10 Uncertain uncertainty in global disaster diplomacy

Ilan Kelman

We always saw it coming: Disaster as a political process

It is easy to lament after many earthquakes, and as with the COVID-19 pandemic among other disease outbreaks: "Why didn't we see this coming?" The key to answering is another question: What is "this"? If "this" refers to nature, then it would be overreaching to expect that humanity could understand everything about the natural world and know exactly what it will produce and when. Nature always has uncertainties, producing surprises and never-before-observed-or-recorded phenomena; that is, the external, natural uncertainties described in this book's editorial introduction.

Conversely, if "this" refers to the disaster, notably the social impacts, then we can hardly excuse ourselves today by claiming ignorance or uncertainty. Social changes and consequences have extensive analogies and precedents (Glantz 2003), while impacts are easy to discern by applying vulnerability theory to indicate who would be more adversely affected and why, irrespective of specific environmental phenomena (Hewitt 1983; Lewis 1999; Wisner et al. 2004). Nature has uncertainties, but that does not mean that disasters do.

Because we have the knowledge available to avert disasters if we choose so, then by definition, a disaster is a political process. One long-standing and ongoing area of research linked to global politics is the extent to which politics is affected by disasters and dealing with disasters (Glantz 1976; Platt 1999). Could a hurricane end or cause interstate conflict? Could a regional building code for seismic resistance bring together or widen the gap between noncooperating countries? What uncertainties exist in aiming to answer these questions? One approach for addressing these questions is "disaster diplomacy."

Disaster diplomacy investigates how and why disaster-related activities do and do not influence conflict and cooperation (Kelman 2012; 2016). Much of this interaction potentially occurs through multiple tracks of diplomacy, including the private sector, the nonprofit sector, science diplomacy, sports diplomacy, cultural diplomacy, and individuals. Plenty could also possibly be achieved through formal diplomatic channels at bilateral and multilateral levels, with the latter defining this chapter's focus. Within the context of the scoping and categories of "uncertainty" in this book's editorial introduction, this chapter explores some forms of uncertainties – and especially those that are assumed – that do and do not emerge for disaster diplomacy at the global level.

It does so in three main sections. First, the next section reviews existing work by detailing disaster diplomacy and understandings (as will become clear "un"-derstandings) of disaster, focusing on the United Nations (UN), hence the high-lighting of "global." Then, two specific examples – climate change and outer space phenomena – illustrate this background in the context of different uncertainty types from this book's editorial introduction. These two examples are connected for dis-cussion that indicates how and why different types of uncertainties are not neces-sarily negative, nor need they necessarily inhibit needed action. The conclusion answers this book's underlying questions and suggests future investigations.

This chapter supports this book's purpose 'to engage scholars in a constructive and practically oriented debate on the nature and effects of uncertainty in global politics' in two main ways (Matejova and Shesterinina, introduction to this vol-ume). First, it adds to the understanding of different uncertainty forms by relating two practical examples to two specific disaster theories: disaster diplomacy and disaster "un"-ness. Second, it provides constructive ways of engaging with, work-ing through, and obtaining advantages from where, how, and why uncertainties do and do not emerge within these contexts. As such, this chapter contributes to this volume's 'systematic analysis of the concept of uncertainty in global politics as it manifests itself' specifically with respect to global disaster diplomacy (Matejova and Shesterinina, introduction to this volume).

Disaster causes, diplomacy, and "un"-ness

Disaster causes

This chapter combines two theories to explore uncertainty in global politics: dis-aster diplomacy and disaster "un"-ness, covered respectively in the following two subsections. They both emerge from foundational disaster theory that disasters are not caused by environmental phenomena such as hurricanes, earthquakes, land-slides, rockfalls, rainfall, volcanic eruptions, or droughts, but instead emerge from vulnerabilities (i.e., where and how people live or are forced to live) (Hewitt 1983; Lewis 1999; O'Keefe et al. 1976; Waddell 1977; Wisner et al. 2004). Disasters arise from human choices, or lack of choices, not from the environment or nature. Because disasters are human-caused, they are not natural and so the phrase "natural disaster" is a misnomer and is discouraged in disaster-related research, policy, and practice.

For instance, properties and communities can be designed so that flooding does not lead to much damage (Szöllösi-Nagy and Zevenbergen 2005), plus people do not necessarily need to live in places prone to flooding. While some people choose infrastructure that is easily damaged in floods or choose to live in floodplains, most people in flood-vulnerable situations do not make those choices. Reasons that they end up in these circumstances include not being able to afford to live elsewhere, being forced to live near their work, not having had educational opportunities per-mitting them to investigate flood topics, lack of legal recourse to improve their liv-ing circumstances, and being discriminated against to prevent them from tackling known problems. Wildfires/bushfires are a similar example – in terms of making

infrastructure fire-resistant and people making choices (or not having choices) about living in fire-prone locales without fire resistance through social and technical measures (Smalley 2005).

