines a State's fair share of contribution to the global effort, acknowledging that the fair share will be different for developed and developing countries. The CBDR principle follows from equity by ensuring just burden-sharing by different States with varying levels of development. Historically speaking, the industrialized States of the Global North are responsible for damaging the environment—both on Earth and in outer space—giving rise to their historical responsibility for the damage caused. These countries of the Global North are often former colonizers and have been benefiting from their unjust acts, which are harmful and detrimental to the environment. The Global North countries accorded themselves a higher living standard by using unsustainable modes of production and consumption and exploiting the natural environment for development, resulting in only these countries experiencing a better quality of life while distributing harm across the entire global political economy.[86] For example, in the past, British industrialists used steam power in the colonies on sea and land because these industrialists wanted power over labor and against the majority of the world and had no care for the adverse environmental impact of their actions.[87]

29. The world has become more natural disaster-prone due to human actions that harm the environment on Earth and in outer space. Climate change is responsible for natural disasters across the globe, which not only

85 UNFCCC, above n.84, art. 4.

86 Sarah Mason-Case and Julia Dehm, Redressing Historical Responsibility for the Unjust Precarities of Climate Change in the Present in: Benoit Mayer and Alexander Zahar (eds.), Debating Climate Law (2021), 170.

87 Andreas Malm, The Origins of Fossil Capital: From Water to Steam in the British Cotton Industry, 21 Historical Materialism (2013), 17, 29, 32.

results in air pollution and biodiversity loss but multiplies other risks, negatively impacting billions of people.[88] The effect of climate change is more visible in developing countries due to a lack of infrastructural support and financial ability. In Asia-Pacific, the most disaster-prone region in the world, an average of 43,000 people have been killed yearly by natural disasters since 1970.[89] The recent 2022 flood in Pakistan and the devastation that ensued is physical evidence of the havoc that disasters can cause. The said flood displaced close to eight million people and killed more than 1,500 people, including 552 children.[90] The Prime Minister of Pakistan, Muhammad Shehbaz Sharif, noted in the 2022 UN General Assembly that "[n]ature has unleashed her fury on Pakistan without looking at our carbon footprint, which is next to nothing. Our actions did not contribute to this."[91] Similarly, Sarah Mason-Case and Julia Dehm noted in their 2021 article:

> Yet, those who emitted the least over the course of this prolonged timescale—peoples in the Global South, people living in poverty, Indigenous peoples, and other marginalized groups in settler colonial states—are most affected by the impacts of the problem..... The cumulative emissions of the United States, the European Union, Russia, Japan, and Canada between 1850 and 2012 will contribute to a nearly 0.5°C temperature increase by 2100.... Furthermore, climate change poses a particular threat to the self-determination of those states that are precariously located and otherwise vulnerable because of a history of colonialism, including small island states in the Pacific, the Caribbean, and Africa, as well as the 'least developed countries'. The risk that such damage arises from the emission of greenhouse gases is indisputable.[92]

88 Human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment.

89 UNESCAP, Sustainable and resilient recovery from the coronavirus disease pandemic in Asia and the Pacific, Eighth Asia-Pacific Forum on Sustainable Development ESCAP/RFSD/2021/1 (2021), 1-5 (3).

90 UN News, Flood-ravaged Pakistan's leader appeals for urgent global support in UN address (23 September 2022) (news.un.org/en/story/2022/09/1127791).

91 Ibid.

92 Mason-Case & Dehm, above n.86, 170, 172, 173, 178.

Thus, many scholars believe that the former colonizing States which are often the developed nations have a historical responsibility for addressing climate change and disasters stemming from the climate change.

30. In the context of outer space, upper-stage vehicles were indiscriminately left in outer space, as well as defunct space objects not specifically designed to return to Earth in the first few decades of the space age; it took until a few decades from the beginning of space era for design changes to include plans for the reduction of debris in outer space. This historical disregard for creating space debris and abandoning spacecraft and upper stages of launch vehicles has resulted in about 7,500 tons of material accumulated in orbit as of 2015.[93] The number and amount of materials accumulated in outer space has increased exponentially since then as there has been a spurt of operational satellites post-2015, along with an attitude that views satellites as expendable, thereby increasing the possibility of space junk.

31. Due to the historical reasons previously mentioned, countries with advanced technologies have the responsibility not to repeat their actions of harming the environment and have a duty to ensure that the environment, on Earth and in outer space, does not become more vulnerable. This obligation on technologically advanced States to notify any State of an impending disaster thus flows from a duty to ensure that the environment does not become more vulnerable. Therefore, this duty to notify, to a certain extent, flows from CBDR and historical responsibility. Furthermore, this responsibility for historically polluting the environment arises not simply because industrialized States in the Global North appropriated the environment, both on Earth and in outer space, for economic growth but also because their acts enabled conditions for dispossession, violence, slavery, and racial differences that resulted in and are still responsible for stark asymmetries between and within countries.[94]

32. It must be remembered that in cases of environmental degradation and its adverse effects, prevention is the most crucial factor. Notification and information-sharing regarding an impending disaster are the first and foremost steps to prevent disasters. Further, as a consequence of the general acceptance of the universal impact of, and concern for climate change and its link with the causation of disaster, States have obligations owed to the international community as a whole, i.e., an *erga omnes* obligation to prevent

93 Christophe Bonnal and Darren S. McKnight (eds.) International Academy of Astronautics Situation Report on Space Debris (2016), 69.

94 Mason-Case and Dehm, above n.86, 174.

significant damage to the environment, both on Earth and in outer space. From such an *erga omnes* obligation of prevention should emanate the obligation by the State possessing knowledge to notify a State concerned about an impending disaster.

VI. The duty to notify about disasters flows from human rights law

33. The duty to notify about impending disasters flows from international human rights law; for instance, if host States are no longer able or willing to protect their citizens and a disaster has annihilated the social infrastructure, other States have a duty to help. Moreover, as disasters do not respect borders, it is crucial for all countries to cooperate "to build a safer world based on common interests and shared responsibility to save human lives".[95]

34. Disasters affect human rights as they lead to displacements of people and enforced relocations, loss of documentation, gender-based violence, lack of food security, lack of sanitation, injury to persons and death, etc. The Office of the United Nations High Commissioner has noted that persons with disabilities[96] and older people[97] are disproportionately affected by climate-related disasters. The UN Special Rapporteur on extreme poverty and human rights recently warned of potential climate apartheid in the future, where the wealthy pay to shield themselves from the worst impacts of climate change while the poor suffer immensely.[98] Concerning space disasters, these events can affect not only infrastructure and life in space but also daily functioning on Earth. As early as 1958, a UN General Assembly Resolution stated that it was "conscious of the recent developments" in outer space, acknowledging that these advancements "added a new dimension to man's existence and opened new possibilities for the increase of his knowledge and the improvement of his life."[99]

95 Yokohama Documents, above n.78, para. 4.

96 Report of the Office of the United Nations High Commissioner for Human Rights, UN Doc. A/HRC/44/30 (2020) (As per estimates in 2011, there are more than 1 billion persons with disabilities worldwide. See, WHO and World Bank, World report on disability, 2011).

