

Earth System Law



Louis J. Kotzé and Rakhyun E. Kim

Abstract The existing body of international environmental law has been created in the context of a relatively stable and harmonious Holocene epoch. This assumed regulatory premise of Holocene stability and harmony has resulted in a collection of international environmental law norms that are unable to sufficiently address the governance challenges emanating from within the context of the Anthropocene's complex, unstable, unpredictable, and intertwined earth system. Earth system law has recently been proposed as an alternative vision for international environmental law in the Anthropocene. Earth system law is intended to serve as an imaginative framework that can guide innovative questions regarding the difficulties posed to international environmental law in responding to the complex challenges of earth system governance, and as a roadmap for international environmental law to better address these challenges on an appropriate planetary level in the Anthropocene.

The rapidly deteriorating state of the earth system is now clearly evident through the lens of the Anthropocene (Steffen et al., 2016). The Anthropocene trope evidences progressively invasive and destructive patterns of human mastery on planet Earth that lie buried beneath and within centuries-old layers of corporate greed, political opportunism, appropriation, slavery, colonialism, imperialism, patriarchy, ecocide, and systemically entrenched entitlement that feeds off an increasingly vulnerable and uneven living order (Fineman & Gear, 2013). Law generally, and international environmental law in particular, have played a central role in facilitating these and other drivers of the Anthropocene; and have been unable to effectively prevent, halt and/or minimize continuing earth system decay and to offer meaningful solutions to

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the Anthropocene's deepening socio-ecological crisis in a way that can also safeguard planetary integrity (Kotzé, 2019a).

Several studies reveal international environmental law's perceived regulatory gaps (e.g., the fact that it does not yet regulate potentially harmful new climate technologies such as solar geoengineering (Biermann et al., 2022); its structural complicity in creating the conditions that drive the Anthropocene (Kim & Mackey, 2014; Kotzé, 2019b); its inability to address socio-ecological damage and resultant climate and other inter- and intra-species injustices in an inter and intra-generational way (Gear, 2014); and its lack of regulatory ambition, evidenced in particular by its lack of binding ecological norms (French & Kotzé, 2019; Kim & Bosselmann, 2013; Bridgewater et al., 2014). Moreover, the architecture of international environmental law, including its core assumptions, orientation, operation, and objectives, are not commensurate with the most recent understanding of the governance challenges that arise from within the context of a complex and interlinked earth system (Cardesa-Salzman & Cocciolo, 2019; Viñuales, 2018). A recent study, for example, highlights how international environmental law struggles to grapple with the coordination of planetary boundaries and the many complex planetary scale governance challenges emanating from interacting planetary boundaries (French & Kotzé, 2021). Clearly, international environmental law must change if it is to remain relevant, useful and effective in pursuit of global sustainability in the Anthropocene (Biber, 2017).

Scholars have been exploring alternative visions for international environmental law in the Anthropocene, which they hope will be more fully able to legally respond to the prevailing Anthropocene reality and complex earth system governance challenges (e.g., Kotzé, 2017; Webster & Mai, 2021). While terms such as 'Earth-centred law' (Bosselmann, 2016) and 'planetary boundaries law' (Chapron et al., 2017) have been suggested, the growing epistemic project of earth system law holds out considerable potential to re-imagine and craft "next-generation international environmental law" for the Anthropocene (Kim, 2021), or *Lex Anthropocena* (Kotzé & French, 2018). Earth system law also has the potential to redirect much needed and renewed attention to the critically important role of law "as a technology of social organisation [that] has been neglected in the otherwise highly technology-focused accounts by natural and social scientists of the drivers of the Anthropocene" (Viñuales, 2018: 2). In other words, earth system law reminds us that the Anthropocene predicament is not only interesting for and a concern of earth system science. This predicament, and ways to maintain planetary integrity in the face of unprecedented earth system decay, are also very relevant for the social sciences where law is a "purposeful vehicle for shaping [human] behaviour to achieve desired ends" (Hadfield & Weingast, 2012: 473).