While environmental phenomena have traditionally been labelled with words such as "hazard," "threat," "peril," and "danger" – leading to the standard mnemonic of disasters arising from a combination of hazard and vulnerability – disaster circumstances occur only due to the existence of vulnerabilities. The forces and energies from nature are not denied and obviously exist. For instance, surviving pyroclastic density currents (hot, fast gas and ash clouds from explosive volcanic eruptions) and jökulhlaups (glacial outburst floods) is not easy, even in robust infrastructure. Given the knowledge available about nature, without denying the knowledge gaps and uncertainties, people with power and resources could make decisions to avoid these forces and energies, through varied techniques including place selection, adequate infrastructure, warning, and evacuation. Analyzing vulnerabilities, notably the lack of uncertainty regarding who and where are most vulnerable to disasters and why, explains why vulnerabilities are tackled in some contexts and not addressed in others. The focus on vulnerabilities and the lack of "natural" disasters also provide the starting point for the two theories applied in this chapter: disaster diplomacy and disaster "un"-ness.

Disaster diplomacy

Disaster diplomacy investigates how and why disaster-related activities do and do not influence conflict and cooperation (Kelman 2012; 2016). Entities enacting or inhibiting disaster diplomacy can be individual (e.g., heads of government, celebrities, or philanthropists) or collective (e.g., organizations and governments), at any governance level, all interacting through formal and informal mechanisms. Here, the focus is on global disaster diplomacy, which means considering multilateral and multinational high-level collaborations and disputes across all sectors.

Thus far, disaster diplomacy analyses at these levels have not shown any new, lasting diplomacy achieved from disaster-related activities (Kelman 2012; 2016). The reason is that political and diplomatic decisions are made for numerous reasons, not always with the goal of saving lives and reducing suffering. Instead, where cooperation was already sought, disaster-related activities can support further cooperation. Where conflict was already preferred, disaster-related activities including humanitarian aid are used as an excuse to pursue continuing conflict.

North Korea provides an example of disaster diplomacy not yielding positive results despite decades of efforts. In 1953 at the end of the Korean War, North Korea shut out most of the rest of the world. Nonprofit groups from the USA would offer medical diplomacy and typhoons would hit both Koreas, yet nothing produced long-lasting improvements in North Korea's relations with other countries – or even in the country's abilities to deal with environmental phenomena and disasters (Kim et al. 1998; Yim et al. 2009).

Mismanagement of North Korea's agriculture was illustrated in 1995 in a significant famine leading to international relief efforts to support the country. These

initiatives did not produce significant results in improving North Korea's situation or furthering dialogue to end the country's isolation. Then, the year 2000 witnessed further food aid given to North Korea and discussions about engaging with the world. Nonetheless, North Korea threatened violence, tested missiles, criticized South Korea, and initiated military incursions into South Korea. In 2001, North Korea became part of US President George W. Bush's "Axis of Evil," augmenting hostility between the two countries.

Flood risk in 2002, a major explosion after a train crash in 2004, swine flu in 2009, and a famine and typhoons in 2012 repeated the pattern. Aid was offered, sometimes accepted and sometimes declined, but North Korea never opened up. Diplomatic negotiations started, sometimes progressing and sometimes faltering, but never producing a solid, long-term agreement. Weapons tests in and belligerence from North Korea continued. Science diplomacy through an international collaboration on the explosive potential of Mount Paektu (Changbaishan/Baekdusan) on the China–North Korea border did not produce any high-level diplomatic results (Hammond 2016). Disaster diplomacy for North Korea over decades has ended up with some useful disaster-related activities but few substantive peace-related results.

As a different disaster diplomacy example, the COVID-19 pandemic starting in 2020 led to extensive efforts at international cooperation alongside multi-country disputes. Early in the pandemic, China, Cuba, France, Germany, Russia, Taiwan, and the UK sent bilateral aid to other countries in the form of medical supplies and personnel. The pandemic also led to bickering, with Italy complaining that the European Union was not providing enough assistance while several countries tried to punish China diplomatically because the new virus had originated there.

Once vaccines were available, little new was witnessed in terms of vaccine diplomacy. Before vaccines had been approved, an international initiative called COVAX aimed to find, produce, and distribute COVID-19 vaccines globally and equitably. By October 2020, over 150 countries representing almost two-thirds of the global population had signed on, including many expecting to provide vaccines, not just those expecting to receive them. As vaccines became available, many countries focused on vaccinating their own populations. Even within countries, subnational jurisdictions such as provinces and territories in Canada followed their own vaccination routes and prioritized their own populations, which is understandable given the politics surrounding lockdowns and health systems. China provided its own suite of vaccines to allied countries or countries it was hoping to become close to, mirroring Cuba's intentions as it developed vaccines.