97 Report of the Office of the United Nations High Commissioner for Human Rights, UN Doc. A/HRC/47/46 (2021).

98 Report of the Special Rapporteur on extreme poverty and human rights, UN Doc. A/HRC/41/39 (2019), 12.

99 UNGA Res. 1348 (XIII) (1958) (Question of the Peaceful Use of Outer Space).

35. All human beings have some fundamental human rights, including the right to life,[100] dignity, and equality.[101] The State is the main duty-bearer of these human rights, which is legally obligated to respect, protect, facilitate, and fulfil. Thus, the State is obligated to prevent loss of lives and loss of economic and social assets, as well as prevent human rights violations, irrespective of whether human or natural forces cause them.[102] However, early knowledge of the occurrence of a disaster may be beyond the capacity and resources of the potentially affected State/s or even beyond the ability of any other State that may otherwise prevent and mitigate that disaster. Disasters are emergencies where human lives and property are in danger, and the need for rescuing becomes paramount. Thus, territorial sovereignty, in these cases, becomes porous.[103] The importance of early warnings in disasters cannot be emphasized enough. Imposing on third-party States the duty to notify about disasters regarding which they have knowledge is important, as a violation of rights in one place can be felt worldwide.[104]

VII. International Disaster Law on the duty to notify

36. It is relevant to examine what the international disaster law provides about the duty to notify in disasters. While certain hard law provisions apply to specific situations and provide a duty to notify in case of an impending disaster, some soft law instruments also provide for the duty to notify disaster events. The question, therefore, is whether these hard law and soft law provisions cumulatively form a general obligation on third-party States possessing knowledge about an impending disaster to notify the international community, particularly the potentially affected States and any other States having the ability to prevent and mitigate said disaster.

37. To understand whether third-party States have a general obligation to notify of an impending disaster, one must appreciate the concept of

100 GA Res. 217A (III) (1948) (Universal Declaration of Human Rights), art. 3; International Covenant on Civil and Political Rights (ICCPR), 999 UNTS 171, art. 6.

101 GA Res. 217A (III) (1948), above n.100, art. 1, 2, 7; ICCPR, above n.100, arts. 2, 3, 26.

102 Karen da Costa and Paulina Pospieszna, The Relationship between Human Rights and Disaster Risk Reduction Revisited: Bringing the Legal Perspective into the Discussion, 6.1 JIHLS (2015), 64.

103 Diego Zannoni, Disaster Management and International Space Law (2019), 6.

104 C.J. Friedrich (ed.), I. Kant, Moral and Political Writings (1949), 448.

customary international law. Article 38(1) of the ICJ Statute implies that "international custom, as evidence of a general practice accepted as law" is a source of international law.[105] Customary international law may be defined as the "generalization of the practice of States",[106] the reasons for such a generalization include whether "the practice is fit to be accepted, and is in truth accepted, as law".[107] The elements to prove customary international law are (a) substantial uniform State practice and (b) *opinio juris*, i.e. "a belief that [a] practice is rendered obligatory by the existence of a rule of law requiring it".[108] These two elements are to be separately ascertained,[109] though the two elements are intertwined, and the same material may be used as evidence for ascertaining both these elements.[110] For establishing State practice, one may look at "diplomatic acts and correspondence; conduct in connection with resolutions adopted by an international organization or at an intergovernmental conference; conduct in connection with treaties; executive conduct, including operational conduct 'on the ground'; legislative and administrative acts; and decisions of national courts".[111] For evidencing *opinio juris*, one may rely on "public statements made on behalf of States; official publications; government legal opinions; diplomatic correspondence; decisions of national courts; treaty provisions; and conduct in connection with resolutions adopted by an

105 Statute of the International Court of Justice, 3 Bevans (June 26, 1945) 1179, art. 38.1.

106 Fisheries (United Kingdom v. Norway), Judgment, ICJ Reports 1951, 116, 191 (diss. op. Read).

107 James R. Crawford (ed.), Ian Brownlie, Brownlie's Principles of Public International Law (2012), 23-28.

108 North Sea Continental Shelf (Federal Republic of Germany v. Denmark; Federal Republic of Germany v. Netherlands) Judgment, ICJ Reports 1969, 44.; ILC, Identification of customary international law, II YILC (2018) 90, UN Doc. A/CN.4/SER.A/2018/Add.1, Conclusion 2 (The International Law Commission's conclusions on identification of customary international law also notes the two elements to identify an international customary law); See generally, Report on Matters relating to the Work of the International Law Commission at its Sixty-sixth Session, Doc. AALCO/53/ TEHRAN / 2014/SD/S1 (prepared by the AALCO Secretariat); Sienho Yee, Report on the ILC Project on "Identification of Customary International Law", 14: 2 Chinese JIL (2015), 375–398.

109 ILC, Identification of customary international law, above n.108, conclusion 3(2).

110 ILC, Identification of customary international law, above n.108, 128-129.

111 ILC, Identification of customary international law, above n.108, conclusion 6(2); Jurisdictional Immunities of the State (Germany v. Italy: Greece intervening), Judgment, ICJ Reports 2012, 123.

international organization or at an intergovernmental conference."[112] It may be noted here that though the UN General Assembly resolutions do not constitute rules of customary international law or serve as conclusive evidence of their existence, these resolutions provide evidence of an existing or emerging international customary law and may contribute to developing a rule of customary international law.[113]

38. International disaster law is an emerging area of international law, designed to respond to both natural and human-caused disasters. While other international laws, such as human rights law and international environmental law, apply to disaster situations, disasters, in general, have also led to a body of law, including both hard and soft law provisions, which expressly and directly apply in disaster contexts. The international disaster law began with the Convention Establishing an International Relief Union 1927, which entered into force in 1932. The said Convention was applicable to all kinds of disasters and covered both disaster relief and prevention. The funding from States and private entities, however, was voluntary in nature. The voluntary financing, coupled with the political situation in the 1930s, led to the Union's centralized approach becoming inoperative, with most States opting for the withdrawal clause post-World War II.[114] The international law of disaster has been growing in a piecemeal fashion ever since.

