



Analyses on the anthropocene from anthropology to philosophy


Bektas, Yener¹ – Bektas, Oya Esra²


Abstract:

Although there are differing views on when the Anthropocene began, the relationship between man and nature reached a critical point in history during this period. Since the beginning of the Neolithic period, the world's population has grown significantly, reaching approximately eight billion people today, with more than half of them living in metropolitan areas. The growing population and density of cities have played a significant role in increased consumption of natural resources, the decline of biological diversity, and the emergence of ecological issues. Urbanisation has resulted in infrastructure and industrial activities that continue to disrupt the natural structure of the Earth. As a result, for the first time in history, the quantity of human-made objects has exceeded all living biomass. The apparent impact of humanity on the natural environment, which is viewed as the primary driving force behind these transitions, has raised concerns about the future. The solution to the growing concerns and escalating problems lies in reimagining and reconstructing the relationship between nature and man. In this regard, it is necessary to reconsider the definition of nature. What do we mean by nature? When asked this question, many people envision forests, mountains, or lakes. What is noteworthy, however, is that individuals do not place themselves within these images of nature. So, why does humanity position itself so distinctly apart from nature? To answer this, it is necessary to closely analyse the mode of modern thinking. The modern world's way of thinking is based on a dualist perspective; everything is approached through opposites, and subject-object duality becomes more evident. Man has moved away from nature by confronting nature as an object and has begun to see himself as superior as a subject. Is this actually the case? In fact, each of us, like all life on earth, came from nature; we are its components.

Keywords:

Man, Nature, Anthropocene, Sustainability, Education

¹ Nevşehir Hacı Bektaş Veli University, Faculty of Arts and Sciences, Department of Archaeology, Nevşehir/Turkey; ynrbehtas@gmail.com; 

² Nevşehir Hacı Bektaş Veli University, Faculty of Arts and Sciences, Department of Philosophy, Nevşehir/Turkey; oyaesrabektas@gmail.com; 

Introduction

When asked what nature is, many people think of forests, mountains, or lakes. What is notable is that people do not place themselves within these images of nature. So why does humanity isolate itself from nature? To answer this question, it is necessary to examine closely the modern way of thinking. The modern world's thinking style is based on a dualistic perspective. Everything in the modern world is considered through oppositions, and this subject-object duality has become more apparent. By positioning themselves as subjects, people isolated themselves from nature and began to see themselves as superior. Is this actually the case?

Although the term „nature” is commonly used to refer to the physical or material world, it encompasses all of life, including humans, and extends from subatomic to cosmic scales. Carl Sagan said “Some part of our being knows this is where we came from. We long to return. And we can. Because the cosmos is also within us. We’re made of star stuff. We are a way for the cosmos to know itself.” (Sagan et al., 1980). A research team found that each star contained the elements carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur and mapped the prevalence of these life-building blocks in the Milky Way. According to this research, the center of the Milky Way is the richest place for these elements. But perhaps the most striking finding of the research is that these basic building blocks found in stars also make up 97 percent of our bodies (Sloan Digital Sky Survey, 2017). As it is commonly understood, each of us, like all life on earth, is a product of nature; we are its components. Humans cannot exist apart from nature. So, how did humans, who originated in nature itself, differentiate and evolve into their current form? And what kind of natural forces influenced this process? In the context of these questions, this study will approach the concept of the Anthropocene on a line from anthropology to philosophy, emphasizing that the negative relationship that humans have with nature in today's world can be corrected through education.

Changing Climate and Human Evolution

Although the Earth's surface appears to be uninterrupted, it is actually made up of a structure that moves slowly and constantly changes shape. The earth's crust changes on the surface as a result of a variety of natural events, including volcanic eruptions, landslides, and earthquakes. Plate tectonics, which is the primary cause of these changes that have altered Earth's landscape for millions of years, also has an impact on all living things on Earth by constantly changing its climate. Humans, like all living things, have experienced changing environmental conditions. Examining these changes in this context helps us better understand the emergence of humans, their biological and cultural diversity, and how they have evolved into a species that is attempting to replace

nature as the dominant environmental force on the planet today, and is, in fact, primarily responsible for the Anthropocene (DeConto, 2009; Dartnell, 2020).