All these responses led to debates about the extent and appropriateness of effective international cooperation, especially within the ethics of COVAX (Sharma et al. 2021). For instance, some states might be reluctant to donate vaccines to countries that spend excessively on the military and lack robust health systems, such as the USA and Ethiopia.

Consequently, it is not clear that "vaccine justice" or equitable vaccination means equal vaccine distribution or widespread donations of vaccines needed for

one's own population. A further implication is that no assumption can be made that disaster diplomacy, health diplomacy, and vaccine diplomacy through COVAX or other mechanisms will achieve the desired vaccine distribution goals.

These examples, and all the others from the wide array of disaster diplomacy work (Kelman 2012; 2016), show how much of disaster management relates to people and politics, even where people and politics do not necessarily show interest in being influenced by a disaster or disaster-related activities. From the book's editorial introduction, different understandings of uncertainty may emerge with regards to disaster diplomacy:

1. A lack of information: Information regarding politics and decisions can never be complete, so explanations of disaster diplomacy must be framed within this type of uncertainty.
2. A lack of meaning: People and politics are core to disasters and disaster diplomacy, so norms and identities diverge.
3. Too much information: To fully understand the origins of vulnerabilities and political structures, and hence their intersections, detailed analysis from multiple perspectives across space and time scales is required, leading to an extensive amount of information to process and synthesize.
4. A multiplicity of interpretations: The large ambiguities within knowledge about people and politics for addressing vulnerabilities means that many incompatible interpretations are feasible.

Disaster "un"-ness

Disaster "un"-ness refers to Hewitt (1983) challenging predominant notions of disasters that describe them with "un" words, especially "uncertain" as well as unexpected, unprecedented, unpredictable, unusual, unmanageable, unscheduled, and unstoppable. Hewitt (1983) evidences how these adjectives are inaccurate since the fundamental causes of disasters are vulnerabilities. Vulnerabilities emerge from long-term political processes that remove people's options and resources to improve their own situations, so they cannot choose to handle environmental phenomena and to avoid disasters. These processes are understood and identifiable by analyzing vulnerabilities – disasters could be avoided if the causes were admitted and redressed.

Analyzing vulnerabilities is, in effect, the politics–disasters link, but in the opposite direction from disaster diplomacy. Disaster diplomacy examines how disaster-related activities might or might not influence politics; that is, disasters to politics. Vulnerability analysis examines the politics behind creating, ignoring, or dealing with disasters and disaster risk (Hewitt 1983; Lewis 1999; Wisner et al. 2004); that is, politics to disasters. Vulnerability is fundamentally the process by which people and places end up in situations in which they cannot deal with environmental or social influences and so disasters result.[1] These processes take a long time to develop and to be maintained, meaning that vulnerability is a long-term political process.

Vulnerability is frequently exposed when an environmental phenomenon manifests, yet it is always available to be documented and analyzed if someone chooses so. Claims of uncertainties in vulnerabilities emerge mainly from, as this book's editorial introduction labels, human sources of "uncertainty making" in which information is withheld, misrepresented, or ignored.

Since vulnerabilities can be examined, explored, analyzed, and redressed, the explanation is clear for how and why disasters occur: people forcing vulnerabilities on others and, less frequently, choosing vulnerabilities for themselves. This statement is not claiming a full understanding of nature or of the environmental phenomena typically implicated in disasters. Conversely, the baseline of disaster causes accepts the ever-present natural and physical uncertainties while showing that the vulnerabilities are typically similar and cause disasters.

As an example, Haiti suffered over two centuries of vulnerability creation and perpetuation by internal and external politics, which meant that disasters occurred with hurricanes in 1954, 2004, 2008, and 2016 (among others) and with earthquakes in 1751, 1842, 2010, and 2021 (among others) (Mika 2019). Even if environmental phenomena had been tsunamis, heat, or others, disasters would have resulted from these vulnerabilities of exploitation, oppression, inequity, inequality, and marginalization leading to poverty, inadequate governance, poor livelihood opportunities, and lack of healthcare and education for everyone. With the known vulnerabilities – or the ability to know them – the disasters in Haiti were the opposite of "un" words (Mika 2019). The disasters were not unexpected, unpredictable, uncertain, or unstoppable because the people and country's situation was long known. Many initiatives in Haiti recognized the challenges and aimed to solve them, whether through the UN, science, or direct actions from governments, international agencies, and nongovernmental organizations (Candell 1975; COUC 2008; Dorn 2009; USAID 2009). Recent disasters in Haiti were neither unprecedented nor unusual, because they had happened previously, while the country was known to experience all manners of environmental phenomena. Using "un" words circumvents Haiti's long history of vulnerabilities and, in effect, sets up the country for more, similar disasters.