39. Regarding the duty to cooperate in the international law of disaster, the special rapporteur analyzed the scope of this duty to cooperate at the sixty-first session of the International Law Commission in 2009.[115] Again, at the sixty-fourth session in 2012, the International Law Commission sought more deliberation on the special rapporteur's proposal on further elaboration of the duty to cooperate among nations during times of disaster. The report contained three crucial points relating to cooperation. Those are: A. elaboration on the duty to cooperate, B. conditions for provisions of assistance, and C. termination of assistance. Furthermore, in 2013, at the sixty-fifth session, the International Law Commission's special rapporteur included an article on prevention in the context of protection of persons in the event of disasters,

112 Ibid.

113 ILC, Identification of customary international law, above n.108, 91, 107-109, conclusion 12; Legality of the Threat or Use of Nuclear Weapons, above n.20, 254-255.

114 Zannoni, above n.103, 12-14.

115 Protection of persons in the event of disasters - Summaries of the Work of the International Law Commission (legal.un.org/ilc/summaries/6_3.shtml).

including disaster risk reduction, prevention as a principle of international law, and international cooperation on prevention.[116] Hence, the ILC Draft Articles on the Protection of Persons in the Event of Disasters provides that States shall cooperate amongst themselves and other assisting actors.[117] Cooperation in response to disasters includes humanitarian assistance, coordination of international relief actions and communications, making available relief personnel, equipment and goods, and scientific, medical, and technical resources.[118] It further provides that the primary responsibility for disaster management is on the affected State, but the affected State has the duty to seek external assistance when the disaster exceeds its national response capacity[119] and lays down that the affected State shall give due consideration to all offers of external assistance received.[120] Thus, as a sovereign State, the affected State may decide whether external assistance is required because one cannot violate the State's sovereignty in the garb of providing assistance. It may be deduced that the duty to cooperate in the event of a disaster includes the duty of third-party States possessing the knowledge regarding disasters to notify the international community, particularly the potentially affected States and the State with the ability to prevent and mitigate the effects of an impending disaster. The imposition of such a duty does not violate the sovereignty of the State that is informed and is an effective way of preventing a disaster that may affect the world at large.

40. Several UN General Assembly resolutions in the past have provided the duty to cooperate in the international law of disaster, and from such duty to cooperate flows the duty to notify, which is emerging as customary law. UN General Assembly Resolution 46/182 (1991) provides as follows: "[t]he magnitude and duration of many emergencies may be beyond the response capacity of many affected countries. International cooperation to address emergency situations and to strengthen the response capacity of affected

116 Ibid.

117 ILC Draft articles on the protection of persons in the event of disasters, 2 ILCYB Part II, UN Doc. A/71/10 (2016), art. 7.

118 ILC Draft articles on the protection of persons in the event of disasters, above n.117, art. 8.

119 ILC Draft articles on the protection of persons in the event of disasters, above n.117, art. 11.

120 ILC Draft articles on the protection of persons in the event of disasters, above n.117, art. 12.

countries is thus of great importance ….”[121] The said resolution also urges that “[t]he international community should adequately assist developing countries in strengthening their capacity in disaster prevention and mitigation, both at the national and regional levels, for example, in establishing and enhancing integrated programmes in this regard”.[122] The resolution further states that “[t]he international community is urged to provide the necessary support and resources to the programs and activities undertaken to further the goals and objectives of the decade”.[123] Resolution 46/182 moreover provides that international relief assistance should supplement national efforts to improve the capacities of developing countries to mitigate the effects of natural disasters.[124] One may say that the primary responsibility is on the country affected by the disaster, but that does not negate the duty to cooperate on the part of the other States.

41. Furthermore, the experiences of implementing the Hyogo Framework for Action 2005[125] taught the international community the following lessons:

(1) a broader, more people-centered preventive approach to disaster risk is necessary.
(2) international, regional, subregional, and transboundary cooperation is the key to reducing disaster risk.
(3) developing countries, particularly the least developed countries, small island developing States, and landlocked developing countries, need special attention and support through bilateral and multilateral channels, such as through financial and technical assistance and technology transfer.

42. Sendai Framework for Disaster Risk Reduction succeeded the Hyogo Framework Action 2005-2015 and was adopted by a United Nations

121 GA Res. 46/182, UN Doc. A/RES/46/182 (1991), Annex, guiding principles, para. 5 (Strengthening of the coordination of humanitarian emergency assistance of the United Nations).

122 Ibid., para. 13.

123 Ibid., para. 17 (“Decade” in GA Res. 46/182, above n.121 refers to the International Decade for Natural Disaster Reduction, beginning on 1st January 1990, as found in GA Res. 44/236, UN Doc. A/RES/44/236 (22 December 1989).

124 Ibid., para. 18.

125 Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters, UN Doc. A/CONF.206/6 (22 January 2005).

conference at Sendai City, Japan.[126] This concise, focused, forward-looking, and action-oriented framework looks into the substantial reduction of disaster risk and losses in lives, livelihoods, and health and the economic, physical, social, cultural, and environmental assets of persons, businesses, communities, and countries. To achieve the expected outcome, the framework argues for "enhancement of the implementation capacity and capability of developing countries … including the mobilization of support through international cooperation for the provision of means of implementation in accordance with their national priorities".[127] It may be noted that while each State has the primary responsibility to prevent and reduce disaster risk,[128] there is a need for international, regional, subregional, transboundary, and bilateral cooperation. Principle 25(c) of the Sendai Framework urges international cooperation and technology transfer in geospatial and space-based technologies and related services, noting that maintaining and strengthening in situ and remotely sensed earth and climate observations is important. The objective of the principle is to understand the risk of the disaster and develop policies and practices accordingly. Principle 24(f) provides that it is vital to "promote real time access to reliable data, make use of space and in situ information, including geographic information systems (GIS), and use information and communications technology innovations to enhance measurement tools and the collection, analysis and dissemination of data" relating to disasters.[129] It may be noted here that the ICJ in the *Nicaragua* case[130] affirmed that the General Assembly Resolutions and the outcome of the international conferences can be evidence of State practice, pointing towards the development of a customary principle of international law. Though the Sendai Framework is a non-binding international law instrument, this framework adopted by the UN General Assembly in 2015 points towards the emergence of customary international law principles on disaster.

43. The Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations is a treaty that deals with cooperation during disasters.[131] Until the Tampere Convention, the

126 GA Res 69/283, above n.7.

127 Ibid., target 6, guiding principles 12, 13 at 6-8.

128 Ibid., guiding principle, para. 19(a) at 7.

129 Ibid., guiding principle, para. 24(f).

130 Military and Paramilitary Activities in and against Nicaragua, above n.40.

131 Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations (Tampere Convention), 2296 UNTS 5.

trans-border use of telecommunication equipment by humanitarian organizations was often impeded by national regulatory barriers. This convention simplifies the use of life-saving telecommunication equipment, especially by relief workers, and the assistance provided to mitigate the impact of a disaster. The Tampere Convention notes "the history of international cooperation and coordination in disaster mitigation and relief, including the demonstrated life-saving role played by the timely deployment and use of telecommunication resources".[132] It further urges the "governments to take all practical steps for facilitating the rapid deployment and the effective use of telecommunication equipment for disaster mitigation and relief operations by reducing and, where possible, removing regulatory barriers and strengthening cooperation among States".[133] Article 2 of the Tampere Convention creates an obligation for the United Nations Emergency Relief to coordinate with the United Nations agencies, particularly the International Telecommunication Union. Article 3 thereafter mandates the States parties to coordinate amongst themselves and non-state actors for disaster relief. Though the Tampere Convention has 49 States parties,[134] it points to the fact that certain States felt it important to remove regulatory barriers and strengthen cooperation during disasters.