Examining the earth's climate fluctuations over the last 50 million years reveals a long-term global cooling trend (Zachos et. al., 2001). It is suggested that this event, known as Cenozoic cooling, could be caused by a variety of natural factors, including earth's orbital motions, continental drift, and vertical movements (Hay et. al., 2002). It is also clear that various natural factors that occurred during this time period resulted in significant climatic changes across the African continent. This process has changed rainfall seasonality and increased drought levels, particularly in East Africa (Cane & Molnar, 2001; Feakins & deMenocal, 2010). During this process, climatic fluctuations have increased over the last five to seven million years of the earth's history. These major climatic fluctuations appear to coincide with human evolution, and a series of events such as speciation, the emergence of complex mental and social behavior, and dispersal events have occurred during this period. As a result, the genus *Homo*'s evolution, which began around three million years ago, and the adaptations that define *Homo sapiens* are linked to global climate fluctuations (Maslin et.al., 2014; Dartnell, 2020; Raia et. al., 2020; Timmermann et. al., 2022).

Throughout human history, climatic shifts have created new human species in Africa and allowed some of them to migrate to other parts of the world (Schaebitz et. al., 2021). *Homo sapiens* was one of the species that migrated from Africa and settled around the world. Although *Homo sapiens* first appeared in Africa 315,000 years ago (Hublin et. al., 2017), contemporary behaviors are thought to have evolved only 75,000 years ago (Henshilwood et. al., 2004). Environmental factors continued to influence the resourceful *Homo sapiens* who left Africa. *Homo sapiens*' migration from Africa to a wide range of environments has resulted in the emergence of population-specific traits such as skin color, lactose tolerance, and the immune system (Deng & Xu, 2017). The role of *Homo sapiens*, which was biologically and culturally influenced by climatic fluctuations, shifted dramatically during the Neolithic period, when the transition from hunter-gatherer to settled life began.

Archaeological evidence suggests that *Homo sapiens*, who had been hunter-gatherers for the majority of their existence, began to transition to agriculture only 12,000 years ago (Chu & Xu, 2023). During this period, known as the Neolithic, humans discovered that they could control the growth and reproduction of specific plants and animals. This cultural transition began to change the natural form of the planet. As more food became available, the human population, which was estimated to be eight million during the Neolithic period, began to rapidly grow (Taiz, 2013). This massive population growth in a relatively short period of time has unintentionally caused a critical turning point in the history of life on Earth. With this turning point, the Anthropocene epoch's foundations were being formed.

The Deep Intellectual Roots of the Anthropocene

The term Anthropocene refers to the Earth's exit from the current geological epoch known as the Holocene, and humans, who have become a geological force, are primarily responsible for this transition (Crutzen, 2006). Although the Anthropocene is defined in this way, there are differing views on its beginnings. According to some researchers, this epoch refers to various consequences of the Neolithic period, which marked the beginning of humanity's status as a biophysical force. Some other researchers begin the Anthropocene with the industrial revolution, which occurred at the end of the 18th century. According to another viewpoint, the observable effects of the Anthropocene have become globally visible since the end of the World War II (Ellis et. al., 2016). Regardless of when the Anthropocene began, it is clear that humanity's relationship with nature has reached a critical moment unlike that of any other time in history. During this period, population growth accelerated, resulting in increased use of natural resources, decreased biodiversity, and environmental concerns (Steffen et. al., 2015). More than half of the world's growing population now lives in cities, and the urbanisation process disrupts the natural cycle through activities such as road construction and industrialisation (Ritchie & Roser, 2019). Elhacham et al. (2020) point out that, for the first time in history, the mass of human-made objects exceeds living biomass. The crucial question at this point is whether there is a way out of this predicament, which is a result of our biological and cultural evolution.

In *Protrepticos*, Aristotle claims that, excluding random factors, the existence of some of the things that occur is due to man's planning thought and ability, whereas others are due to nature (Hutchinson & Johnson, 2017). In this time period known as the Anthropocene, such a distinction appears to have lost its meaning. It is therefore extremely difficult to find something in nature that has not been manipulated, controlled, or somehow destroyed by humans. As Hannah Arendt emphasised, mankind has been making great scientific efforts for a while to artificialise life outside the human-made world and break the last bond that includes humans among the children of nature. According to Arendt, this scientific struggle that man wages in an effort to make himself immortal is a reflection of his desire to escape from the human condition (Arendt, 1998). However, this seemingly innocent effort has caused great harm to nature and therefore to itself, and what we call nature in its natural state has become a relic of a bygone occurrence. Whatever exists in the human world that has its own resonance or has entered this world by human endeavor has become a component of the human condition (Arendt, 1998). As a result, the bond between humans and nature, far from strengthening, has been almost completely broken.