As such, Haiti exemplifies disaster "un"-ness distracting from a disaster's characteristics and causes. Overcoming disaster means overcoming "un"-ness by avoiding the "un" words and accepting the real causes of disasters in order to tackle them (Hewitt 1983; Lewis 1999; Wisner et al. 2004).

Realities of climate change and outer space phenomena

The two theories of disaster diplomacy and disaster "un"-ness from the previous section are now applied in the following two subsections to examples relevant to the global politics of disasters and hence global disaster diplomacy: human-caused climate change and outer space phenomena. A *double entendre* with "un"-ness emerges in the context of global politics that "un"-ness can appear to be "UN"-ness, relating to the UN which attempts to address many topics including climate change and outer space phenomena. Any parallelism could be challenged by those

who expect "UN"-ness to overcome "un"-ness, particularly uncertainty, leading to an exploration of the effectiveness of "UN"-ness for uncertainty in global disaster diplomacy.

Climate change

The Earth's environment has always changed at all time scales, from immediate to aeons, and at all space scales, from individual to international. Today, one major concern is the rapid speed and large extent to which human activities are changing the world's climate. Since Europe's Industrial Revolution began in the eighteenth century, human activities have released increasing amounts of several gases, such as carbon dioxide and methane, into the atmosphere. A significant (but not the only) source of these gases, called "greenhouse gases," is from combusting fossil fuels, such as coal and petroleum. Simultaneously, major ecosystems that absorb these gases have been destroyed, with deforestation being especially prominent. The overall impact is a substantial increase in the atmospheric concentration of greenhouse gases, which then trap the Sun's heat around the planet.

As the atmosphere heats up, the weather changes. "Climate" is defined as average weather, historically often calculated over 30 years, but with no consistent timeframe. When the weather changes, the average weather obviously changes, which means that the climate changes. This is "climate change," and the UN provides two different definitions.

First, the Intergovernmental Panel on Climate Change (IPCC) is the UN body responsible for providing a synthesis and assessment of climate change science, to be accepted and signed off by member state governments, making the final documents political. The two main sources of uncertainty, as noted in this book's introduction, are evident in the IPCC's work. External uncertainty remains from the climate and its influencers while human-based uncertainty is introduced from the politics. Full IPCC assessments began in 1988 to publish the first one in 1990, leading to the sixth assessment report in 2021–2022. This sixth assessment report (IPCC 2021) defines "climate change" to be any change in the climate over decades arising from both natural and human influences.

Second, the UN Framework Convention on Climate Change (UNFCCC) was signed in 1992 and defines "climate change" as 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods' (UNFCCC 1992, Article 1, Paragraph 2). The UN secretariat responsible for this convention is now referred to as UN Climate Change and it organizes international negotiation meetings, called a Conference of Parties (COP), seeking binding agreements for countries to tackle the causes of climate change and its impacts.

The two definitions differ in that the IPCC considers all contributors to climate change, both human and nonhuman, while the UNFCCC centers on human-caused climate change. Nonetheless, the IPCC tends to be viewed as the epitome of climate change science with the UNFCCC being the policy body. Overlaps

exist, such as the IPCC Assessment Reports producing a 'Summary for Policy Makers' (SPM), which is described as 'the potentially least robust aspect of the Assessment Report process' (Ghaleigh 2016: 65), because it typically misrepresents many of the scientific conclusions. Similarly, agreements are reached at the UNFCCC negotiations, which are invariably presented as successes, yet none of the major ones (Kyoto in 1997, Copenhagen in 2009, Paris in 2015, and Glasgow in 2021) achieved their goals or substantively tackled human-caused climate change.

The IPCC and UNFCCC's processes on the world stage represent classic disaster diplomacy, classic "un"-ness, and classic "UN"-ness. The standard disaster diplomacy conclusions are affirmed in that the suggested adverse consequences from human-caused climate change have not led parties to succeed in joining together for new, lasting, global measures. "UN"-ness through the two UN processes presents inconsistent material, such as the definition of "climate change" and the (mis)-synthesis of science through the SPM, evidencing uncertainties as a lack of meaning and a multiplicity of interpretations. These uncertainties contribute to both top-down monolithic processes failing to achieve their goals.