44. Moreover, the Convention on Early Notification of a Nuclear Accident, 1986,[135] was adopted following the Chernobyl nuclear plant accident. The treaty, which has 135 States parties,[136] establishes a notification system for nuclear accidents. The treaty provides that a State shall promptly notify those States which are or may be physically affected, as well as the International Atomic Energy Agency, about any accident under its jurisdiction or control that may occur due to the release of radioactive material or that is likely to occur and has resulted or may result in an international transboundary release that could be of radiological safety significance for another State.[137] In other cases, such as an accident not occurring within their jurisdiction or control, the States parties may notify in the event of a nuclear

132 Tampere Convention, above n.131, preamble.

133 Tampere Convention, above n.131.

134 Tampere Convention, above n.131.

135 Convention on Early Notification of a Nuclear Accident, 1439 UNTS 275.

136 International Atomic Energy Agency, Convention on Early Notification of a Nuclear Accident (www.iaea.org/sites/default/files/23/11/not_status.pdf).

137 Convention on Early Notification of a Nuclear Accident, above n.135, arts. 1, 2.

accident to minimize the consequences of that accident.[138] Opinions expressed by delegates during the negotiation of the Convention on Early Notification of a Nuclear Accident and subsequent practice affirm that the obligation to notify nuclear accidents is customary law.[139] In 1987, the Council of the European Communities adopted a decision on the early exchange of information in a radiological emergency.[140]

45. Provisions on early notification can also be found in the International Health Regulations 2005 (IHR), which is legally binding on 196 States, including the 194 World Health Organization member States.[141] The IHR provides that each State party shall notify the World Health Organization of all the events that constitute a "public health emergency of international concern within its territory."[142] These regulations also provide that as far as practicable, States parties "shall inform WHO within 24 hours of receipt of evidence of a public health risk identified outside their territory that may cause international disease spread".[143] In another example, after the Tsunami in the Indian Ocean in 2004, the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, which possesses primary seismic, auxiliary seismic, and hydroacoustic data that can serve tsunami warning purposes, decided that data may be provided to tsunami warning organizations approved by UNESCO.[144] Moreover, the United Nations Law of the Sea Convention 1982 obliges States to notify in cases of imminent or actual damage. This obligation extends to international organizations that are associated with such disasters. As soon as the State is aware of the danger or pollution, it should immediately inform the affected states to take precautionary measures.[145] The Convention on Transboundary Effects of Industrial Accidents, ratified by 21 countries, imposes a similar duty to notify the

138 Convention on Early Notification of a Nuclear Accident, above n.135, art. 3.

139 Zannoni, above n.103, 37-38.

140 Council Decision of 14 December 1987 on Community arrangements for the early exchange of information in the event of a radiological emergency, OJ L 371/76 (1987).

141 International Health Regulations, 2005 as amended in 2022, WHO Doc. A77/A/CONF./14.

142 International Health Regulations, above n.141, art. 6.

143 International Health Regulations, above n.141, art. 9(2).

144 Standard Agreement on The Provision of Data for Tsunami Warning Purposes, CTBT/PTS/INF.906/Rev.1 (2007).

145 United Nations Convention on the Law of the Sea, 1833 UNTS 3 (1982), art. 198.

affected State immediately by the State of origin in case of an industrial accident of a transboundary nature.[146] Provisions of the ASEAN Agreement on Disaster Management and Emergency Response 2005,[147] the Convention on the Law of the Non-navigational Uses of International Waterways 1997,[148] and the Framework Convention on the Protection of the Marine Environment of the Caspian Sea[149] also provide for similar obligation to notify in cases of emergencies. Therefore, the obligation of third-party States to notify the affected States in cases of disasters is not unknown to contemporary international law and is reflected in various general and regional treaties. Further, these piecemeal efforts regarding the duty to warn and notify about disasters indicate an emergent norm of the general duty to notify in case of disasters.[150]

46. The important role of cooperation and exchange of information dates to the early 1900s. The British Company Marconi invented the radio, and in 1896, the first radio signals were transmitted by a radio-relay system. Britain, however, insisted on using their own signals for the Marconi radio sets on their ships, which went against the interests of Germany's Telefunken Company. Hence, in 1903, the Radio-telegraph conference was convened, and in 1906, the International Telegraph Convention was adopted. Article 3 of the International Telegraph Convention provided that it was necessary to exchange communication between coastal and ship stations, and such communication was made obligatory, irrespective of the radio set used.[151] This Convention, though, does not provide for mandatory communication between ship stations regardless of the radio set used due to resistance by the British. In 1912, the world witnessed the Titanic tragedy when an iceberg hit the ship and could not get assistance from the nearest

146 Convention on Transboundary Effects of Industrial Accidents, 2103 UNTS 457 (1992), art. 10(2).

147 ASEAN Agreement on Disaster Management and Emergency Response, 2444 UNTS 1 (2005), art. 7(2).

148 Convention on the Law of the Non-Navigational Uses of International Watercourses, 36 ILM 700 (1997), art. 28(2).

149 Framework Convention for the Protection of the Marine Environment of the Caspian Sea, 44 ILM 1 (2003), art. 13(3).

150 See generally, Zannoni, above n.103 at 39-43.

151 International Radio Telegraph Convention of Berlin 1906 and Propositions for the International Radio Telegraph Conference of London (search.itu.int/history/HistoryDigitalCollectionDocLibrary/4.36.51.fr.200.pdf; earlyradiohistory.us/1906conv.htm#main).

ship *Californian* due to mismanagement of the radiocommunications, like using more than one emergency signal and a lack of twenty-four-hour radio communication signals. As the International Telecommunication Union's website notes:

> [*Californian*] did not hear her distress call because radio operators were not on duty overnight. The rockets fired by Titanic also confused the Californian's crew, perhaps because ships owned by different companies had many differing patterns of lights for communicating at night. Commercial rivalry also played a part. Wireless operators were the employees of the companies that supplied ships' radio equipment, and these firms fought hard to capture market share.[152]

Thereafter, the International Radiotelegraph Convention held in London in 1912 amended the existing law to read as follows: "Coast stations and ship stations are bound to exchange radio telegrams reciprocally without distinction as to the radiotelegraph system adopted by such stations. Each ship station is bound to exchange radio telegrams with any other ship station without distinction as to the radiotelegraph system adopted by such stations."[153]

47. Another instance of cooperation in disasters is through outer space applications, which have been instrumental in disaster prevention. International Charter-Space and Major Disasters is a worldwide collaboration that makes satellite data available for disaster management.[154] It is composed of 17 space agencies from around the world who work together to provide satellite imagery for disaster monitoring purposes, including space agencies of Argentina, Canada, France, USA, UAE, India, Japan, China, Korea, Russian Federation, Germany, United Kingdom, Bolivia and Brazil which are members of this charter. This initiative came into effect in 2000 and has been activated 962 times till April 2025.[155] An objective of the Charter is "promoting

152 ITU, Sending out an SOS, (www.itu.int/itunews/manager/display.asp?lang=en&year=2006&issue=06&ipage=pioneers&ext=html).

