

Global Ethics in a Time of Crises

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Chapter 7

Developing a geo-citizenship through the global ethics of geoethics

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The Anthropocene has ended, now it's time for polycrisis.

When in 2002 Paul Crutzen (1933-2021), a Nobel Prize-winning chemist, challenged the scientific community during a meeting by asserting that humanity had become the protagonist of deep time, ushering in the Anthropocene¹, perhaps there was an illusion not only of finding a term, a concept, a strong idea that described the unavoidable history of the world, but also of encapsulating the key to unequivocally defining humanity through the products of its creative-destructive inner energy² and outlining its complex existential condition.

The term Anthropocene seems to encompass all of humanity's ability to construct worlds, shape an idea of the future, and create a new architecture within the planetary network of relationships. At the same time, this term appears to contain the capacity for catastrophic disruption of natural equilibria, destruction of biodiversity, irreversible modification of climate, ecosystems, and relationships between human communities and the physical environment³.

In this perspective, the Anthropocene would be nothing more than the reflection of a human being with an intrinsically dual nature as both builder and destroyer. But what if the

Anthropocene instead represented the interpretative paradigm of an existential schizophrenia, whose effects are manifested by the ongoing polycrisis?⁴

At the beginning of 2024, the scientific community has determined that the Anthropocene lacks stratigraphic significance⁵. Therefore, it is not possible to classify the Anthropocene as a distinct geological epoch within the deep time record⁶, following the Holocene, that is the geological epoch in which we are living. Nevertheless, a significant portion of the scientific community deems it legitimate to consider the Anthropocene as a relevant geological event in Earth's history, diachronic and diverse⁷, rather than a geological epoch distinct from the previous one according to stratigraphic criteria⁸. It is evident that the significance of the Anthropocene in these two alternative views, epoch or event⁹, is profoundly different: indeed, it is one matter to officially “record” a global temporal passage in the registry of geological time using stratigraphic criteria, it is quite another to associate the concept of the Anthropocene with a series of localized events in human history that, albeit significant, may be insignificant compared to the grandiosity of the geological processes that have occurred on a global scale. Essentially, it is as if geological history and human history cannot reconcile except through an epistemological expedient constituted by the concept of a stratigraphic event, which, however, lacks formal value in the geological time scale.

Can we then consider the Anthropocene finished as a concept for a new geological epoch? Perhaps. However, science cannot rule out the possibility that new stratigraphic evidence may emerge in the future, leading to a reconsideration of its formalization. In any case, the Anthropocene remains alive as a cultural concept¹⁰, even though it may increasingly appear as the tip of an iceberg, incapable of capturing the essence and deep causes of what it seeks to label, that is, the assertion of the human species as a geological force acting on the planet, or a

"telluric" force, to use the words of the geologist Antonio Stoppani (1824-1891), who already in the 19th century expressed the same concept with "Anthropozoic Era"¹¹.

The Anthropocene characterizes an ongoing change in the physical, chemical, and biological conditions of the habitable portion of the Earth system. It partly defines the historical contours and possible future developments, attributing responsibilities not without simplifications and historical moralism. It focuses attention on the effects of intricate, self-reinforcing phenomena. Through its usage, perhaps excessively, it exemplifies the complexity that characterizes the history of the planet.

In any case, the term Anthropocene labels a temporal interval in which the *Anthropos* is by definition an active subject, the cause of what happens even in nature, within the Earth system. However, this term does not define the *Anthropos*, the subject of action, nor does it establish its intrinsic characteristics as a "telluric" force. Some have tried to define its phenotypic profile (man, white, wealthy, from the Western world - Europe and North America), as if this represents its natural genotype. This would be *Homo telluricus*. Over time, the concept of the Anthropocene has strengthened in some scholars, if not in some societies, the idea of an ethnic-geographic guilt for the world's ills. In this perspective, the Anthropocene may appear almost genetically determined. After all, it is undeniable that the predatory and destructive attitude towards nature has characterized the actions of certain sectors of society living in a specific part of the planet (the wealthy Global North, the Western world), which for centuries have oppressed and exploited the remaining part of the Earth's population (the Global South), persisting in their actions even today. From a historical-socio-ecological perspective, the Global North, albeit with different degrees of responsibility, has polluted, depleted resources, consumed energy and materials, and developed an economic-financial model (capitalism) and a consumption pattern

(consumerism) that have sacrificed land, air, water, biological species, and indigenous populations to bring prosperity to a portion of the global population at the expense of other regions of the planet. The Western model was thus exported through colonial conquest and economic globalization¹² to assume the characteristics of a planetary status quo. In this context, although the material condition of some non-Western peoples has certainly improved, this has not occurred without generating further economic and social inequalities at the local and regional levels, or without sacrificing indigenous cultures that constituted the identity substrate of ancient human communities.