How do these issues relate to "un"-ness? No matter which definition of "climate change" is adopted, influencers of climate change are complicated, including sources which are entirely natural, which are entirely anthropogenic, and which are a combination. An example of an entirely natural source is variations in the Earth's orbit around the Sun inducing the planet to move into and out of ice ages (Hodell 2019). Entirely anthropogenic sources include fossil fuel combustion releasing gases as well as ecosystem degradation reducing their uptake (IPCC 2021). A combination emerges from wildfires/bushfires, many of which are typical ecosystem processes and many of which are fueled by human mismanagement of the ecosystem and ignition sources including discarded cigarettes and arson (Miller et al. 2011). All fires burn vegetation, releasing greenhouse gases. A lack of information about all the influencers and their interactions brings this form of uncertainty to climate change science and politics.

Meanwhile, a decades-long campaign of misinformation and disinformation, especially from fossil fuel companies, obscured the origins and consequences of human-caused climate change (Oreskes and Conway 2010). Politicians supported by these companies or seeking votes in places depending on fossil fuel industries, opposed legislation to discourage or reduce shifts toward less harmful (and cheaper and safer) alternatives. What started in the nineteenth century – a later publication is from Arrhenius (1896) – and became consolidated through MIT's (1970, 1971) scientific analyses was morphed into a political process designed to fabricate external, natural uncertainty and concoct debate about science and scientists. Too much information about all the influencers and their interactions, invented through a multiplicity of interpretations, brings uncertainty to climate change science and politics. Part of the "un"-ness thus surfaces. Human-caused climate change has long been the opposite of the "un" words. Instead, concerted efforts manufactured uncertainty and other aspects of "un"-ness in order to prevent needed action.

Simultaneously, some of those accepting the science behind human-caused climate change as a major concern have migrated to the other extreme, far beyond what the science states. They refer to climate change as an "existential threat" to humanity, potentially leading to human extinction, despite a lack of scenarios demonstrating a complete wipe-out. Phrases such as "climate crisis" and "climate emergency" have been normalized, thereby shifting away from the crisis and emergency being human behavior and choices. Although the intention is to highlight how human behavior and choices change the climate, emphasizing "climate" reinvigorates paradigms of environmental determinism and the environment (even if human-modified) as the real threat. This framing was overturned in the early days of climate change as a scientific field (Torry 1979; Waddell 1977), yet it persists today. Additionally, referring to "climate chaos" and "climate breakdown" (in the sense of them being dangerous anomalies) is unscientific. "Climate," by definition, is a statistical calculation which has never been stable throughout Earth's history (IPCC 2021; Tziperman 1997) and which has always displayed properties of mathematical chaos (Annan and Hargreaves 2004; IPCC 2021).

The words "chaos" and "breakdown" attempt to instill external uncertainty from nature as being detrimental when it is actually part of the system. No expectation should exist of certainty in the climate system. In the meantime, "crisis" and "emergency" evoke many other assumptions of "un"-ness. As with disasters, the environmental component – here, average weather changing – will always display "un"-ness, but the vulnerability component – here expressed by highlighting expected or possible impacts – does not need to. As with all environmental phenomena and processes, vulnerabilities are easy to identify and are typically the same, irrespective of how or why the environment changes (Enarson and Morrow 1998; Hewitt 1983; 1997; Lewis 1999; Wisner et al. 2004). "Un"-ness is contrived for climate change, both human-caused and natural, from those who support (as well as oppose) action.

Rather than focusing on science and examining the causes and consequences of the physicality of a changing climate, climate change's "un"-ness and "UN"-ness have become social constructs and political sport. Climate change is used to represent a wide range of societal ills, including tsunamis (Bell 2006), representing hazards despite limited climate change connection, and injustices (Sultana 2021), representing vulnerability which existed in the same form long before human-caused climate change became a concern and which would exist irrespective of human-caused climate change. Too often, vulnerabilities are diminished in favor of blaming climate change for all difficulties witnessed, rather than society.

Further illustrating the "UN"-ness of climate change leading to "un"-ness and undermining disaster diplomacy, difficulties in separating rhetoric and reality occur for actions needed to address climate change. These actions are separated – rather than working together – into stopping human-caused climate change (i.e., "climate change mitigation") and dealing with the impacts (i.e., "climate change adaptation"). Through the UN, mitigation is defined as reducing greenhouse gas sources while increasing sinks, and adaptation is defined as reducing adverse impacts while gaining from positive impacts (IPCC 2021; UNFCCC 1992). These two sets of

activities are typically examined separately, despite long-standing work explaining the importance of bringing them together (Dang et al. 2003; Kane and Shogren 2000) – which could have represented successful disaster diplomacy.