153 International Radiotelegraph Convention, 10 UKTS 139 (1912).

154 Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (International Charter-Space and Major Disasters), Doc. Rev.3 (25/4/2000).2.

155 Disaster Charter, Fire in Russian Federation (disasterscharter.org/activations/fire-in-russian-federation-activation-962-).

cooperation between space agencies and space system operators in the use of space facilities as a contribution to the management of crises arising from natural or technological disasters."[156] The Charter aims to provide a unified space data acquisition and delivery system to authorized users for natural or human-made disasters.[157] Similarly, the United Nations has also adopted a space-based platform for disaster management for enhanced coordination efforts at the global level to reduce the impact of disasters (UN-SPIDER),[158] recognizing the importance of improved risk assessment, early warning, and monitoring of disasters.[159] UN General Assembly Resolution 61/110, which adopted the space-based disaster management platform, urges international coordination regarding the use of space technology in disaster management.[160] This resolution also notes the need for a globally coordinated approach to disaster management and cautions the world that unless there is a coordinated approach, it might be challenging to tackle such large-scale disasters.[161]

48. To conclude, many UN General Assembly Resolutions and International Law Commission documents emphasize the importance of cooperation, coordination, and notification in case of disasters. Notifying a State, that will likely suffer from a potential disaster, regarding such an impending event is the first step for cooperation to ensure disaster prevention. Hard law instruments, such as the Tampere Convention, emphasize the importance of notification in disasters. These hard law provisions of a piecemeal nature, as well as the soft law documents, indicate that there is an emerging custom regarding the duty to notify in case of an impending disaster. Unless the obligation to notify in case of disasters is also placed on third-party States who know about an impending disaster, the said obligation is rendered meaningless. Hence, such duty to notify by third-party States should be recognized, and this obligation *erga omnes* should be owed to the international community as a whole.

156 International Charter - Space and Major Disasters, above n.154, art. 2.

157 J.L. Bessis et al, The International Charter "Space and Major Disasters" Initiative, 54(3) Acta Astronautica (2004), 183-190.

158 GA Res. 61/110 (United Nations Platform for Space-based Information for Disaster Management and Emergency Response), preamble 4.

159 Ibid., Preamble para. 5.

160 Ibid., Principles 1, 2.

161 Ibid., Principle 4.

VIII. Duty to notify and International Space Law

49. *Armageddon*, *Deep Impact*, and *Apollo 13*[162] have immortalized incidents of disasters in space in movies. The international community has witnessed *disasters* in outer space in reality, too, examples being that of *Columbia* and *Challenger*.[163] As recently as on 28 February 2024, there was a close pass between NASA's Thermosphere Ionosphere Mesosphere Energetics and Dynamics Mission (TIMED) space object and the Russian Cosmos 2221 satellite. As both the American and the Russian satellites did not have the capacity to maneuver, the close pass was concerning as it could have created a significant amount of space debris.[164] Thus, space disasters, i.e., damage and/or destruction to a space vehicle carrying humans or a satellite orbiting Earth, have taken place in the past and are predicted to become more frequent as the population of human-made objects in outer space, particularly in Earth's orbit, exponentially increases. While there were about 1400 operational satellites in 2017, the number of operational satellites has risen to 11,200 as of 30 April 2025.[165] Coupled with the increasing number of operational satellites, which can be attributable to mega-constellations, small satellites, decreasing cost of satellite launch and manufacturing, and reusability in space technology, there exist a number of non-operational space objects in outer space, also referred to as space debris. According to the European Space Agency's April 2025 data, there are about 54,000 space debris greater than 10 cm, 1.2 million space debris greater than 1 cm and up to 10 cm, and 140 million space debris greater than 1 mm and up to 1 cm.[166] The increasing debris population and the sudden exodus of the number of operational satellites in the last 10 years have made outer space susceptible to accidental collisions between space objects, especially since the particles move at phenomenal velocity in outer space. Once the space population reaches a tipping point, a single accidental collision may lead to many more such accidents, making entire orbits unusable, as predicted by Donald Kessler (Kessler's syndrome).

162 "Armageddon", "Deep Impact", "Apollo 13": these three are famous Hollywood movies released respectively 1988, 1988 and 1995.

163 "Columbia" and "Challenger" space disasters occurred in 1986 and 2011, respectively.

164 NASA, NASA's TIMED Spacecraft Passes Safely by Satellite (blogs.nasa.gov/sunspot/2024/02/28/nasas-timed-spacecraft-passes-safely-by-satellite/).

165 ESA, Space debris by the numbers, (www.esa.int/Space_Safety/Space_Debris/Space_debris_by_the_number).

166 Ibid.

According to studies, as early as 2011, the outer space population had already reached the tipping point.[167] Due to uncertain weather conditions in outer space and the human inability to predict the trajectory of space objects with complete accuracy, disaster response in outer space becomes more complex and unsure. Collisions in outer space may lead to destruction or damage to operational space objects, technical malfunction of crewed and uncrewed space flights and changes in space weather, amounting to further disastrous consequences. These collisions in outer space are referred to as "disasters in space" or "space disasters" in this paper.

50. It is difficult for one State to manage and address collisions in space, and there is a need for cooperation among the countries in such situations. At the same time, a space collision may affect the entire international community by limiting the potential future uses of orbits, which are limited natural resources. Effective collision avoidance measures, such as maneuvering space objects, can only take place if "sufficiently accurate and timely information" is available regarding possible instances of collisions between space objects.[168]

51. International law applies to outer space activities. The Outer Space Treaty explicitly provides that "States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law…."[169] Hence, the obligation to cooperate and duty to notify in case of disasters, identified earlier in this paper, should also apply to space collisions, which lead to space disasters.

