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The Earth in the Anthropocene – and the World in the Holocene?

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1. What is the Anthropocene?

The Earth is undergoing a shift from conditions of the most recent officially accepted geological time interval, the Holocene, to a new planetary state. The Holocene is the latest, and formally still current, geological epoch. It comprises the past 11,700 years,¹ which have been marked by an exceptionally long period of relative environmental stability, including, for the last ca 7000 years, of sea level. As such, the conditions of the Holocene were a key factor facilitating the development of human civilization.

In the early 2000s Paul Crutzen (Nobel Prize laureate for his work on atmospheric ozone) suggested that, because of the global environmental effects of economic development and increased human population, the Earth system had already left the Holocene and has entered a new epoch: the 'Anthropocene'.² Following that proposal, during the past 15 years – and since 2009 in particular – the Anthropocene concept has spread rapidly and became widely accepted as an unofficial scientific term referring to a human imprint on the Earth system already so profound as to have reached geological magnitude. From 2009, this concept has been under formal scrutiny within geology: the *Anthropocene Working Group* was then formed within the International Commission on Stratigraphy in order to examine the stratigraphic basis and the scientific justification for, and the utility of, possible formalization of the Anthropocene as the most recent geological time unit.³ The findings of the Anthropocene Working Group are expected in 2016.

¹ Mike Walker et al., 'Formal Definition and Dating of the GSSP (Global Stratotype Section and Point) for the Base of the Holocene Using the Greenland NGRIP Ice Core, and Selected Auxiliary Records' (2009) 24 *Journal of Quaternary Science* 3.

² Paul Crutzen and Eugene Stoermer, 'The Anthropocene' (2000) 41 *Global Change Newsletter* 17; and Paul Crutzen, 'Geology of Mankind' (2002) 415 *Nature* 23.

³ On the International Commission on Stratigraphy, see at: www.stratigraphy.org. On the Anthropocene Working Group, see at: <http://quaternary.stratigraphy.org/workinggroups/anthropocene/>.

The Anthropocene hypothesis has already passed beyond the boundaries of natural science, emerging as a new way of understanding the human role and the implications of our actions for the world we live in and its future. The Anthropocene concept offers a broad framework for bridging the perceived divide between *nature* (the Earth system we find ourselves in) on the one hand, and *humans* (and the political world we have created), on the other. What is fundamentally new in the Anthropocene concept is its focus on the role of humans in the destabilization of the *Earth system*, and not just the human impact on the environment, as in various earlier approaches.⁴ Among the many societal consequences on the horizon of this convergence of geological epochs,⁵ there arises the question of relevance and implications for international law.

2. Is the Anthropocene Relevant for International Law?

Unlike the Holocene, which has been characterized, especially in its later stages, by the longest overall stability in environmental conditions on the Earth since the appearance of *Homo sapiens*, the Anthropocene is seen as characterized by change, uncertainty and, probably, considerable instability in the behaviour of the Earth system.⁶ This may have increasingly high relevance and, over time, important consequences for the organisation of international relations as currently regulated by international law.

In the fundamentals of today's international law, stability operates at two levels. One level concerns the conscious objective of working towards legally guaranteed stability in international relations, which themselves are vulnerable to frequent political change. The other level of stability is implied: it is based on human experience of the generally stable environmental conditions of the late Holocene. Changes in that underlying element of stability contain the potential for unprecedented types of tension in relations between states. The conditions of the Anthropocene will bring a fundamental shift of the context in which international law operates – a shift in which the challenges are increasingly recognized as the consequences of natural, not only political, change. This may aggravate the existing tensions in the regulation of inter-state relations under international law.

2.1. *Discovering the Globe, Dividing the World*

Since the early days of international law as a discipline, our keen interest in the Earth – though perhaps perceived as a globe on the face of which the political world is being shaped – cannot be denied. The emergence of classical international law has been largely intertwined with the 'discoveries' of overseas lands by European powers; and

⁴ Clive Hamilton and Jacques Grinevald, 'Was the Anthropocene Anticipated?' (2015) 2 *The Anthropocene Review* 59.