In antiquity, the Greek term „*Anthropos*”, meaning „human”, was described as a species related to the land, indicating that humans were regarded as a species among other beings in nature (Raffnsøe, 2016). If this is the case,

the narrative of the disconnection between humans and nature is, in a sense, the history of modernity, not the history of the past. As a matter of fact, in modern philosophy, in the line of thinking that goes back to Descartes and subsequently Kant, the difference between humans and nature was put at the center, and even the difference between them turned into an unbridgeable rift over time. While Kant made a distinction that is difficult to bridge between the faculties of mind as a result of this (Kant, 1974), he divided nature and human beings into two separate areas of existence on both the ontological and epistemological planes. According to him, while nature is a field that operates with mechanical laws and can only be understood within these limits, humans are included in this field on the one hand, but on the other hand, they are also included in the field of freedom (Kant, 1974). The human being who has grasped the secret of the laws of nature is the only being who can also determine his own laws. This humanist perspective is actually the legacy of the Renaissance.

In this approach, which resulted in anthropocentrism (Raffnsøe, 2016), which can now be described as a crisis, the human being, who has all the power from the functioning of nature to his own life and even the determination of the boundaries of the divine, has turned into a being that can dominate and intervene in the universe with his mind. The inevitable result of this power was the extreme destruction and exploitation of nature. When human beings are accepted as the highest goal and the measure of everything, nature, which is the basis for this idea, has devolved into a „worthless material” (Arendt, 1998, p. 212).

In this context, the modern way of thinking glorifies the human mind and causes nature to be seen as a tool that this mind will use to its fullest. The Industrial Revolution is widely seen as the culmination of this instrumentalisation. In this sense, it can be said that the theories that started the Anthropocene with the Industrial Revolution have a solid foundation.

From Humanism to Posthumanism

In the face of the belief that humans, who are responsible for the collapse of nature today, are also the sole subject of its salvation, Cohen and Duckert (2015) argue that believing that the planet belongs to us to be destroyed or protected is two distinct manifestations of the same hubris. In order to get rid of the negative consequences of this human-induced change or to minimise the negativities, awareness and a radical and rapid ontological transformation stand as a necessity for humanity. However, for this, the humanist perspective must be abandoned and replaced with a posthumanist one as soon as possible.³

³ Here, the term of posthumanism refers to a new eco-ontological and eco-political structuring that emphasises the integrity of nature, including humans, in the context of relationality, as opposed to a form of power caused by intellectual, historical, economic or cultural discourses that distinguish humans from other species.

As Cohen and Duckert underscore, humans must cease viewing themselves as the center of the world and realise that they do not have a distinct place among other species. In fact, it seems that the Copernican Revolution and Darwin's theory should be remembered once again. While Copernicus took the earth, which was seen as the center of the cosmos, and placed it where it actually is, Darwin similarly placed humans where they really are among living things (Ayala, 2010). We should now be able to present a different perspective. As Roy Scranton emphasises, if *Homo sapiens* survives the next millennium, it will live in a completely different world from the world we have known for the last 200,000 years. In order to adapt to this new world, we will need new ideas, new myths and stories, and a new conceptual understanding of reality (Scranton, 2015, p. 19).

In light of these circumstances, a posthumanist viewpoint should be taken, and existence should be treated in its entirety. If success is accomplished, nature will be understood in its organic rather than mechanical integrity, as the modern world envisions, and perhaps a chance will be provided for it to return to its original condition. In other words, unlike the mechanical design of nature, which sees nature as an inorganic entity that can be controlled in any manner, nature will be permitted to generate itself by viewing it as an organic integrity. In this context, posthumanist epistemology, despite its current ambiguous borders, might be viewed as an opportunity for nature to persist in its natural condition.

The continued existence of nature is, of course, also for the good of humans, because, after all, we are also a part of it. However, this knowledge process should not be continued with a perspective such as 'What is for the good of nature is also for the good of man'. This is an extremely pragmatic approach. This approach ultimately serves humanity by opening the door to humanism, which obviously will not offer a way out of the current situation. If an ethical framework whose boundaries are determined under the guidance of humanism is thought to be an absolute solution - and even philosophical movements that can be described as contemporary such as phenomenology and existentialism seem to have failed to overcome this - the current state of crisis will reach an even more critical point.