52. In addition to general international law, there are hard law and space law provisions in the gamut of space law that indicate the principle of cooperation and, thereby, the duty to notify should apply in space disasters. As Peter Martinez[170] argues, mutual cooperation is the need of the hour for the long-term sustainability of outer space. The UN COPUOS's Guidelines for the Long-term Sustainability of Outer Space Activities, adopted in 2019,

167 National Research Council of the National Academies, Limiting Future Collision Risk to Spacecraft: An Assessment of NASA's Meteoroid and Orbital Debris Programs (2011).

168 Marlon Sorge et al, Space traffic management: Improvements to spacecraft collision avoidance (COLA), 229 Acta Astronautica (2005), 600.

169 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty), 610 UNTS 205 (1967), art. 3.

170 Peter Martinez, "Space sustainability" in Kai-Uwe Schrogl (ed.), Handbook of Space Security: Policies, Applications and Programs (2020), 319-340.

emphasize the importance of cooperation in outer space. The importance of cooperation in outer space has been discussed since the beginning of the space age, and though there is a general agreement on the need for cooperation, the particularities regarding the duty to cooperate, such as when, how, and with whom to cooperate remain at the discretion of the cooperating States.[171] The duty of the third-party States, that know about an impending space disaster, to notify the international community flows from the obligation to cooperate. In space disasters, critical space infrastructure may be destroyed or damaged, exposing certain States to suffering and thus, the obligation to notify should be implemented to prevent such disasters. The Yokohama Principles note, "[e]arly warnings of impending disasters and their effective dissemination using telecommunications, including broadcast services, are key factors to successful disaster prevention and preparedness."[172] Along the same line, the Vienna Declaration on Space and Human Development, 1999 linked space technology to disasters and noted that it was important "to implement an integrated, global system, especially through international cooperation, to manage natural disaster mitigation, relief and prevention efforts, especially of an international nature, through Earth observation, communications and other space-based services, making maximum use of existing capabilities and filling gaps in worldwide satellite coverage".[173] Satellite observation data can be crucial for detecting an impending disaster, irrespective of meteorological conditions, and hence, it is even more important to protect space objects.

53. Scholars have discussed the scope of customary international law in outer space.[174] Over time, many principles enshrined in the Outer Space

171 GA Res 51/122, UN Doc. A/RES/51/122 (13 December 1996) (Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries or Benefits Declaration).

172 Yokohama Documents, above n.78, Principle 5.

173 The Space Millennium: Vienna Declaration on Space and Human Development, UN Doc. A/CONF.184/6 (1999) ("The Space Millennium: Vienna Declaration on Space and Human Development" was adopted by the States at the third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), held in 1999 and was endorsed by UN General Assembly through GA Res A/RES/54/68, para. 11(d)(xiii)).

174 V.S. Vereshchetin and G.M. Danilenko, Custom as a source of international law of outer space, 13 J Space L (1985), 22.

Treaty 1967 have become customary principles of international law.[175] Also, it may be noted that in terms of international law-making, there has been a movement in space law from a hard law to a soft law approach. As Ram S. Jakhu and Steven Freeland argue, the soft space law instruments work as State practice and *opinio juris* and are instrumental in developing customary principles of international space law.[176]

54. Certain hard law provisions exist that specifically regulate and apply to space disasters. For example, Article 9 of the Outer Space Treaty,[177] provides for obligations of cooperation and mutual assistance, due regard for other States' interests, and to seek consultations in case of potential harmful interference with other States' space activities.[178] The term "due regard to the corresponding interests of all other States Parties to the Treaty" has often been interpreted by scholars as a condition to the freedom of exploration and use of outer space and that it imposes an obligation of due diligence on States.[179]

175 Ram S. Jakhu and Steven Freeland, The Relationship between the Outer Space Treaty and Customary International Law, 59 Proc II Space L (2016), 183.

176 Ibid.

177 Outer Space Treaty, above n.169, art. 9 reads as follows: "In the exploration and use of outer space, including the moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space, including the moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty. States Parties to the Treaty shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose. If a State party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the moon and other celestial bodies, may request consultation concerning the activity or experiment."

178 See also, GA Res 1962 (XVIII), UN Doc. A/RES/1962(XVIII) (13 December 1963) (Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space), para. 6.

179 For detailed discussion in due regard obligation under international space law, see Sergio Marchisio, "Article IX", in Stephan Hobe et al (eds.), Cologne Commentary

Further, Article 11 of the Outer Space Treaty imposes on States an obligation to share the information or duty to notify the UN Secretary-General and the scientific community regarding the nature, conduct, locations and results of space activities.[180] One of the functions of UN COPUOS is information-gathering about Earth and outer space environment through space applications. Sharing information with the UN Secretary-General about the results of space activities should include the duty to notify regarding an impending disaster.

55. In addition, duty to cooperate in case of space disasters also flows from the Registration Convention,[181] which lays down a mandatory system of registering space objects believing that the system of registration will assist in implementation, application and development of international law of outer space. Article 6 of the Registration Convention provides if identification of the space object which has caused damage to a third party State is difficult or if a space object is hazardous or deleterious and has caused damage, in that case, other States parties to the Registration Convention, especially the "particular States possessing space monitoring and tracking facilities" shall respond "to the greatest extent feasible" to a request for assistance in identification of space object under "equitable and reasonable conditions."[182]

56. Another space law obligation which is rooted in the principle of cooperation can be found in Article 5 of the Outer Space Treaty, under which the States parties are obligated to render astronauts "all possible assistance in the event of accident, distress, or emergency landing" on a State's territory or on

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on Space Law—Outer Space Treaty (2017) 568; Andrea J. Harrington, "Due Regard as the Prime Directive for Responsible Behavior in Space", 20:1 Loyola U Chicago ILR 57 (2023); for general international law on due diligence, see International Law Association Study Group on Due Diligence in International Law First Report (7 March 2014), (ila.vettoreweb.com/Storage/Download.aspx?DbStorageId=1427&StorageFileGuid=ed229726-4796-47f2-b891-8cafa221685f).

180 For State practice on Article XI of the Outer Space Treaty, see generally, United Nations Office for Outer Space Affairs, Background paper on the implementation of article XI of the Outer Space Treaty and article IV of the Registration Convention, UN Doc. A/AC.105/C.2/L.338 (2025) (documents.un.org/doc/undoc/ltd/v25/017/43/pdf/v2501743.pdf).

181 Convention on Registration of Objects Launched into Outer Space (Registration Convention), 1023 UNTS 15 (1976), preamble.