However, social and economic gradients are always unstable, precarious, and transient. The interplay between the mechanisms that have generated them and those that tend to level them out can reach a breaking point, creating conditions for disasters and crises, ideological and armed conflicts, which history is replete with in all times and places.

The Anthropocene would be the ultimate event of a spatially extensive, temporally long, and culturally complex process, appearing as the extreme result of a human evolution that travels hidden, without macroscopic evidence. The human species (*Homo sapiens*) would always have been a “geological force” (capable of altering geo-environments as well as bio-geochemical cycles of the Earth system), without distinctions of cultures and societies, due to its intrinsic disposition to modify the environment in the struggle for survival first and well-being later. Only in the last 250 years has the cumulative history of that common attitude of our species led us more rapidly to the thresholds of planetary limits, with a marked acceleration in the manifestation of the effects of manipulation of the Earth's environment after the end of World War II, starting from 1950. Therefore, it is from the industrial revolution that we would have begun to undermine or exceed the Earth system's carrying capacity, with all the progressively

observed negative consequences, leading to the critical point constituted by the "Great Acceleration" of the 20th century¹³. But in this sense, the Anthropocene, as a phenomenon generating global changes without leading to completely irreversible or even catastrophic bio-geo-chemical changes to the Earth system that is continuing to maintain in a sort of equilibrium even if unstable, would already be over, and we would have entered a time of considerable instability of the Earth system, understood as a set of physical and human-technological spheres overlapping and interconnected, characterized by multiple amalgamated crises: the time of polycrisis¹⁴.

The polycrisis encompasses ecological crises (climate change, biodiversity loss), social crises (growing inequalities), political crises (involution of representation systems and crisis of major ideologies), educational crises (questioning the methods and meaning of knowledge and educational models), cultural crises (dissolution of interpretative models of reality), health crises (increased risk of pandemics), geopolitical crises (armed conflicts and economic tensions), ethical crises (human rights contraction). The time of polycrisis delineates a space of uncertainty for human beings and encourages the emergence of the network of relationships that connect each individual to the whole that inhabits the Earth system. Ultimately, the polycrisis is an *Anthropocrisis*¹⁵, a potentially existential risk for humanity.

Defining human being

Telmo Pievani, a philosopher and evolutionist, in his preface to the volume "Geoethics: Manifesto for an Ethics of Responsibility Towards the Earth," by Peppoloni and Di Capua¹⁶, asserts: "What makes us human? This is the great question of philosophy, but also of evolution. The answer lies not only in our invasiveness. Those same dark-skinned African hunter-gatherers who hunted mammoths at the North Pole, a few millennia later in a completely different

ecological context, namely in the humid heat of the tropical Indonesian island of Sulawesi, produced refined and delightful rock art. Long before Chauvet and Lascaux in Europe, these humans like us devoted time and resources to a symbolic and aesthetic activity that served no purpose for survival. They could afford it. That is what makes us human. We are not only invasive, we are also creative. We imagine worlds in our head. We are an ambivalent species, creator and destroyer, from the very beginning”¹⁷.

Pievani would confirm the intrinsic duality of the human being, as well as the substantial homogeneity of certain socio-cultural characteristics that define our species, such as artistic creativity and invasive mobility, both adapting to new spaces and modifying them to make them more suitable for our life needs. *Homo sapiens* would thus be an adapter-modifier entity. According to Ellis et al., humans have continuously shaped their ecological niche for at least 12,000 years¹⁸. This ongoing process of demolition and construction occurs globally, albeit with varying intensities across societies and cultures. It has reached a scale where human-made mass now exceeds all living biomass¹⁹, profoundly altering the Earth's surface through extensive energy consumption²⁰. This transformation has been so significant that the planet's surface is increasingly recognized as an engineered artifact²¹, resulting in a hybridized physical environment. Therefore, despite the undeniable historical culpability of a part of the world that, through technological means, has indefinitely expanded its limited physical-biological powers, there is something that our species shares among all individuals, not only from a biological standpoint. These are characteristics that progressively amalgamate biology and culture in the incessant evolutionary flow of the human species. They are psychological, behavioral, and spiritual traits that, despite the great diversity in expressive modalities that individuals and human groups have developed over time, unite us and identify us now as terrestrial beings. They