The UN also frequently separates climate change action from action on parallel endeavors. IPCC and UNFCCC exist solely for climate change instead of their mandates being integrated into wider environment and development initiatives. The Sustainable Development Goals (UNGA 2015) not only list an entirely separate goal for climate change (Goal 13), but also explicitly designate UNFCCC as the lead for this topic – with no other goal deferring to another organization. An opportunity to develop links and to set the stage for disaster diplomacy across sectors and interests was missed. Simultaneously, climate change mitigation applies exactly the same principles as wider pollution prevention (e.g., from Higgins 1995), while climate change adaptation offers nothing new to the broader and deeper endeavor of disaster risk reduction (Kelman et al. 2017).

Again, "UN"-ness might not be fully supportive of disaster diplomacy and ends up bolstering "un"-ness. Overall, for climate change especially caused by human activities, "UN"-ness has not been overly effective for global disaster diplomacy or for addressing the various forms of uncertainties identified (or other "un"-ness).

Outer space phenomena

Outer space brings many environmental phenomena to the Earth, namely objects and radiation, which sometimes overlap. Biota could be considered, namely extra-terrestrial beings. They could be intelligent life exploring the universe showing that we are not alone (and that we are not as intelligent as we think) but might instead be microbes that survive the aeons in deep freeze as they drift across galaxies.

Space objects, some of which are referred to as Near-Earth Objects (NEOs) when they approach our planet, could be asteroids, comets, other bodies such as moons or planets, dust clouds, other stars, and less usual phenomena including black holes or unknowns. Without a collision, a black hole, star, or planet could affect the Earth through gravity, heat, and radiation. Asteroids or comets skimming through the atmosphere without touching down produce shockwaves and heat blasts. Sometimes they strike the surface, leading to direct physical damage, shockwaves, heat blasts, tsunamis if hitting water, and dust clouds if hitting land.

Space radiation bombards the Earth continually. The solar wind is charged particles emitted by the Sun's atmosphere and is diverted from hitting the Earth directly by the planet's magnetic field. At the Earth's two magnetic poles, the solar wind's particles are able to get closer, resulting in the auroras. When the Sun produces intense activity, a geomagnetic storm or solar storm results with many more particles reaching the Earth, potentially knocking out power grids and communications networks including satellites.

International cooperation supports the monitoring of and response to outer space phenomena. For the UN, the space agency is the UN Office for Outer Space Affairs (UNOOSA). Others contribute to specific topics such as the UN Office for Disarmament Affairs (UNODA) supporting the use of outer space for peaceful

purposes, and the UN Office for Disaster Risk Reduction (UNDRR, previously the UN International Strategy for Disaster Reduction (UNISDR) ensuring that outer space phenomena are fully considered (UNDRR 2020).

For NEOs since 2014, based on UN recommendations and hence 'UN'-ness, the International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG) have worked on coordination and action in what has long been termed "planetary defense" (see also Kofler et al. 2019). IAWN shares information and brings people together to study NEOs – namely, detection, tracking, and monitoring – while SMPAG plans and prepares for an international response to a NEO threat. Neither has formal UN status, complicating the relevance of "UN"-ness and introducing "un"-ness regarding who is responsible and how. In fact, many non-UN initiatives have examined planetary defense, for instance, Morrison (1992) for the USA.

For space weather, in 2009 the UN Committee on the Peaceful Uses of Outer Space within UNOOSA started the International Space Weather Initiative (ISWI), focusing on the science and science communication of space weather. Operational warnings and response recommendations tend to be from national agencies, such as the UK's Met Office (Meteorological Office). Again, the relevance of "UN"-ness is undermined while "un"-ness is promoted in the uncertainties of a multiplicity of interpretations and a lack of information regarding who leads and acts. If UN member states do not support UN agencies, the effectiveness of "UN"-ness becomes limited. In other words, the standard disaster diplomacy conclusions are affirmed in that the suggested adverse consequences from outer space phenomena have not led parties to succeed in joining together for new, lasting, global measures.

Non-UN international contributors to addressing outer space phenomena include the International Astronomical Union (IAU), a member-based scientific organization working on international cooperation for astronomy, and private initiatives monitoring and issuing warnings for NEOs and/or space weather. Countries' individual space agencies and scientific offices also collaborate internationally, bilaterally, or multilaterally. For an external observer aiming to fathom how humanity might respond to outer space phenomena, the main uncertainty might be who is in charge of a response and how decisions are made, as Bower and Prem demonstrate in this volume in the cases of satellites and autonomous weapons systems, respectively. Prospects exist for the world to come together to face a major threat or to recover from a catastrophe, but the lack of cooperation and coordination for prevention and risk reduction does not portend well for any collaboration to last beyond a specific situation. Any such situation could also end up with nationalism simultaneously with ad hoc cross-border collaboration, as seen for other global disaster diplomacy including COVID-19. Either way, optimism could be misplaced for global disaster diplomacy through "UN"-ness to overcome the "un"-ness of outer space phenomena.