As a matter of fact, when an ethics based on humanism is demanded, the most that can be done for and on behalf of nature is to use natural resources in a way that is as sustainable as possible, which would mean treating nature as an instrumental value for humans rather than seeing it as a value in itself. Here, the understanding that 'Nature should continue to exist as much as possible in order to serve human existence' comes to the fore. Every action we perform as if we are acting on behalf of nature actually means committing a moral crime and realising what we have done, but still continuing on our way. Furthermore, there seems to be nothing to stop us from acting this way unless we are held accountable for it (Bradley, 2019).

A New Ethical Perspective in the Transition from Ego to Eco

In these conditions, where even the concept of sustainability is open to discussion, an ethical transformation is needed in order to solve the problems. This transformation may offer an opportunity to leave behind two elements encountered in humanist ethics: the subject-object opposition and intersubjectivity. Both elements draw on a subject-centered ethical framework and marginalise the non-human. This impasse can only be overcome with a post-humanist theory, where the process of transitioning from ego to eco must occur and an ecological ethic must be implemented.

What ecological ethics tells us is that the world, which is properly more than human, has no instrumental value arising solely from its possible uses for humanity. While this discourse points out that the natural world has an inherent value, it opens the doors to a nature that has been forgotten or perhaps never discovered by modern philosophy. Furthermore, while it helps to change the regulations required for nature's sustainability, it stresses an even more significant point.

Accordingly, environmental ethics is not only an action plan regarding the sustainability of nature but also means the ontological transformation of humans on behalf of nature by holding a mirror to themselves in the crisis that nature is facing (Bradley, 2019). Actually, while it is undeniable that there is an existential crisis at this moment, in order for this crisis to be resolved, mankind, who is primarily responsible for the crisis, must first question its own existence and responsibility.

The inquiry leads us to the conclusion that it is not possible to exit the Anthropocene unless we stay within the current conditions and take radical measures for ourselves, our environment, the world we live in, and nature. As a matter of fact, the basis of this state of crisis lies in human awareness of what self-perception is and the decision regarding how to continue their lifestyle in the context of this self-perception.

The decision in question is about the continuation of capitalism. In other words, will the continuation of capitalism be approved for the sake of individual benefit, or will there be a radical decision that it must be ended? It is apparent that as long as capitalism's economic pressures persist, nature will be unable to sustain its natural order or replace what has been lost. This is true because capitalism is not only an alienating economic order, it is also the name of an alienated ecological order (Foster, 2022).

Far from offering ecological solutions, capitalism constantly undermines these solutions for the sake of its continued existence, and even the capitalists themselves constantly state that the only solution to economic stagnation is economic growth in order to keep the system running (Foster, 2022). Through this emphasis, humanity is trying to be convinced that economic wealth is its primary need. The real tragedy here is that the continuation of

these economic conditions, far from meeting the needs of humanity, indicates the end of its life-and-death struggle.

Although there is still hope for the reversibility of this, as Naomi Klein emphasises, we will have no chance unless the logic of unruly capitalism is challenged (Klein, 2014). As a result, given the scientific techniques that have previously been proposed, taking action becomes unavoidable. Everyone should take action on their own, with the awareness that they have a direct or indirect role in this process. Every step taken is for the future and sustainability of people, nature, and indeed the world.

Conclusion

If the aim is sustainability, one of the main precautions that can be taken here is to leave modern education models behind and switch to an education model that can bring a holistic perspective. The educational model in question should offer a methodology that will allow seeing nature as an end in itself rather than a tool. In order to see nature as a goal, action must be combined with theoretical knowledge. Therefore, as Donna Haraway emphasises, we must combine knowledge about nature with interest in it and, in the third step, do something for nature. Taking on this responsibility entails not just safeguarding nature, but also developing an emotional tie with it. Haraway uses the term of kinship to emphasise this emotional bond that expresses the redrawing of boundaries between humans and other beings (Wolff et al., 2020). Haraway⁴ states that her aim is to ensure that the concept of kinship means much more than beings connected to each other through descent, and she believes that establishing kinship based on kindness will expand the imagination and change the story (Haraway, 2015). Although Haraway tries to give kinship a new context, its usage area is still limited. Therefore, in this research, the idea of relationality, which can be found in perspectives ranging from Spinoza to Schelling, Deleuze, and Guattari, is proposed as an alternative to the word kinship. As a matter of fact, relationality unites all beings in nature, without discrimination, at a shared place, without marginalising, excluding, or alienating one another. With the Anthropocene, people have begun to feel more the fact that the relationships they depend on consist of the entire planet (Raffnsøe, 2016). The relationality that can be reconstructed between the subject and the object will bring peace between people as well as between people and other existing beings (Adorno, 2005). In this sense, while relationality indicates the leaving behind of humanism, it can also be considered as a manifestation of the posthumanist perspective.

