



# Introducing ‘Anthropocene Science’: A New International Journal for Addressing Human Impact on the Resilience of Planet Earth

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“It is surely our responsibility to do everything within our power to create a planet that provides a home not just for us, but for all life on Earth”—Sir David Attenborough, BBC Planet Earth II, 2016.

Welcome to the new journal *Anthropocene Science* (eISSN 2731-3980), an exciting trans- and multidisciplinary international peer-reviewed journal for addressing human impact on the resilience of planet Earth, published by Springer Nature (<https://www.springer.com/journal/44177>). The Editorial Board and the Publishing Editor of the *Anthropocene Science* are pleased to announce this new launch. We invite prospective authors across the world to submit their

novel and exemplary research findings on various anthropogenic drivers of and responses to changes on the vitality, stability, and environmental functioning of planet Earth and ground-breaking solutions for restoring and enhancing the carrying capacity of our biosphere. The journal encourages new knowledge and technological, political, and socio-cultural advancements to enable transitions towards global sustainability and planetary stewardship. However, we are also saddened by the ravage of a tiny virus to the entire humanity as we are in the midst of another planetary emergency—a global health crisis triggered by COVID-19 pandemic (<http://www.who.int>). The SARS-CoV-2 is not only

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taking a heavy toll on human life but also further harming our social, bio-cultural, and economic systems (Crisp 2021) beyond the point of immediate recovery. The severity and fatality of the viral outbreak is a wake-up call for humanity to urgently reinstate ecosystem health for the benefit of both people and planet (IPBES 2020).

Despite exploring sustainable solutions for various planetary conditions that have emerged during the last few decades, another well-thought out reason to launch this timely and topical journal is to address the current and future development trajectories of human–environment relationships involving, as examples, ecosystem and human health, social-ecological resilience, and deciphering transformative solutions for the future survival of human beings (Whitmee et al. 2015; Turner et al. 2016; O'Connor and Kenter 2019; Clark and Harley 2020; Díaz et al. 2020). Further to discern the scope of this journal in an integrated manner, *Anthropocene Science* is defined as a transformative human-environmental science based on traditional and modern knowledge systems, technologies, applications, and nature-friendly practices ingrained in ethics, plural values and positive behavioural changes for planetary stewardship. Thus, the journal is not merely meant to address human-induced alterations at various scales and speed but also to offer solutions for necessary course corrections and sustainable strategies for living in harmony with nature, while recognising our role as an integral part of it.

Millions of species of plants, animals and other life forms that share this blue planet with us (Smil 2002), but we, the *Homo sapiens*, have most significantly altered planetary bio-physical systems, albeit in a very unequal way. Human activities have increased the provisioning services of the Earth, in some cases increasing natural capital and enabling pockets of biodiversity gain (Thomas 2017). Such activities, however, have various impacts on the environment and Earth system, in many cases resulting in irreversible consequences like unprecedented biodiversity loss and ecosystem degradation, pollution, soil depletion, climate change, glacier melt, sea level rise, marine acidification and so on so forth (IPCC 2013; IPBES 2019; Tilman et al. 2019; Leclère et al. 2020; Veerman et al. 2020; Dasgupta 2021; DeFries 2021; Folke et al. 2021). We are continually trying to modify our environment in our relentless quest for affluence and supremacy over nature, rather than leading a sustainable and more nature-friendly lifestyle to support our own survival on this planet. This has not only caused us to cross planetary boundaries (Rockström et al. 2009) and deplete many vital resources beyond the point of replenishment, but has also caused irreversible damage to critical life supporting systems, undermining the survival of all forms of life on Earth.

The move to naming of the present epoch as the 'Anthropocene' thanks to the Nobel Prize-winning chemist late

Professor Paul J. Crutzen (Crutzen 2002), the late Professor Eugene F. Stoermer (Crutzen and Stoermer 2000) and many others for championing this notion (Lewis and Maslin 2015; Ellis 2018; Folke et al. 2021), reflects the enormous extent to which we have modified the Earth system (Steffen et al. 2020). While developmental activities are intended to improve the quality of human life and well-being, the lack of sustainable resource governance and adherence to sustainability principles lead to wide-spread ecosystem degradation and interlinked socio-economic issues like inequality, poverty and malnutrition at the regional and national scale. Investing both time and resources into recognising the amount of damage done, identifying the beacons of hope and good practices where sustainability has prevailed at smaller scales, as well as devising sustainable strategies for restoring and rehabilitating ecosystem health is indeed the need of the hour. Against this backdrop, *Anthropocene Science* is conceived as an e-journal to understand the extent of human impact on the Earth system and to develop environmental, economic, technological, political and socio-cultural innovations targeted towards restoring the vitality of the planetary systems (Fig. 1) and preventing their further damage.