182 Registration Convention, above n.181, art. VI.

the high seas.[183] In addition, States should immediately inform other States parties or UN of any phenomena they discover in outer space "that could constitute a danger to life or health of astronauts".[184] Moreover, the Rescue and Return Agreement provides that the personnel of a spacecraft who have "suffered accident or are experiencing conditions of distress or have made an emergency or unintended landing in territory under its jurisdiction or on the high seas or in any other place not under the jurisdiction" shall be rendered assistance.[185] Additionally, the Rescue and Return Agreement provides that when a State "receives information or discovers that a space object or its component parts has returned to Earth in territory under its jurisdiction or on the high seas or in any other place not under the jurisdiction of any State", the State should return the space object to the launching authority.[186] Additionally, similar to Article 5, para. 3 of the Outer Space Treaty, the Moon Agreement provides that States should "promptly inform the Secretary-General, as well as the public and the international scientific community, of any phenomena they discover in outer space, including the Moon, which could endanger human life or health".[187] Joint reading of Article 5 of Outer Space Treaty with the Rescue and Return Agreement and the Moon Agreement provisions indicate that the spirit of cooperation and mutual assistance will be upheld if a State with knowledge of an impending space disaster notifies the State whose space objects are in danger.

57. Article 1 of the Outer Space Treaty creates a positive obligation upon the states to encourage international cooperation in outer space exploration and use. Due to the extraordinary nature of outer space technology, mutual cooperation and benefit of all should be regarded as paramount. The downstream application of space technologies is used for the socio-economic development of individuals on Earth. Weather forecasting, cloud coverage, telecommunication or broadcasting, and other uses of space technology have become important for life on Earth. This advantage is not only limited to

183 Outer Space Treaty, above n. 169, art. 5, para. 1; See also, GA Res 1962 (XVIII), above n.178, para. 9.

184 Outer Space Treaty, above n. 169, art. 5, para. 3.

185 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue and Return Agreement), 672 UNTS 119 (1968), arts. 1-4.

186 Rescue and Return Agreement, above n.185, art. 5.

187 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement), 1363 UNTS 3 (1979).

social or economic spheres but also includes peace and security for the entire Earth. In fact, space technology can directly or indirectly contribute[188] to all the 17 UN Sustainable Development Goals that are targeted to be achieved by 2030.[189] In addition, the Benefits Declaration provides that there should be international cooperation in space exploration and such cooperation "shall be carried out for the benefit and in the interest of all States, irrespective of their degree of economic, social or scientific and technological development…. Particular account should be taken of the needs of developing countries".[190] It also provides:

> All States, particularly those with relevant space capabilities and with programmes for the exploration and use of outer space, should contribute to promoting and fostering international cooperation on an equitable and mutually acceptable basis. In this context, particular attention should be given to the benefit for and the interests of developing countries and countries with incipient space programmes stemming from such international cooperation conducted with countries with more advanced space capabilities.[191]

Thus, the principles of CBDR and mutual cooperation have been included in the gamut of space law through the common benefit principle which is enshrined in Article 1 of the Outer Space Treaty as well as the Benefits Declaration which puts certain onus on the technologically advanced States. This onus should include duty to notify an impending disaster occurring either on Earth or in outer space.

58. Further, the principle of benefit of all and cooperation encapsulated in Article I of the Outer Space Treaty is also captured in the Principles relating to Remote Sensing of the Earth from Outer Space (Remote Sensing Principles).[192] Principle 11 of the Remote Sensing Principles provides that

188 UNOOSA, "Space Supporting the Sustainable Development Goals" (www.unoosa.org/oosa/en/ourwork/space4sdgs/index.html); GA Res 76/3, UN Doc. A/RES/76/3 (2021) ("Space2030" Agenda: Space as a Driver of Sustainable Development); See also, Wu Xiaohui, Chronology of Practice: Chinese Practice in Public International Law in 2020, 21 Chinese JIL (2022), 342.

189 UNGA Res 70/1 (2015), above n.68.

190 GA Res 51/122, above n.171, para. 1.

191 GA Res 51/122, above n. 171, para. 3.

192 GA Res. 41/65, UN Doc. A/Res. 41/65, (1986) (Principles Relating to Remote Sensing of the Earth from Outer Space), Annex 1(a), Principles IX, X, XI. See generally, S. Hadi Mahmoudi and Sima Moradinasab, Global Space Governance of

States should transmit data or information to the affected states in case of natural disasters.[193] The joint reading of Article 11 of the Outer Space Treaty and Principle 11 of the Remote Sensing Principles indicate that the duty to notify is a binding international principle. Further, Principle 10 of the Remote Sensing Principles provides that collected and identified information by States about any harmful phenomenon to Earth's natural environments shall be shared with the States. This obligation to share information or notify the affected States is not only limited to raw data collected by the remote sensing satellites but includes processed and analyzed remote sensing data. Principle 9 of the Remote Sensing Principles provides as follows:

> A State carrying out a programme of remote sensing shall inform the Secretary-General of the United Nations. It shall, moreover, make available any other relevant information to the greatest extent feasible and practicable to any other State, particularly any developing country that is affected by the programme, at its request.

Thus, Principle 9 of the Remote Sensing Principles too requires States to share information, particularly with the States that are affected.

59. UN General Assembly resolutions, especially when adopted unanimously, indicate the emergence of *opinio juris* of the States,[194] which form an essential ingredient of customary international law.[195] A UN General Assembly Resolution adopted unanimously is also evidence of State practice. The Remote Sensing Principles, adopted at the UN General Assembly unanimously, without a vote,[196] go a long way to evidence both State practice and *opinio juris.* The Remote Sensing Principles was passed by the UN General Assembly without any objection by any member States after the draft was discussed for approximately 20 years. Initially, even though there were fundamental differences among the countries, the States concluded the present draft after a series of negotiations, and the UN General Assembly passed it unanimously without any objections. If a large number of States support any

Remote Sensing and the Needs of Developing States, 23 Chinese JIL (2024), 735-791, for the vital role that the Remote Sensing Principles play in promoting global cooperation and addressing global inequality.

193 GA Res. 41/65, above n.192, Principle XI.

194 Legality of the Threat or Use of Nuclear Weapons, above n. 20, 254-255; Military and Paramilitary Activities in and against Nicaragua, above n.40, para. 215.

195 North Sea Continental Shelf, above n. 108, 44, para. 77.

196 Zannoni, above n. 103, 148-155.

declaration, it goes a long way to prove that an international custom exists or that such a custom is emerging.[197] Judge Lauterpacht noted:

> It would be wholly inconsistent with sound principles of interpretation as well as with highest international interest, which can never be legally irrelevant, to reduce the value of the Resolutions of the General Assembly—one of the principal instrumentalities of the formation of the collective will and judgment of the community of Nations represented by the United Nations—and to treat them.… as nominal, insignificant and having no claim to influence the conduct of the members. International interest demands that no judicial support, however indirect, be given to such conception of the Resolutions of the General Assembly as being of no consequence.[198]

Thus, while under the Charter General Assembly resolutions are recommendatory in character, such resolutions have important bearing on creation and implementation of international law.