⁴ To back up this claim, Haraway cites in her article „Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin” that Marilyn Strathern taught her that relatives in British English were initially in „logical relations” and only became „family members” in the tenth century (Haraway, 2015, pp.161–162).

References

- Adorno, T.W. (2005). *Critical models: interventions and catchwords*. Columbia University Press.
- Arendt, H. (1998). *Human Condition*. The University of Chicago Press. <https://doi.org/10.7208/chicago/9780226924571.001.0001>
- Ayala, F.J. (2010). Darwin's explanation of design: From natural theology to natural selection, *Infection, Genetics and Evolution*, 10, 840–843. <https://doi.org/10.1016/j.meegid.2009.09.014>
- Bradley, D.O. (2019). The Ethics of Sustainability, Instrumental Reason, and the Goodness of Nature: From the Abstractions of Despair Back to the Things Themselves, In Lally, R. (Ed.), *Sustainability in the Anthropocene: Philosophical Essays on Renewable Technologies*, (pp. 194-197). Lexington Books.
- Cane, M.A. & Molnar, P. (2001). Closing of the Indonesian seaway as a precursor to East African aridification around 3–4 million years ago. *Nature*, 411, 157–162. <https://doi.org/10.1038/35075500>
- Chu, A.C. & Xu, R. (2023). From Neolithic Revolution to Industrialization. *Macroeconomic Dynamics*, 28(3), 699-717. <https://doi.org/10.1017/S1365100523000214>
- Cohen, J. & Duckert, L. (2015). Introduction Eleven Principles of the Elements, In Cohen, J. & Duckert, L. (Eds.), *Elemental ecocriticism: Thinking with earth, air, water, and fire*, (pp. 1-26). University of Minnesota Press.
- Crutzen, P.J. (2006). The “Anthropocene”. In Ehlers, E. & Krafft, T. (Eds.), *Earth System Science in the Anthropocene*. Springer. https://doi.org/10.1007/3-540-26590-2_3
- Dartnell, L. (2020). *Origins: How The Earth Shaped Human History*. Vintage.
- DeConto, R.M. (2009). Plate tectonics and climate change. In Gornitz, V. (Ed.), *Encyclopedia of paleoclimatology and ancient environments*, (pp.784-797). Springer. https://doi.org/10.1007/978-1-4020-4411-3_188
- Deng, L. & Xu, S. (2017). Adaptation of human skin color in various populations. *Hereditas*, 155, 1. <https://doi.org/10.1186/s41065-017-0036-2>
- Elhacham, E., Ben-Uri, L., Grozovski, J., Bar-On, Y.M. & Milo, R. (2020). Global human-made mass exceeds all living biomass. *Nature*, 588, 442–444. <https://doi.org/10.1038/s41586-020-3010-5>
- Ellis, E., Maslin, M., Boivin, N. & Bauer, A. (2016). Involve Social Scientists in Defining the Anthropocene. *Nature*, 540, 192-193. <https://www.nature.com/articles/540192a>
- Feakins, S.J. & deMenocal, P.B. (2010). Four Global and African Regional Climate during the Cenozoic. In Werdelin, L. & Sanders, W.J. (Eds.), *Cenozoic Mammals of Africa*, (pp. 45-56). University of California Press. <https://doi.org/10.1525/california/9780520257214.003.0004>