⁵ See especially Sir Crispin Tickell, 'Societal Responses to the Anthropocene' (2011) 369 *Philosophical Transactions of the Royal Society – A* 926.

⁶ Jan Zalasiewicz, Paul Crutzen and Will Steffen, 'The Anthropocene', in Felix Gradstein et al. (eds), *The Geologic Time Scale 2012*, vol. 2 (Elsevier, 2012).

their expansion has often included territorial acquisition. International law doctrines, concepts and rules have been affecting the political shape of the globe for quite some time. The key international documents that followed Columbus' 1492 voyage introduced – a demarcation line. In discovering the *Globe*, we have not seen the *Earth*; we have aimed at dividing the *World*. Under the Treaty of Tordesillas, agreed by Spain and Portugal in 1494, the 'New World', including any lands yet to be 'discovered', was to be divided between them by a 'boundary or straight line ... drawn north and south, from pole to pole, on the said ocean sea, from the Arctic to the Antarctic pole'. In the intervening centuries, geography has become firmly and deeply embedded in the fundamentals of international law.⁷

Moreover, when lands distant from Europe became better known and their riches revealed, others, including England under Queen Elizabeth I, demanded different 'lines': first of all, the lines of unimpeded maritime trade and participation in the accumulation of profit. International law then received its still highly celebrated doctrinal work, published in 1609 and in retrospective widely recognized as one of its classical foundations. The practical subtitle of that book (*The Right Which Belongs to the Dutch to Take Part in the East Indian Trade*) proved far more durable in scope than the ideology conveyed through its main title: *Mare liberum* ('The Free Sea', or 'The Freedom of the Seas').⁸ Who indeed would wish to stop international trade; some 90 per cent of it nowadays travels on the seas.

2.2. Spheres of Tension in International Law of the Holocene

Modern international law, especially as it has developed since the mid-20th century, has been marked by two main spheres of constant tension. First is the tension between sovereign equality of states as the founding postulate of international law on the one hand, and the political, military, strategic, economic and other differences between states, on the other. This tension between the sovereign equality of states and their geopolitical differences has been often presented as caused by the 'horizontal' nature of international law, and the 'vertical' reality of international politics due to the many differences between states.⁹

A second sphere of tension is the one between the legal guarantee of territorial integrity of sovereign states on the one hand, and claims, nurtured by a myriad of factors from economic to ethnic, in the political division of the world, on the other. This sphere of tension stems from the fact that the world is territorially divided into many parts, each under sovereignty of a distinct state – currently some 200 of these – delimited by interstate boundaries (incomplete in some cases). The adjoining maritime areas of

⁷ Daniel Bethlehem, 'The End of Geography: The Changing Nature of the International System and the Challenge to International Law' (2014) 25 *European Journal of International Law* 9.

⁸ See discussion in Davor Vidas, 'Responsibility for the Seas', in Vidas (ed.), *Law, Technology and Science for Oceans in Globalisation* (Brill, 2010), available at www.fni.no/doc&pdf/DAV_Ch_1_offprint.pdf.

⁹ See, e.g., Richard Falk, *(Re)Imagining Humane Global Governance* (Routledge, 2014), 87.

states with their own coasts are divided as well. What remains beyond is one part of a water column under the sovereignty or sovereign rights of no state (the high seas); and one part of the seabed lying beyond the limits of national jurisdiction (the international seabed area).¹⁰ Competing claims to territories, land and maritime, have abounded through history, often leading to wars or to territorial changes based on political power. Therefore, facilitating the peaceful settlement of territorial disputes based on the rules of international law is among the highest achievements of human civilization thus far.

In both spheres of tension, the objective of international law has been to facilitate political stability in inter-state relations through international cooperation and to maintain international peace and security.¹¹ The end of the Holocene and the onset of the Anthropocene is set to introduce a third, fundamentally different and profoundly new type of tension.