The journal recognises the changes society has made to the functioning of the biosphere and addresses the various dimensions of these changes for human and environmental well-being. It aims to publish full length research articles, short communications, reviews, graphical reviews, policy analysis, opinions, news and views, and case studies focusing on interactions between nature and people and how these relationships tend to affect the critical life supporting systems and human survival. The journal welcomes new and innovative concepts, frameworks, technologies and policy interventions addressing transitions towards sustainability in areas such as agriculture, food systems, biodiversity, land use, water resource management, urban development, industrial production, pollution control, energy production and utilisation, climate change mitigation and adaptation, public health and sanitation, natural resource governance etc. The journal welcomes research drawing on emerging paradigms such as planetary healthy diets, nature-based solutions (NbS), ecosystem-based adaptation (EbA), ecosystem health (EH), ecosystem governance (EG), ecosystem-based disaster risk reduction (Eco-DRR), as well as research that harnesses biocultural diversity and traditional knowledge for achieving the UN Sustainable Development Goals (UNSDGs). In essence, the journal aims to address how human activities influence the resilience of planet Earth and how knowledge-driven scientific and technological innovations and societal transformations based on sustainability principles can restore the Earth's vitality.

We are proud and thankful to have an editorial board of highly distinguished experts covering all aspects of *Anthropocene Science*, from diverse institutions and countries who



**Fig. 1** Left panel: the cover page of *Anthropocene Science* symbolises the human footprint on planet Earth. Right panel: a word art embedded on planet Earth showing some of the major themes (indicative, not exhaustive) of *Anthropocene Science* (<http://www.wordart.com>). Please visit journal webpage for detailed aims and scope (<https://www.springer.com/journal/44177/aims-and-scope>). One of the striking features of this journal is that apart from measuring, analysing, and modelling past, present, and future anthropo-

genic pressures on planet Earth, the journal strives to provide solutions based on sustainability principles for regaining the vitality of the planet as well as planet-friendly ways for living in harmony with nature. Overall, *Anthropocene Science* promotes systemic trans- and multidisciplinary research approaches and frameworks to achieve a just and inclusive transformation to sustainability (Pradhan et al. 2017; Haberl et al. 2019; O’Brien 2021; Reichstein et al. 2021)

will maintain the highest standards of scientific quality, rigour, and publishing ethics while providing equal opportunity and fair evaluation to all prospective authors. We have a balanced mix of rising stars and top leading global authorities on board. A number of board members are the top cited researchers in their field (<http://www.clarivate.com>) and Fellows of prestigious science academies such as the Royal Society of London, the Royal Swedish Academy of Sciences, the US National Academy of Sciences, the British Academy of Sciences, The World Academy of Sciences, Italy, etc., and have received recognitions such as a knighthood by the British crown, the Blue Planet Prize, the Zayed International Prize for the Environment, the Volvo Environment Prize, the Taylor Prize etc., to name a few. We are also thankful to team Springer-Nature for their kind support and help in launching this timely journal. Dr. Mamta Kapila (India), Dr. Jacco Flipsen (Netherlands), Dr. Raman Shukla (India), Dr. Isabell Kaiser (Germany) and Dr. Miyuki Akioka (Japan) deserve special praise. We welcome constructive comments and suggestions alongside outstanding proposals for thematic and special issues in *Anthropocene Science*.

Amidst planetary crises, the silver lining is that humanity has the trailblazing power to create new paths towards sustainability and has the immense potential to co-create new knowledge to reverse harm and restore vitality for a better future. We are sure *Anthropocene Science* will serve as one of the avenues for facilitating such a transition. Let us pledge

to live with nature as a core part of it, while safeguarding our living planet for the well-being of all life forms so that they may flourish.