The concept of earth system law was first proposed in a 2019 publication (Kotzé & Kim, 2019); an endeavour that Biermann (2021: 12) describes as an "attempt to chart a new legal field". Although the discourse on earth system law is all but mature, interest in this proposal is growing, as the emerging scholarship shows (e.g., du Toit et al., 2021; Gellers, 2021; Kotzé et al., 2022; Kim & Kotzé, 2021; Kotzé & Kim, 2020; Mai & Boulot, 2021; Kim, 2021; Leach, 2023; Petersmann, 2021;

van Asselt, 2021). In essence, the project of earth system law offers an alternative framing for international environmental law to facilitate the type of transformations and governance interventions that are in step with a continuously transforming earth system, and that are required to address the socio-ecological crisis of the Anthropocene and the multiple governance challenges arising from this crisis (Kim et al., 2022). Because of the intimate disciplinary, conceptual and practical links between law and governance, earth system law situates such an alternative framing within the context of “earth system governance”, which is defined as “organised human responses to earth system transformation, in particular the institutions and agents that cause global environmental change and the institutions, at all levels, that are created to steer human development in a way that secures a ‘safe’ co-evolution with natural processes” (Biermann, 2007: 328).

Earth system law’s principal objective is to align international environmental law with an earth system perspective. It does so by prompting lawyers and policymakers to discard assumptions of one-dimensional Holocene-nested linearity, predictability, simplicity and harmony on which international environmental law rests; and instead to embrace an alternative understanding of the role and contribution of international environmental law in governing complex, non-linear, interconnected, multi-scalar and unpredictable earth system governance challenges that arise in the Anthropocene. Earth system law therefore encourages law, lawyers and other social actors to grapple more deliberately with the natural science aspects of the earth system and to translate these into the social science domain in a way that also meaningfully embraces “earth system governmentality” (Lövbrand et al., 2009). To this end, earth system law seeks to facilitate a deeper understanding of international environmental law’s (in)ability and potential contribution to respond to the multiple governance challenges and implications flowing from earth system thinking. In terms of such a description, earth system law is not so much a new body of law (such as human rights law or trade law that focuses on a specific issue) as it is a vision or imaginary of what international environmental law could become for the purpose of facilitating the legal aspects of earth system governance in the Anthropocene.

Earth system law is defined as an innovative legal imaginary that is rooted in the Anthropocene’s planetary context and its perceived socio-ecological crisis. Earth system law is aligned with, and responsive to, the earth system’s functional, spatial and temporal complexities; and the multiple earth system science and social science-based governance challenges arising from a no-analogue state in which the earth system operates. Earth system law seeks to respond to the earth system’s instability and unpredictability and its governance challenges through a continuous norm development process that drives meaningful transformations as well as intra, inter- and trans-disciplinary learning and deliberation (Kotzé et al., 2022). To this end, and in pursuit of desirable planetary futures, earth system law potentially offers: an intra-, inter- and trans-disciplinary analytical framework to better understand and respond to the legal dimensions of earth system governance; the normative foundations to govern the full spectrum of earth system relationships in a way that promotes planetary integrity and justice in their fullest sense; and the legal means to

facilitate transformative earth system governance for long-term sustainability (Kotzé & Kim, 2020).

In an *analytical* sense, earth system law offers a framework to critique the current deficiencies of international environmental law, and to reimagine international environmental law; to open up the closures of earth system science for lawyers, while illuminating the juridical aspects of earth system governance for earth system scientists; to reveal the regulatory implications of earth system thinking for law; and to serve as a new crosscutting theme of scientific enquiry for scholars working in the area of global sustainability. In a *normative* sense, earth system law offers a framework to design better and more ambitious legal rules to respond more effectively to the type of planetary governance challenges that the dynamic and complex earth system presents. The transformative dimension of earth system law involves both reforming existing international environmental law alongside the governance demands of a complex earth system (internal transformations), as well as pursuing initiatives that are fully embedded in an earth system law paradigm that can trigger and steer societal transformation towards planetary integrity and justice (external transformations).

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