This conclusion is illustrated further by outer space phenomena that have the potential to destroy the planet. Here, planet-wide vulnerability is 100% certain while the outer space phenomena have high external, natural uncertainty, leading

to the certainty of planetary destruction and species extinction, with little warning. Two key examples come from stars which, if nearby the Earth, could unleash devastation and which have been examined scientifically. The first example is a sudden burst of gamma rays (Palmer et al. 2005). The second example is a star's death throes as a supernova (Fields and Ellis 1999). The uptake of these concerns at the level of global politics and diplomacy is negligible, demonstrating another failure of global disaster diplomacy.

Nothing uncertain but uncertainty itself?

As with climate change, outer space phenomena display significant "un"-ness including uncertainty, but the disaster cause remains vulnerability and so lacks "un"-ness. Consequently, outer space phenomena yield a similar conclusion to climate change that "UN"-ness has so far had limited efficacy for global disaster diplomacy or for addressing uncertainty and other "un"-ness." While the incorrect discourse of climate change being an existential threat to humanity is prominent globally in research, policy, and practice, even entering the UNFCCC's negotiations, real extinction threats from outer space phenomena could do with more attention outside of science.

The main result from the two examples can, thus, be summarized: for global disaster diplomacy, nature-related uncertainties are permitted to overtake decisions rather than available knowledge on vulnerabilities being used to bypass these uncertainties. Examples of external, natural uncertainties for human-caused climate change are wide ranges for possible sea-level rise over the coming millennia (Clark et al. 2016; Moore and Orchard in this volume) and the potential ecosystem impacts of ocean acidification (Doney et al. 2020). Examples of external, natural uncertainties for outer space phenomena are warning times for large solar flares (Petrakou 2021) and catastrophic, sudden events. Uncertainties for the vulnerabilities, however, could be overcome and resolved through investigating and acting on them, including through global disaster diplomacy, in order to obviate "un"-ness. For now, efforts to do so are perfunctory. Instead, nature's uncertainties are advanced as excuses for inaction based on human sources of uncertainty that could be resolved.

Since global disaster diplomacy and countering "un"-ness could be used to move past the uncertainties for successful actions, so-called "black swans" and "shocks" should not exist. Instead, by reducing vulnerabilities through global disaster diplomacy and by avoiding "un"-ness in order to accept and tackle baseline disaster causes, the uncertainties in the environmental phenomena should not lead to uncertainties in global disaster-related action. Consequently, the practical significance of combining the two theories in this chapter emerges for changing the policy and practice discourse of global politics in two ways. First, to highlight that environmental phenomena have significant uncertainties but rarely cause disasters while emphasizing that vulnerabilities have much fewer uncertainties and typically cause disasters. Second, to explain how populist notions, namely black swans and shocks, misdirect policy and practice away from communicating and tackling these

fundamental disaster causes. They do so by accentuating the environmental phenomena as excuses for inaction and for claiming "black swans" and "shocks" exist.

These uncertainties certainly exist yet become an excuse for bypassing the certainty of vulnerabilities and of vulnerabilities as causing disaster. Using another example, an earthquake's epicenter's magnitude and depth present uncertainties, along with the exact timing and spatial extent of a specific tremor. It remains certain that poorly constructed and maintained buildings will collapse and kill far more frequently than those with seismic resistance measures – even as uncertainties remain regarding which specific structures will fail in which specific manners in which specific earthquakes (Spence and So 2021).

Such practicalities supplement the answer to the question "Why didn't we see this coming?" which began this chapter. It becomes a practical and philosophical struggle to defend the thesis "because of (any form of) uncertainty" when the uncertainties within disasters are not the cause. Instead, the tendency is to shy away from accepting responsibility for what we do know or could know – i.e., vulnerabilities – irrespective of gaps in what we do not know – i.e., nature and hence environmental phenomena.

The implications apply to disasters which do not involve nature much. Perrow (1999), for instance, demonstrates technological design outcomes which seem to surprise based on extensive uncertainties. The recommendation is, thus, either (i) not designing in this way so that uncertainties are reduced and surprise is avoided or (ii) accepting the certainty of "surprising" catastrophic failure and hence disasters. If the latter is selected, the choice was considered and foreseeable meaning that it cannot be a "black swan."