### References

Clark WC, Harley AG (2020) Sustainability science: toward a synthesis. *Ann Rev Environ Resour* 45:331–386. <https://doi.org/10.1146/annurev-environ-012420-043621>

Crisp N (2021) Human flourishing in a health-creating society. *Lancet* 397:P1054-1055. [https://doi.org/10.1016/S0140-6736\(21\)00585-7](https://doi.org/10.1016/S0140-6736(21)00585-7)

Crutzen PJ (2002) Geology of mankind. *Nature* 415:23. <https://doi.org/10.1038/415023a>

Crutzen PJ, Stoermer EF (2000) The “Anthropocene”. *IGBP News* 41:17–18. Available at: <http://www.igbp.net/download/18.316f18321323470177580001401/1376383088452/NL41.pdf>. Accessed on 28 May 2021

Dasgupta P (2021) The economics of biodiversity: the Dasgupta review. Her Majesty Treasury, London (ISBN 9781911680291)

DeFries R (2021) What would nature do? A guide for our uncertain times. Columbia University Press, Columbia (ISBN: 9780231199421)

Díaz S, Zafra-Calvo N, Purvis A, Verburg PH, Obura D, Leadley P, Chaplin-Kramer R, Meester LD, Dulloo E, Martín-López B, Shaw MR, Visconti P, Broadgate W, Bruford MW, Burgess ND, Cavelier-Bares J, DeClerck F, Fernández-Palacios JM, Garibaldi LA, Hill SLL, Isbell F, Khoury CK, Krug CB, Liu J, Maron M, PjK McGowan, Pereira HM, Reyes-García V, Rocha J, Rondinini C, Shannon L, Shin YJ, Snelgrove PVR, Spehn EM, Strassburg B,