ontologically qualify us in the substratum of social, political, and cultural superstructures through which our formal variability is shaped. *Homo sapiens* manifests in a multitude of socio-cultural forms: the diversity that distinguishes it is the creative-expressive richness of our species, a mutable characteristic in space and time. On the other hand, its essential root is that of *Homo*, a universal constant, episteme²², which possesses a peculiar unity of action that is historically realized through a specific creativity in constructing and shaping reality in material and immaterial forms. This ancestral identity challenges each individual to recognize what specifies us as human beings and thus unites us in a single terrestrial community. It is true, however, that the latest developments in modern technology are beginning to change this deep unity, contributing to the creation of new beings, hybridized human beings, potentially different from humans, or even digitizable/digitized beings. This new, post-human world seems destined to accompany or even replace the existing world, generating new forms of inequality.

In this view, the time of polycrisis appears as the inevitable breaking point, dangerous, projecting us towards a new, uncertain, unpredictable reality. Polycrisis emerges powerfully as a comprehensive crisis of the Earth system, anthropogenically caused. At its core lies the lack of a common feeling of humanity, which derives from an inability of the human being to grasp their inner identity, the uniqueness of human root. This disunity of the human being is historicized in a progressive distancing from our natural identity, towards something else still undefined. This process, mediated by technology, is reaching its climax, with the growing polycrisis, and over time, it may lead to the end of humanity.

Technology itself is evolving, in the general indifference of some or the enthusiastic approval of others, towards a self-creating entity that not only overlaps, adapting to, the ancient spheres that make up the Earth system, but also begins to possess self-awareness capabilities, as

in the case of robots²³, and will have likely self-realization capabilities as in the case of future generative artificial intelligence. If the philosopher Hans Jonas (1903-1993) warned us about technological progress without ethics of responsibility (Jonas 1979) and the philosopher Günther Anders (1902-1992) cautioned us that technology was now a subject of history²⁴, geologist Peter Haff (1944-2024) identified in the technosphere an autonomous and self-evolving organism over time²⁵. Bill Joy states on Wired that the technosphere has begun this process of self-evolution and is leading us towards conditions of gradual dependence on the replacement of our species²⁶. The war between the world of humans and the world of machines, foreshadowed by some visionary directors in various movies, from "Terminator"²⁷ to "Matrix"²⁸, seems to be inevitable.

And what if the technosphere, escaping our control, had already taken over and was leading us towards a species replacement, rendering the planet uninhabitable for humans? How do we avoid this scenario? How can we regenerate the human being? What ethical criterion, capable of tapping into the essence of the human, could help us overcome the time of polycrisis and provide us with the capacity and awareness necessary to guide the processes rather than be dominated by them?

Centuries of alterations to nature, stemming from both the natural evolution of the environment and humanity's progressive technological development, have changed the face of the world numerous times. These alterations have generated social changes, which in turn have contributed to further, new modifications of nature and its processes. However, the act of modification cannot be inherently deemed negative, as it represents an inevitable interaction between biotic and abiotic forms, between human and non-human entities. When this interaction transforms into dominance and a lack of consideration for consequences, then its effects become acts against nature that propagate within the established system of relations. Human nature itself

is affected, offended, and questioned by violent and predatory anthropogenic actions. The effect is not only a loss of local ecological quality but also a depletion of the entire ecological relationship system. In fact, the selfishness of the individual human or a group thereof results in permanent and irreversible damage to the Earth system, including the anthroposphere itself. This damage transfers from nature to the social, economic, political, educational, cultural systems²⁹, and through the changes produced therein, returns to the natural system and so on in a mechanism of actions and feedback.

If the interaction between humans and the planet maintains a balance thanks to a newfound awareness of the limits of the capacity that the systemic network of relations can bear, then the system (comprising human society and the environment) progressively evolves to progress and adapt over time, maintaining a balance within the systemic network of relations.

Without this awareness, the system changes to the detriment of its parts, eventually leading to systemic collapse. Polycrisis is thus the geo-systemic effect of persistent anthropogenic disturbance, which disregards the carrying capacity of the system that supports human existence.