60. Evidence of State practice regarding the duty to notify impending disaster can be found in Principles Relevant to the Use of Nuclear Power Sources in Outer Space (NPS Principles).[199] As per the NPS Principles, as soon as a malfunction is identified, any State launching a space object with nuclear power sources on board should notify the UN Secretary-General, especially regarding the re-entry of such malfunctioning space object. Though the NPS Principles provides the duty to notify on the launching State, the obligation to notify should extend to any State that acquires the information, irrespective of whether it is a launching State. Article 7 of the NPS Principles provides that all States possessing "space monitoring and tracking facilities" should in the spirit of international co-operation, share available information on malfunctioning of space object with a nuclear power source on board to UN Secretary General and concerned States so that necessary precautionary measures might be taken.[200] Further, after re-entry into Earth's atmosphere of a space object

197 Oliver Lissitzyn, International Law Today and Tomorrow (1965), 34-36.

198 Voting Procedure on Questions Relating to Reports and Petitions concerning the Territory of South-West Africa, advisory opinion (UNGA request), ICJ Reports 1955, 122.

199 GA Res 47/68, UN Doc. A/RES/47/68 (1992) (Principles Relevant to the Use of Nuclear Power Sources in Outer Space), Principle 5.

200 Ibid., Principle 7.

containing a nuclear power source, the launching State shall promptly offer necessary assistance to eliminate "actual and possible harmful effects".[201]

61. Based on the aforesaid provisions and principles of international space law, we conclude that the duty to notify an impending space disaster is an emerging customary international law principle, and the duty to notify should be an *erga omnes* obligation owed to the international community, particularly the State/s with the capacity to mitigate and prevent the disasters. Hard law instruments such as the Outer Space Treaty, the Rescue and Return Agreement, and soft law instruments such as the Remote Sensing Principles and the NPS Principles indicate the emergence of a binding obligation to notify disasters. The duty to notify regarding impending space disasters should be recognized as an *erga omnes* norm. Notifying the affected States and the international community in general regarding impending space disasters is imperative for preventing the disasters.

62. Other UN General Assembly resolutions also indicate the relevance of the duty to notify regarding impending space disasters. In 2013, the UN General Assembly passed Resolution 68/75 to establish the International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG).[202] The objective of the first group is to observe, identify, and study potentially hazardous near-Earth objects (NEOs) such as comets and asteroids. The group shares information with States on potential threats from NEOs. As of today, IAWN has members from entities worldwide.[203] The IAWN also receives information from the constituting States regarding impact consequences, hazard analysis, and mitigation responses. Like IAWN, the SMPAG,[204] facilitated by the UN, has been established to prepare international responses for potential threats from NEOs through exchanging information, collaborative research and NEO threat mitigation planning. Space agencies of more than 17 States are part of this group, including agencies of all the major space nations. Further, several planetary defense conferences have emphasized information-sharing in case of urgency and disasters in space, either from human-made space objects or threat of impacts from natural asteroids and comets.

201 Ibid., Principle 7.

202 GA Res 68/75, UN Doc. A/RES/68/75 (2013) (International cooperation in the peaceful uses of outer space).

203 IAWN (iawn.net/).

204 SMPAG (www.unoosa.org/oosa/en/ourwork/topics/neos/smpag.html).

63. Under international space law, the importance of exchanging information has been recognized since the beginning of the space age. However, while sharing information often takes place voluntarily, and as the space population grows manifold, it is crucial to recognize that there should be a specific obligation to notify an impending space disaster. As discussed earlier, in 2011, the USA's National Research Council noted that the outer space population had already reached the tipping point.[205] Further, the UN Interconnected Disaster Risks Report 2023 also noted that the space debris population has reached the tipping point, causing the loss of multiple satellites.[206] In light of the above, it is even more critical for the international community to impose on third-party States, having knowledge of impending space disasters, an *erga omnes* obligation to notify impending space disasters to the international community, particularly the State/s with the capacity to mitigate or prevent the space disasters.

IX. Conclusion

64. The State of origin's duty to notify about transboundary harm is established under international law. The question is whether the duty to notify of impending disasters extends to third-party States that know about such an event occurring. This paper posits that the obligation to notify about impending harm based on possession of knowledge, affirmed by the ICJ in the *Corfu Channel* case, should extend to all cases of impending disasters, even in cases where the impending disaster does not take place within the territorial control of the State possessing knowledge. Therefore, in this paper, we urge that the duty to notify regarding disasters that may cause transboundary harm should extend to third-party States, i.e., any State with information and knowledge about the impending disaster. Any third-party States possessing knowledge regarding an impending disaster should inform the international community regarding such impending disaster, particularly the potentially affected States and any other States that have the ability to mitigate and prevent that impending disaster. This obligation to inform and notify emerges from various piecemeal hard law instruments, several UN General Assembly resolutions, principles of cooperation, common but differentiated responsibility, and historical responsibility. This paper states that

205 National Research Council of the National Academies, above n.67.

206 United Nations University Institute for Environment and Human Security, "Interconnected Disaster Risks – Risk Tipping Points", (2023) (doi.org/10.53324/WTWN2495).

there is an emergent international norm that imposes on the third-party States possessing knowledge, a duty to share such information with the international community. This duty takes on greater importance as both Earth and outer space are becoming more vulnerable and risk-prone due to human activities, and there is a need to prevent disasters and minimize their harmful effects. The time is right to require a mandatory exchange of information and sharing of knowledge regarding impending disasters. Such information and knowledge sharing helps realizing various SDGs in this interconnected world. If a State possessing knowledge of an impending disaster does not share such information with the international community, any State should have the standing to take action against that State. There should also be reparations for not sharing knowledge about impending disasters as per customary international law, such as satisfaction, compensation, restitution, and declaration of non-repetition.[207] However, the intricacies regarding enforcement of the duty to notify regarding impending disasters need further elaboration, which this paper does not address.

65. In this paper we have identified the existing hard law and soft law instruments including the UN General Assembly Resolutions, that provide for third-party States' obligation to cooperate and duty to notify regarding impending disasters, either on Earth or in space. We believe that these incremental endeavors significantly impact the development of a customary law imposing a legal obligation upon third-party States to notify in disasters occurring on Earth and in outer space. We acknowledge, however, that the duty to notify impending disasters can be appropriately implemented only when some fundamental questions regarding the definition of disaster are clarified, such as whether war or armed conflict situations are disasters, and which disasters are significant enough to trigger this duty to notify. We understand these definitional questions and queries relating to armed conflict and neutrality during armed conflict pose significant impediments to our research and the obligation of duty to notify that this paper seeks to identify. However, this work is the beginning of the discussion, and we hope to be watching and participating in the ongoing debates and conversations regarding the ambit of the duty to notify impending disasters being expanded.

207 ILC Articles on Responsibility of States for Internationally Wrongful Acts, 2001, above n.30, arts. 28-39.

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