2.3. The Anthropocene Tension: The Earth System under Human-induced Change

Showing relative stability throughout recent human history, the underlying condition of the Earth system has been taken as a given – and upon that premise our political structures were created in the course of the past centuries. The relationship of international law with the observed geographical features and indeed the overall geological dimension of the Earth system has generally been confined to an implicit assumption about the undetermined, long-term horizon of current conditions – as an objective circumstance surrounding us since time immemorial. We are accustomed to understanding of any change in the Earth system as a matter of geological time, events stretching through many millennia, or millions (if not billions) of years – as opposed to politically relevant time and the related pace of change, whether embodied in national election horizons, pre- and post-war periods, newly emerging or dissolved world alliances, the adoption and entry into force of international treaties, creation of international organizations, or other milestones on that scale.

Many aspects of international law are based on such understanding of the stability of the Earth conditions.¹² Indeed, the definition of current international law is, in many respects, that of a system of rules resting on foundations that evolved under the circumstances of the late Holocene, assumed to be ever-lasting. International law takes the conditions of the Holocene for granted, and on that premise a huge edifice of international law has been constructed over the past several centuries. The change

¹⁰ The Antarctic, defined as the area south of 60° S latitude, has a unique status under the 1959 Antarctic Treaty, which is the legal basis of the Antarctic Treaty System applying to this area; see Olav Schram Stokke and Davor Vidas (eds), *Governing the Antarctic: The Effectiveness and the Legitimacy of the Antarctic Treaty System* (Cambridge University Press, 1996).

¹¹ See UN Charter, Article 1(1) and (3).

¹² Exceptions found in international law to the overall conditions of stability are also based on experience: the changing courses of rivers (and the related rules on interstate boundaries in such situations); or the changing coastal geography in some large river deltas (and the related rules in the law of the sea).

introduced in that underlying element of stability – and that is what the transition from the Holocene to the Anthropocene conditions involves – contains the potential for an unprecedented type of tension in relations between states. This can spill over to and aggravate existing tensions between the territorial integrity of states and territorial claims – coupled with the fact of immense geopolitical differences, on the one hand, and sovereign equality of states as the founding postulate of international law, on the other.

3. International Law at the End of the Holocene

Various aspects of international law rely on an implicit pre-text of the familiar conditions of stability. For instance, a defined territory – indeed, *having* a territory – is a basic criterion of statehood under international law (as codified in Article 1(a) of the 1933 Montevideo Convention on Rights and Duties of States). The perspective of sea-level rise is but one of many symptoms in the outlook of an Anthropocene world – and challenges to the continuity of statehood of some low-lying small island states are bound to emerge. Moreover, the law of the sea architecture relies on the general stability of coastal geography and the resultant baselines,¹³ which serve as the key objective circumstance for determining the extent of various maritime zones of states, and for resolving maritime delimitation disputes. In the not-too-distant future, important questions may therefore arise, requiring re-examination of some presently accepted paradigms of international law.¹⁴

Some of the serious changes are conceivable already in the course of the 21st century – that is, within a human lifetime. Other potential human-induced changes are, however, conceivable as imminent: consider the consequences of the possible use of nuclear weapons available today. Indeed, the hypothesis on the onset of the Anthropocene, now supported by a large majority of the Anthropocene Working Group members, relates it to the mid-20th century, in particular to the first nuclear bomb detonation (16 July 1945 at Alamogordo, New Mexico) followed by additional detonations which were at an average rate of one every 9.6 days until 1988.¹⁵

With a fundamental change of the context in which international law operates – and with the challenges increasingly recognized as the consequences of natural, not only political, change – new legal axioms will have to evolve. If international law is to be able to meet the new challenges of changing circumstances and achieve its overarching objectives of facilitating international cooperation and maintaining international peace and stability, humankind may have to organize society in the Anthropocene epoch

¹³ The 'Bangladesh exception' in Article 7(2) of UNCLOS applies to highly unstable coastlines caused by river deltas – and is of limited reach and targeted to specific situations.