- Foster, J.B. (2022). *Capitalism in the Anthropocene: Ecological Ruin or Ecological Revolution*. Monthly Review Press.
- Haraway, D. (2015). Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin, *Environmental Humanities*, 6, 159-165. <https://doi.org/10.1215/22011919-3615934>
- Hay, W.W., Soeding, E., DeConto, R.M. & Wold, C.N. (2002). The Late Cenozoic uplift – climate paradox. *Int. J. Earth Sci.* 91, 746–774. <https://doi.org/10.1007/s00531-002-0263-1>
- Henshilwood, C.S., d’Errico, F. & Vanhaeren, M. (2004). Middle Stone Age shell beads from South Africa. *Science* 304, 404-404. <https://doi.org/10.1126/science.1095905>
- Hublin, J.J., Ben-Ncer, A., Bailey, S.E., Freidline, S.E., Neubauer, S., Skinner, M.M., Bergmann, I., Le Cabec, A., Benazzi, S., Harvati, K. & Gunz, P. (2017). New fossils from Jebel Irhoud, Morocco and the pan-African origin of Homo sapiens. *Nature*, 546, 289-292. <https://doi.org/10.1038/nature22336>
- Hutchinson, D.S. and Johnson, M.R. (2017). (Eds.) *Aristotle, Protrepticus or Exhortation to Philosophy (citations, fragments, paraphrases, and other evidence)*. DSH & MRJ.
- Kant, I. (1974). *Kritik der reinen Vernunft 1*. Shurkamp Verlag.
- Klein, N. (2014). *This Changes Everything: Capitalism vs. the Climate*. Simon and Schuster.
- Maslin, M.A., Brierley, C.M., Milner, A.M., Shultz, S., Trauth, M.H. & Wilson, K.E. (2014). East African climate pulses and early human evolution. *Quaternary Science Reviews*, 101, 1-17. <https://doi.org/10.1016/j.quascirev.2014.06.012>
- Raffnsøe, S. (2016). *Philosophy of the Anthropocene: The Human Turn*. Palgrave Macmillan. <https://doi.org/10.1057/9781137526700>
- Raia, P., Mondanaro, A., Melchionna, M., Di Febbraro, M., Diniz-Filho, J.A.F. Rangel, T.F., Holden, P.B., Carotenuto, F., Edwards, N.R., Lima-Ribeiro, M.S., Profico, A., Maiorano, L., Castiglione, S., Serio, C. & Rook, L. (2020). Past Extinctions of Homo Species Coincided with Increased Vulnerability to Climatic Change. *One Earth*, 3(4), 480-490. <https://doi.org/10.1016/j.oneear.2020.09.007>
- Ritchie, H. & Roser, M. (2019). *Urbanisation*. <https://ourworldindata.org/urbanisation> (2024.01.20)
- Sagan, C., Druyan, A. & Soter, S.B. (1980). *Cosmos TV series - Episode 1 - Shores of cosmic ocean* [Video]. Vimeo. <https://vimeo.com/284639661>
- Schaebitz, F., Asrat, A. & Lamb, H.F. Cohen, A.S., Verena Foerster, Duesing, W., Kaboth-Bahr, S., Opitz, S., Viehberg, F.A., Vogelsang, R., Dean, J., Leng, M.J., Junginger, A, Ramsey, C.B., Chapot, M.S., Deino, A., Lane, C.S., Roberts, H.M., Vidal, C., Tiedemann, R. & Trauth, M.H. (2021). Hydroclimate changes in eastern Africa over the past 200,000 years may have influenced early human dispersal. *Commun Earth Environ*, 2, 123. <https://doi.org/10.1038/s43247-021-00195-7>

- Scranton, R. (2015). *Learning to Die in the Anthropocene: Reflections on the End of a Civilization*. City Lights Publishers.
- Sloan Digital Sky Survey. (2017). *The Elements of Life Mapped Across the Milky Way by SDSS/APOGEE*. <https://press.sdss.org/the-elements-of-life-mapped-across-the-milky-way-by-sdssapogee/> (2024.01.20)
- Steffen, W., Broadgate, W., Deutsch, L., Gaffney, O. & Ludwig, C. (2015). The Trajectory of the Anthropocene: The Great Acceleration. *The Anthropocene Review*, 2, 81–98. <https://doi.org/10.1177/2053019614564785>
- Taiz, L. (2013). Agriculture, plant physiology, and human population growth: past, present, and future, *Theoretical and Experimental Plant Physiology*, 25(3), 167-181. <https://doi.org/10.1590/S2197-00252013000300001>
- Timmermann, A., Yun, K.S., Raia, P., Ruan, J., Mondanaro, A., Zeller, E., Zollikofer, C., Ponce de León, M., Lemmon, D., Willeit, M. & Ganopolski, A. (2022). Climate effects on archaic human habitats and species successions. *Nature*, 604, 495-501. <https://doi.org/10.1038/s41586-022-04600-9>
- Wolff, L-A, Skarstein, T.H. & Skarstein F. (2020). The mission of early childhood education in the Anthropocene. *Education Sciences*, 10(2), 27. <https://doi.org/10.3390/educsci10020027>
- Zachos, J.C., Pagani, M. Sloan, L., Thomas, E. & Billups, K. (2001). Trends, rhythms and aberrations in global climate 65 Ma to Present. *Science*, 292, 686–692. <https://doi.org/10.1126/science.1059412>