If there is no awareness of the limit, ethics is absent or blind. In this case, individuals act without adherence to the inherent value dimension of their complex nature. Their actions are guided by random or distorted logics, which are dysfunctional to life and the maintenance of natural evolutionary dynamics, and which can compromise the system at the local, regional, or planetary level. In this view, ethics is not a cultural construct but a direct emanation of being, a criterion of nature to live in harmony with the whole, carefully preserving the space and time given to us, as masterfully shown by director Wim Wenders through the protagonist of the movie “Perfect Days”³⁰.

Geoethics as global ethics

Peppoloni and Di Capua stated that polycrisis is the result of an ontological-aesthetic crisis that over time has nearly completely severed the bond between humans and nature³¹. This has occurred despite the fact that we are fundamentally biocultural beings, “born into a world of social and physical ecologies, patterns, institutions, and ideologies that become inextricably entangled with our biology, even before we leave the womb”³². However, one thing is to be, another is the perception and awareness we have of it, which can shape our actions. If ethics is to illuminate action as an expression of human essence, then it must first and foremost focus on reestablishing the connection with episteme, to make the human being an authentic expression of nature and thus develop its full ontological potential. In this view, ethics is not simply formal correctness; rather, it must be an existential discipline to cultivate respect for one's own human nature. This nature is not destructive: there is no ambivalence in humanity that is not the product of a culturally determined deviation through the compulsion to repeat erroneous automatism that has been established over time within human communities increasingly perceptually detached from the natural environment and the sense of belonging to the territory.

An ethics rooted in awareness of our human existence (natural ethics) would allow us to grasp the ecological dimension of our being in the world, translating into respect for the whole, not as ephemeral ideological formalism, but as genuine adherence to our life criterion. In this view, ethics takes on the sense of self-care and care for others. It is an ethics of virtue of individual regeneration, aimed at enhancing human episteme, but it specifies also as an ethics of responsibility, in the ability to weigh the significance of actions, to consider the consequences they may have within the network of planetary relations.

Therefore, natural ethics unfolds in an expanded spatial and temporal dimension beyond the limit of individual experiences. Our re-established connection with nature makes us embrace a spatial and temporal dimension that extends beyond our sensory limits. The ethical space that shapes our actions is enlarged and extended through the participation of all in a systemic disruption felt everywhere on the planet. In this vision, sharing in planetary problems generates actions in local context with the aim of impacting the global one too to create a healthy living space.

Natural ethics is a geoethics, understood as the ethics towards the planet as a whole³³, which becomes the ideal relational practice with the Earth system, or that complex system of exchanges of matter and energy.

In fact, the same polycrisis confronts us with a spatial and temporal dimension of problems that transcends geopolitical boundaries and generations, calling for solutions that cannot be confined to mere contingent or local dimensions. Solutions to the polycrisis must be a synthesis of supranational governance, regional policies, local practices, and social and individual commitment to be developed as action within a global reference framework that helps in organizing and interpreting information and policies within an international context.

The progressive hybridization of the human being may result in a gradual reduction of the space for action guided by the ethics of nature, as it delegates solutions to pre-established, robotic mechanisms of evaluation and reaction, increasingly distancing us from the material reality of experiences and the spiritual dimension of our essence. From this perspective, it is urgent to identify the best means to regenerate the human being, re-establishing awareness of our being nature, rediscovering the meaning of our actions in our roots as creatures of nature and for nature, and cultivating that sense of self-care, not in an egoistic sense, but as a quest for what

makes us human as individuals and connects us to the rest of humanity and the planet. In fact, we are who we are because of the planet on which we live, not because of the species we are.

Without the regeneration of the human being, the polycrisis risks leading the Earth system to a sudden and irrecoverable rupture, since “everything that does not regenerate, degenerates”³⁴.

Therefore, the issue of education becomes central again, that focuses on a humanistic formation of the individual aimed at rediscovering their human essence in an ecological sense. Education should not be understood solely as professional training, as this alone would risk feeding the infinite voracity of the technosphere. Humanistic education should place the cultivation of the individual at the heart of the educational system, defining a path of authentication that values their uniqueness, enhances their sense of belonging to the human community, and directs their passions and abilities towards caring for others, other living beings, and the territory as a common dwelling place. Caring for others is a prerequisite for self-care, and vice versa. It is in this sort of circular functional egoism that humanistic education should be articulated, referring to the entire system of relationships that specify us in our individuality and humanity. In this way, we would progressively strengthen the sense of planetary community, discovering a common destiny that belongs to us not only as an animal species but also as constituent elements of planet Earth.