¹⁴ Davor Vidas, 'Sea Level Rise and International Law: At the Convergence of Two Epochs' (2014) 4 *Climate Law* 70, available at <http://www.fni.no/doc&pdf/DAV-ClimateLaw-2014.pdf>.

¹⁵ Jan Zalasiewicz, Colin Waters, Mark Williams et al., 'When Did the Anthropocene Begin? A Mid-Twentieth Century Boundary Level is Stratigraphically Optimal' (2015) *Quaternary International* (forthcoming).

differently from what we have known so far. This transformation will have to embrace fundamental principles of the international law architecture – with geography firmly and deeply embedded in its core.

In that broad framework of *our* needs and purposes looming on an Anthropocene horizon, the primacy given in international law to the assertion of sovereign rights over territory may have to be reconsidered, while the emphasis on population and human rights may have to gain in prominence and find expression in new forms of international law subjectivity. As international law rests on thick sediments of political power and accumulated vested interests, the challenges in changing the current course are deep-reaching, and involve many difficult questions. Whether and when these will be raised in practice will depend on the changing gravity of challenges over time.

4. International Law for the Anthropocene? An Outlook

With the possible formalization a new geological epoch and, indeed, the onset of the Anthropocene conditions, international law may become the subject of particular scrutiny, for two reasons. First, certain segments of international law – the law of the sea in particular, but also the rules on the acquisition of territory – involve historical and ideological causal links with the development towards Anthropocene conditions.¹⁶ And second, core aspects of international law rely on the stability of Holocene conditions, which have been taken for granted – logically enough, given our experience thus far.

The Anthropocene contains the potential of profound implications for international law in two main ways. The first is a shorter-term perspective: the formalization of the Anthropocene as a new geological time-unit in the history of the Earth, ratified through due scientific process in stratigraphy, may significantly contribute to awareness-raising, prompting an increased focus on the implications for international law. The second aspect of international law implications is directly related to the consequences of the changing conditions in the Anthropocene. Here the perspective is a longer-term one, even if some of the changing conditions, such as sea-level rise – although still uncertain as to the pace and magnitude – may become serious already in the course of the current century.

A core dilemma emerges: the processes of convergence between Holocene and Anthropocene conditions will require response or transformation, including the development of new legal axioms, in accordance with the needs of the new situation – rather than responding by analogy or precedent based on the earlier situation, no longer valid. However, the international legal order will always be in search of stability and, ultimately, solutions to facilitate peace and prevent conflict, therefore requiring gradual changes.

¹⁶ Davor Vidas, 'The Anthropocene and the International Law of the Sea' (2011) 369 *Philosophical Transactions of the Royal Society–A* 909.

Some of those changes, related to core aspects of state sovereignty and sovereign rights, will impact international law at the systemic level; these will reflect on various individual parts of international law. In addition, distinct fields of international law will respond in profoundly different ways; consider the examples of the law of the sea, and international environmental law. Moreover, the emergence of new fields of international law may be expected, as in the case of international genetic resources law.¹⁷

Finally, the Anthropocene will enhance the importance of several other fields of international law, so far rarely addressed from that perspective. In particular, this concerns international economic law, the field of disarmament and non-proliferation of especially nuclear weapons, and ultimately the broad fields of human rights and humanitarian law – all of which may be seen as increasingly exceeding the limits of individual state sovereignty and the related territorial boundaries, and requiring advances in keeping with the demands of a new, and profoundly different, epoch.

¹⁷ Further discussion in: Davor Vidas, Ole Kristian Fauchald, Øystein Jensen and Morten W. Tvedt, 'International Law for the Anthropocene? Shifting Perspectives in Regulation of the Oceans, Environment and Genetic Resources', *Anthropocene*, 4 July 2015, available at <http://www.sciencedirect.com/science/article/pii/S2213305415300084>.