These discussions never imply or claim complete human control, knowledge, understanding, or power. They suggest abilities to analyze, understand, detail, and accept our own limits, being open about what we cannot and sometimes should not do alongside the potential consequences. Such issues have long been articulated as "known unknowns" and "unknown unknowns" (Campbell 1969), which segue here into "certain uncertainties" and "uncertain uncertainties" (Green et al. 1991) – continuing the "un"-ness theme. Ultimately, these practical discussions become a philosophical positioning. If we foresee that we cannot foresee, then is the "surprise" unsurprising and is the uncertainty certain (after Glantz 2003; Streets and Glantz 2000)? Since we now consider and foresee "black swans" as a general concept, how could they be surprising, unforeseeable, or uncertain?

This philosophical position segues into the political. It can be politically rewarding to blame surprise, black swans, and uncertainty by claiming "we simply could not have known, but now I am here to help, so support me" – and hence gaining through disaster diplomacy. Political benefits have been documented through popular political disaster response, such as German Chancellor Gerhard Schröder winning reelection in 2002 partly due to actions following catastrophic floods across the country (Roberts 2003).

Political advantages from averting a disaster – overcoming uncertainty and surprise – are much harder to achieve. More commonly, credit is received for continually visible projects such as sea walls and river dikes which tend to worsen flood

disasters (Fordham 1999; Tobin 1995). Effective measures for infrastructure, with examples being water-resistant paint in houses or base isolators to address earthquakes, are generally not directly visible, so people are not always aware they exist (see also Lewis 2003). Concurrently, risk reduction measures might not be tested during the term of office of the initiator or implementer, while any disaster can be responded to immediately.

The political process of vulnerability rewards the blaming of uncertainty while helping people when it is too late. Aiming to reduce disaster-related uncertainty and surprise would mean accepting the causes and consequences of vulnerabilities, in effect blaming oneself or one's country, from which it is hard to get political traction. Just as disaster diplomacy is often avoided for political gain (Kelman 2012; 2016), "un"-ness tends to be pursued because it yields political gain. Uncertainty in disasters and in politics can be desired and actively sought – or, at the minimum, the pretense of uncertainty is generated.

Underlying answers and beyond

This volume's underlying questions from this book's introduction are:

1. 'How do we best study, understand, and address political phenomena that are inherently uncertain?'
2. 'How do we define and theorize uncertainty in global politics?'
3. 'What can we learn from studying uncertainty in its various forms and how can we use this knowledge to our advantage in individual planning, policy-making, and global problem solving?'

With respect to disasters, all three questions are, in effect, answered by the truism that uncertainty in global politics must always exist. Rather than being feared or avoided, uncertainties should be embraced as part of producing and enacting constructive policy and action. The focus is on ensuring that people are helped and that disasters are prevented irrespective of the magnitude, scope, and nature of the uncertainties. The fundament remains that, while environmental phenomena have significant uncertainties, the causes of disasters as vulnerabilities are much more certain and, especially, dealing with them is much more certain than dealing with environmental uncertainties. Uncertainty does not preclude effective disaster-related action.

As Matejova and Shesterinina (introduction to this volume) note, 'there is not one but many forms of uncertainty' with lengthy science and operational practice available on identifying different forms of uncertainty and acting within them, including 'the meaning of uncertainty and the relationship between this concept and such associated terms as risk, complexity, and ambiguity.' Added to this list are "ambivalence" (Seeman 1953), "fuzziness" (Bellman and Zadeh 1970), and "surprise" (Streets and Glantz 2000). Within disaster research, decision-making analyses have long differentiated various forms of uncertainty, for instance, for volcanoes (Geomatrix 1996) and hazardous substances (Brennan 1990). Examples

are aleatory uncertainty, epistemic uncertainty, causation uncertainty, and attribution uncertainty.

This book's three questions are, thus, answered by ensuring that global politics learns from how uncertainties are defined and managed across different fields. These fields include disasters and disaster diplomacy, noting that the global level is seldom the most successful. That is, uncertainty does not seem to produce or be resolved by UN-certainty through "UN-ness" with global approaches instead often reinforcing "un"-ness. The "un"-ness within "uncertainty," however, is not necessarily detrimental, including for dealing with disasters, even when the uncertainties are uncertain. The key to global disaster diplomacy, and for wider global politics, is to have the skills and interest to work through these uncertainties for preventing disasters, without relying on "UN"-ness, global diplomacy, or global governance, but going far beyond.

Note

1 As noted earlier, sometimes, people make choices to do so, but other times they are forced into these positions through choices of others, not their own. They might fear harassment, assault, or robbery in a disaster shelter, so they choose not to evacuate. They might lose their job if they travel to a safe location for a few days. They might be denied education or health care, reducing their opportunities to help themselves. They might have been lied to about the safety of the property in which they live. They might be governed by a totalitarian dictator amassing personal wealth.

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