Such an education is based on direct, concrete experience of the relationships in which we are immersed, on understanding the complexity and necessity of systemic functioning, on identifying the processes that determine and shape reality, and on dialogue among individuals to enrich the set of observations in a process of co-creation of knowledge guided by educators³⁵. Geoethics underpins the pedagogical program of such education. Indeed, its ultimate goal is to identify the best ways to interact within the social-ecological relationship system³⁶. Its aim is not

simply to transfer reductionistic notions but rather to value cumulative culture as a means and not as an educational end in itself.

For these reasons, geoethics forms the basis of the educational path that prepares human beings for a sense of planetary citizenship³⁷, as geo-citizens, rooted in the concept of “terrestrial identity,” one of the goals of Edgar Morin's educational reform proposal³⁸, which restores the sense of living and the common destiny on this “blue marble”³⁹ lost in the universe.

Geoethics is therefore by its nature a global ethics, an ethics of the Earth, whose fundamental⁴⁰ (dignity, freedom, and responsibility) and aspirational⁴¹ (awareness, justice, respect) principles are not imposed, but rather discovered as elements of common identity, arising from a shared human feeling⁴².

Dignity is to value one's own being and what is other than oneself; it implies the sense and intrinsic necessity of the other, whether it be animal, plant, or rock.

Freedom is the existential condition by which the individual, as a human agent, is able to think, process, and choose without external constraints limiting their intellectual and operative faculties, while being aware of limits.

Responsibility is the need to consider the relationships that bind us to the whole, making our actions more aware of their consequences. The principle of responsibility supports human action within the different levels of relationships of the human being, identified in geoethics as domains of experience of the individual: the self, the social group(s) to which they belong (including those professionals), society and future generations, the environment. These levels become consecutively larger, more complex and intricate as the sphere of agency/relationship of each individual widens⁴³.

Awareness is the ability to understand the network of systemic relationships in which one is immersed and the limits that define the human operational space⁴⁴, safe and just⁴⁵, within the Earth system.

Justice is the willingness to recognize and realize the rights of individuals as an affirmation of the principle of dignity, ensuring their freedom of self-determination within and across generations.

Lastly, respect is the conscious and concrete implementation of the principle of dignity, guaranteeing the full expression of the existential potential⁴⁶ of each biotic and abiotic entity.

Geoethical thought encapsulates this vision in the definition of geoethics proposed by Peppoloni and Di Capua⁴⁷, which specifies its object of interest, delimits its scope of reference, and defines its ideal and practical objective:

Geoethics is a field of theoretical and applied ethics focused on studies related to human-Earth system nexus. Geoethics is the research and reflection on principles and values which underpin appropriate behaviours and practices, wherever human activities interact with the Earth system. Geoethics deals with ways of creating a global ethics framework for guiding individual and social human behaviours, while considering human relational domains [personal, inter-personal, societal, environment], plurality of human needs and visions, planetary boundaries and geo-ecological tipping points.

This definition encompasses the planetary dimension of geoethical thought, which aims to be a synthesis and sharing of values and visions that underpin different cultures. Geoethics is therefore based on the essence of *Homo sapiens*, on its being nature. This makes it a global ethics for the geo-citizens of the world of tomorrow.

Geoethics to go beyond the polycrisis

Geoethics embodies an ethos of entirety, acknowledging the intricate interconnectedness of our world and the complexity within it. In essence, geoethics serves as an ethical compass for navigating the complexities of our objectively intricate world.

The ethical dimension of human existence has now become planetary and globalized, necessitating the adoption of global ethics. Even the smallest human actions can have major repercussions in an interconnected global system⁴⁸. This tells us that perhaps we need global answers, for our choices therefore we need global ethics. Geoethics is a proposal of global ethics.

Geoethics establishes a unity of human action in the various relational domains. This integrity directs coherent behaviours within each of the domains, enriching human existence with meaning: the individual assumes a duty towards him/herself, towards others and progressively towards wider spheres of interaction, up to including the whole Earth system. Through this process, geoethics pushes each individual to feel and become part of the whole, in the recognition of the indissoluble uniqueness of every human being.