- Subramanian SM, Tewksbury JJ, Watson JEM, Zanne AE (2020) Set ambitious goals for biodiversity and sustainability. *Science* 370:411–413. <https://doi.org/10.1126/science.abe1530>
- Ellis EC (2018) *Anthropocene: a very short introduction*. Oxford University Press, Oxford (ISBN: 9780198792987)
- Folke C, Polasky S, Rockström J, Galaz V, Westley F, Lamont M, Scheffer M, Österblom H, Carpenter SR, Chapin FS III, Seto KC, Weber EU, Crona BI, Daily GC, Dasgupta P, Gaffney O, Gordon LJ, Hoff H, Levin SA, Lubchenco J, Steffen S, Walker BH (2021) Our future in the Anthropocene biosphere. *Ambio* 50:834–869. <https://doi.org/10.1007/s13280-021-01544-8>
- Haberl H, Wiedenhofer D, Pauliuk S, Krausmann F, Müller DB, Fischer-Kowalski M (2019) Contributions of sociometabolic research to sustainability science. *Nat Sustain* 2:173–184. <https://doi.org/10.1038/s41893-019-0225-2>
- IPBES (2019) Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. In: Brondizio ES, Settle J, Díaz S, Ngo HT (eds). IPBES Secretariat, Bonn (ISBN: 978-3-947851-20-1)
- IPBES (2020) Workshop report on biodiversity and pandemics of the Intergovernmental Platform on Biodiversity and Ecosystem Services. In: Daszak P, Amuasi J, das Neves CG, Hayman D, Kuiken T, Roche B, Zambrana-Torrel C, Buss P, Dundarova H, Feferholtz Y, Földvári G, Igbinosa E, Junglen S, Liu Q, Suzan G, Uhart M, Wannous C, Woolaston K, Mosisg Reidl P, O'Brien K, Pascual U, Stoett P, Li H, Ngo HT (eds). IPBES Secretariat, Bonn. <https://doi.org/10.5281/zenodo.4147317>
- IPCC (2013) Climate change 2013: the physical science basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. In: Stocker TF, Qin D, Plattner GK, Tignor M, Allen SK, Boschung J, Nauels A, Xia Y, Bex V, Midgley PM (eds). Cambridge University Press, Cambridge. (ISBN 9781107661820)
- Leclère D, Obersteiner M, Barrett M, Butchart SHM, Chaudhary C, Palma AD, DeClerck FAJ, Marco MD, Doelman JC, Dürauer M, Freeman R, Harfoot M, Hasegawa T, Hellweg S, Hilbers JP, Hill SLL, Humpenöder F, Jennings N, Krisztin T, Mace GM, Ohashi H, Popp A, Purvis A, Schipper AM, Tabeau A, Valin H, van Meijl H, van Zeist WJ, Visconti P, Alkemade R, Almond R, Bunting G, Burgess ND, Cornell SE, Fulvio FD, Ferrier S, Fritz S, Fujimori S, Grooten M, Harwood T, Havlík P, Herrero M, Hoskins AJ, Jung M, Kram T, Lotze-Campen H, Matsui T, Meyer M, Nel D, Newbold T, Schmidt-Traub G, Stehfest E, Strassburg BBN, van Vuuren DP, Ware C, Watson JEM, Wu W, Young L (2020) Bending the curve of terrestrial biodiversity needs an integrated strategy. *Nature* 585:551–556. <https://doi.org/10.1038/s41586-020-2705-y>
- Lewis SL, Maslin MA (2015) Defining the Anthropocene. *Nature* 519:171–180. <https://doi.org/10.1038/nature14258>
- O'Brien K (2021) Global environmental change II: from adaptation to deliberate transformation. *Prog Hum Geogr* 36:667–676. <https://doi.org/10.1177/0309132511425767>
- O'Connor S, Kenter JO (2019) Making intrinsic values work; integrating intrinsic values of the more-than-human world through the Life Framework of values. *Susta Sci* 14:1247–1265. <https://doi.org/10.1007/s11625-019-00715-7>
- Pradhan P, Costa L, Rybski D, Lucht W, Kropp JP (2017) A systematic study of sustainable development goal (SDG) interactions. *Earths Future* 5:1169–1179. <https://doi.org/10.1002/2017EF000632>
- Reichstein M, Riede F, Frank D (2021) More floods, fires and cyclones—plan for domino effects on sustainability goals. *Nature* 592:347–349. <https://doi.org/10.1038/d41586-021-00927-x>
- Rockström J, Steffen W, Noone K, Åsa Persson F, Stuart Chapin III, Lambin EF, Lenton TM, Scheffer M, Folke C, Schellnhuber HJ, Nykvist B, de Wit CA, Hughes T, van der Leeuw S, Rodhe H, Sörlin S, Snyder PK, Costanza R, Svedin U, Falkenmark M, Karlberg L, Corell RW, Fabry VJ, Hansen J, Walker B, Liverman D, Richardson K, Crutzen P, Foley JA (2009) A safe operating space for humanity. *Nature* 462:472–475. <https://doi.org/10.1038/461472a>
- Smil V (2002) *The earth's biosphere: evolution, dynamics and change*. MIT Press, Cambridge (ISBN: 9780262692984)
- Steffen W, Richardson K, Rockström J, Schellnhuber HJ, Dube OP, Dutreuil S, Lenton TM, Lubchenco J (2020) The emergence and evolution of earth system science. *Nat Rev Earth Environ* 1:54–63. <https://doi.org/10.1038/s43017-019-0005-6>
- Thomas CD (2017) *Inheritors of the earth: how nature is thriving in an age of extinction*. Allen Lane (Penguin) and Public Affairs Books, London (ISBN: 9780241240755)
- Tilman D, Hartline N, Clark MA (2019) Saving biodiversity in the era of human-dominated ecosystems. *Biodiversity and climate change: transforming the biosphere*. Yale University Press, New Haven, pp 356–365 (ISBN: 9780300206111)
- Turner BL II, Esler KJ, Bridgewater P, Tewksbury J, Sitas N, Abrahams B, Chapin FS III, Chowdhury RR, Christie P, Diaz S, Firth P, Knapp CN, Kramer J, Leemans R, Palmer M, Pietri D, Pittman J, Sarukhán J, Mooney H (2016) Socio-environmental systems (SES) research: what have we learned and how can we use this information in future research program. *Curr Opin Environ Sustain* 19:160–168. <https://doi.org/10.1016/j.cosust.2016.04.001>
- Veerman C, Correia TP, Bastioli C, Biro B, Bouma J, Cienciala E, Emmett B, Frison EA, Grand A, Filchev L, Kriauciūnienė Z, Correia P, Pogrzeba M, Soussana J-F, Vela C, Wittkowski R (2020) Caring for soil is caring for life—ensure 75% of soils are healthy by 2030 for food, people, nature and climate. Independent expert report. European Commission Publications Office of the European Union, Luxembourg. <https://doi.org/10.2777/918775>
- Whitmee S, Haines A, Beyrer C, Boltz F, Capon AG, de Souza Dias BF, Ezech A, Frumkin H, Gong P, Head P, Horton R, Mace GM, Marten R, Myers SS, Nishtar S, Osofsky SA, Pattanayak SK, Pongsiri MJ, Romanelli C, Soucat A, Vega Jyach D (2015) Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation-Lancet Commission on Planetary Health. *Lancet* 386:1973–2028. [https://doi.org/10.1016/S0140-6736\(15\)60901-1](https://doi.org/10.1016/S0140-6736(15)60901-1)

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