Perceiving oneself at the centre of oneself is not a selfish attitude, it does not imply domination towards the other from oneself, as in the traditional anthropocentric vision that has guided human development in recent centuries. It is an expression of the fullness of one's authenticity as a human being. It is a progressive awareness of our specificity of humans within a unique being, transcending one's individual perception to embrace a wider one that extends indefinitely beyond our physical-biological boundaries. This progressive awareness enlightens us about the existence of planetary boundaries that establish the maximum carrying capacity of the Earth system, beyond which the system itself can embark on a path leading to collapse, ultimately reaching new transient states of equilibrium⁴⁹. Indeed, taking into account planetary

boundaries is not simply a matter of technical-scientific concern but also a matter of general interest, as what could be fatally compromised is the habitability of the planet for our species and that of other living organisms⁵⁰. In this sense, geoethics is also an ethics of knowledge (a sort of “epistemic-moral hybrid,”⁵¹) because it requires choices based on the use of geosciences or geoscientific knowledge to better manage anthropogenic impacts on the physical environment. Geoscientific knowledge is therefore a tool within the rational, cultural, and emotional set that supports decision-making, thus better identifying those “*appropriate behaviours and practices, wherever human activities interact with the Earth system*”.

Geoethics synthesizes science and ethics into a unified framework, proposing a coherent set of scientific, social, cultural, environmental, and professional principles and values⁵². This framework aims to foster an ecological-humanistic vision in guiding the interaction between humans and the Earth system. This vision is ecological because it recognizes the essential need to respect ecosystems in all spheres of human activity. It is humanistic because it emphasizes the importance of scientific knowledge in designing practices and nurturing the best qualities of humanity - such as care, dialogue, understanding, and the pursuit of justice - as the foundation for building an equitable, more inclusive, and sustainable society.

It is naive to think that the current polycrisis can be addressed solely by using the outcomes of science and technology, as they are becoming the driving force behind a potentially dehumanized society. By perpetuating themselves for affirmation and preservation, they will progressively reduce the spaces for human involvement, concentrating them in those of hyper-technological post-human elites, of hybridized humans, eventually leading to their gradual replacement with an extra-*Homo* species.

The polycrisis, a historical moment in which civilization is threatened from within, must become an opportunity for the regeneration of humanity in an ecological-humanistic sense, lest it risk degenerating to the point of extinction (due to nuclear conflict and/or ecological collapse). This historical transition requires a profound shift in the interpretive paradigms that shape our understanding of the world in which we live. This means that everyone, with their own skills and resources, is called to reflect on the meaning of their life (in all areas of human experience), for themselves and for others.

We operate within an intricate network of relationships, both direct and indirect, which we cannot ignore if we wish to contribute to the change of a world which needs transformation. Contributing to change requires awareness, knowledge and responsibility. Without an active intention to change by individuals, we allow ourselves to be carried away by the evolution of the times. Perhaps it would be preferable to try, despite many difficulties, to somehow guide the inevitable change that will come. In this sense, younger generations seem to grasp the dangers looming on the horizon before others, which science defines through possible scenarios, increasingly demanding a change in evolutionary trajectory with greater strength and involvement. These demands appear increasingly at odds with the policies of established powers, as well as with majorities of citizens who perceive organized protests and demonstrative actions, such as those of Fridays for Future⁵³, Sunrise Movement⁵⁴, and Extinction Rebellion⁵⁵.

This is the modern “class struggle” in the Anthropocene (a struggle between geo-social classes⁵⁶), as evoked by philosopher Bruno Latour (1947-2022)⁵⁷, against an established, gerontocratic power⁵⁸ that, by its very nature, is slow to make decisions, if not downright deceptive about observable facts, and fundamentally conservative in its political, economic, social, and cultural objectives. Resistance to transformation also lies in groups/masses that are

sometimes compliant with the dominant power, at other times distracted by different sets of values, or unaware due to ignorance or apathy about the seriousness of the situations, sometimes fearful of the potential radicalness of the necessary changes, which could disrupt entrenched lifestyles.

It is undeniable that the polycrisis generates tensions that permeate all levels of planetary relations and become social conflicts (struggles between geo-social classes), geopolitical conflicts (wars), conflicts between humans and other living beings (pandemics), and between humans and machines (due to the development of a technosphere that progressively evolves beyond human control). Therefore, it is important not to focus efforts solely on the problem of climate change, if it is considered only in terms of the physical and chemical phenomena that describe it. Instead, it is imperative to also consider the philosophical, social, economic, and political issues that have determined it and that, in turn, climate change influences. In fact, limiting the problem only to the climate issue could lead to considering the use of geoengineering as the exclusive and inevitable remedy to reduce global warming⁵⁹ and conditioning local weather and climate characteristics, with effects that are still far from being evaluated, even in probabilistic terms. Conversely, the unforeseen effects of some geoengineering techniques could induce environmental changes that exacerbate social differences and intensify geopolitical conflicts.

Conclusion: The sense to live on this planet

The perspective of geoethics is universal, pluralistic, synthetic, broad, multidisciplinary and interdisciplinary, local and global, pedagogical and political⁶⁰. It is a proposal for an ethics of service to the social benefit and environmental protection, grounded in geoscientific knowledge, and considers the complexity and uncertainty of the modern world as indispensable

references for changing the ways in which human beings interact with the Earth system. Yet, many minds refuse to contemplate the complex and uncertain future that awaits us, many gazes turn elsewhere at the sight of what they do not understand, do not approve of, or ignore out of pride, fear, or ignorance. Superficial optimism shapes the world, conforming it to a nonexistent, virtual, fictitious reality. When anthropogenic climate change is denied, when the urgency to adopt policies for adapting to changing environmental conditions, and when to develop a carbon net-zero economy is overlooked, then we are also losing sight of the meaning of our daily actions within the intricate network of connections of the planetary system through which we exert actions and undergo reactions (“Caused, causing, all things in the world pursue each other, connected”⁶¹). The practice of geoethics holds the potential to foster the development of a geo-citizenship feeling rooted in the cultivation of both humanistic and ecological attitude. Implementing geoethics means embarking on the path of a genuine recognition of our biological and ontological filiation⁶².

Educating oneself about complexity and uncertainty through geoethics is a modern civic and ecological virtue that contributes to shaping a geo-citizenship, redefining the sense of being on this planet (the perception of being as connections), and translating into a geosophy of practice⁶³, into a geoaesthetics of material perception⁶⁴, and into a geophilia⁶⁵ of emotions.

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Notes

¹ “...Considering these and many other major and still growing impacts of human activities on earth and atmosphere, and at all, including global, scales, it seems to us more than appropriate to emphasize the central role of mankind in geology and ecology by proposing to use the term “anthropocene” for the current geological epoch. The impacts of current human activities will continue over long periods ...” (Crutzen and Stoermer 2000). The current geological epoch in which we are living is called the Holocene. The Holocene epoch began approximately 11,700 years ago, following the end of the last glacial period. It is characterized by relatively stable climate conditions, which have been conducive to the development of agriculture and human civilizations. The term "Anthropocene" is informally used to describe the present time interval where human activities have significantly impacted the Earth's geology and ecosystems. Recently, the International Commission on Stratigraphy (ICS) of the International Union of Geological Sciences (IUGS) has rejected the proposal to formalize the Anthropocene as Earth's new geological epoch starting around 1950 (https://www.iugs.org/files/ugd/f1fc07_ebe2e2b94c35491c8efe570cd2c5a1bf.pdf, accessed 25 June 2024). Therefore, the Holocene remains the officially recognized epoch for geologically designating the current time.

² It is a concept found in various cultural, spiritual, and scientific contexts. It is believed to be the intrinsic force that animates the human body and mind. Depending on the circumstances and intentions of the individual, it can lead to both creative and destructive results. This type of energy, driven by deep intentionality, has the potential to influence significant events and changes.

³ Steffen et al. 2007; Lewis and Maslin 2018; Bonneuil and Fressoz 2019.

⁴ Morin and Kern 1999, p.74.

⁵ Formalizing a new geological epoch involves a rigorous scientific process overseen by the International Commission on Stratigraphy (ICS) of the International Union of Geological Sciences (IUGS). Steps involved in formalizing a new geological epoch are the following: a) Identification of a significant geological boundary, such as a distinct boundary in Earth's rock layers that marks the beginning of the proposed epoch (this boundary should be globally recognizable and reflect a significant change in Earth's geological processes, often associated with a major event or series of events); b) Definition of stratigraphic markers (once a potential boundary is identified, specific stratigraphic markers are defined that can include changes in sedimentary layers, chemical signatures, fossil records, etc. that serve as indicators of the start of the new epoch); c) Gathering global evidence from around the world to support the existence and global significance of the proposed boundary and markers; d) Formal proposal, based on the evidence gathered, that is submitted to the ICS; e) Peer review and evaluation of the proposal by experts in relevant fields of geology, stratigraphy, paleontology, and related disciplines; f) Decision and formalization; g) Continued monitoring and adjustment (if necessary, adjustments may be made to refine the definition of the epoch or its boundaries based on ongoing research and discoveries). This process to formalize a new geological epoch can take years or even decades, as it requires extensive scientific evidence, consensus among experts, and adherence to strict criteria set by the ICS. Details on the scientific discussions related to the proposed formalization of the Anthropocene can be found in the scientific works that are cited in the text.

⁶ Zalasiewicz et al. 2015, 2023; Head et al. 2022a, 2022b, 2023.

⁷ Walker et al. 2023.

⁸ Edwards et al. 2022; Gibbard et al. 2022; Merritts et al. 2023; Swindles et al. 2023.

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- ⁹ Waters et al. 2022.
- ¹⁰ Allerberger and Stötter 2022; Koster et al. 2024.
- ¹¹ Stoppani 1876.
- ¹² Blaut 1989.
- ¹³ Head et al. 2021.
- ¹⁴ Morin and Kern 1999.
- ¹⁵ Peppoloni and Di Capua 2024.
- ¹⁶ Peppoloni and Di Capua 2022.
- ¹⁷ Pievani 2022.
- ¹⁸ Ellis et al. 2021.
- ¹⁹ Elhacham et al. 2020.
- ²⁰ Syvitski et al. 2020.
- ²¹ Castree 2019.
- ²² Episteme as the foundation of true knowledge about one's own being nature.
- ²³ <https://projects.research-and-innovation.ec.europa.eu/en/horizon-magazine/why-robots-are-being-trained-self-awareness> (accessed 25 June 2024).
- ²⁴ Anders 2007.
- ²⁵ Haff 2014.
- ²⁶ Joy 2000.
- ²⁷ https://en.wikipedia.org/wiki/The_Terminator (accessed 25 June 2024).
- ²⁸ https://en.wikipedia.org/wiki/The_Matrix (accessed 25 June 2024).
- ²⁹ For example, current capitalism does not take into account true human nature. Instead, it is based on a deviant understanding of human nature that disregards its intrinsic connection to

the natural world. This sick/deviant perspective views the environment merely as an infinite reservoir of resources, many of which are non-renewable. As well as the exploitation of people in production processes is the result of the failure to recognize human dignity in others.

³⁰ https://en.wikipedia.org/wiki/Perfect_Days (accessed 25 June 2024).

³¹ Peppoloni and Di Capua 2024.

³² Fuentes 2023.

³³ Peppoloni and Di Capua 2022.

³⁴ Morin 2015.

³⁵ Orion 2024.

³⁶ Peppoloni and Di Capua 2021a, 2024.

³⁷ Thompson 2001.

³⁸ Morin 2015.

³⁹ https://earthobservatory.nasa.gov/features/BlueMarble/BlueMarble_history.php

(accessed 25 June 2024).

⁴⁰ Fundamental principles are the foundations of the human being which specify what is human in its essence.

⁴¹ Aspirational principles can be defined as ideals towards which one strives.

⁴² Peppoloni and Di Capua 2020, 2023a.

⁴³ Peppoloni et al. 2019.

⁴⁴ The physical, cognitive, and social environments in which or through which humans operate.

⁴⁵ Raworth 2012; Oliver et al. 2022; Rockström et al. 2023.

⁴⁶ The inherent capacity of development of each entity, according to its nature, within their respective environments or ecosystems.

⁴⁷ Peppoloni and Di Capua 2021b, 2023a.

⁴⁸ For example, the initial person who becomes infected with a virus disease and begins to spread it to others, thereby starting an epidemic that eventually becomes a pandemic. This person, out of necessity, ignorance, or imprudence, came into contact with an animal virus, favoring the spillover.

⁴⁹ Steffen et al. 2018.

⁵⁰ Lenton et al. 2019.

⁵¹ Potthast 2015.

⁵² Peppoloni and Di Capua 2020.

⁵³ <https://fridaysforfuture.org/> (accessed 25 June 2024).

⁵⁴ <https://www.sunrisemovement.org/> (accessed 25 June 2024).

⁵⁵ <https://rebellion.global/> (accessed 25 June 2024).

⁵⁶ Schultz 2020.

⁵⁷ Manghi 2018.

⁵⁸ Berry 2012.

⁵⁹ Hamilton 2013.

⁶⁰ Peppoloni and Di Capua 2023.

⁶¹ Serres 2016.

⁶² Morin 2020.

⁶³ Bohle and Di Capua 2019.

⁶⁴ Peppoloni and Di Capua 2023b.

⁶⁵ Belardinelli and Pievani 2024.