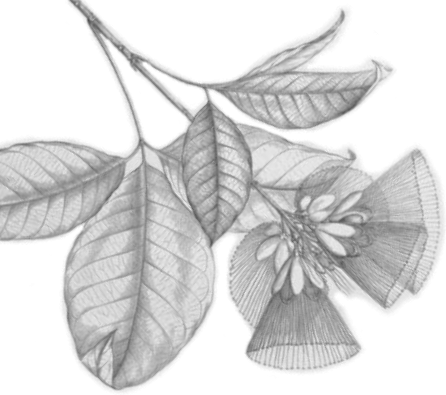

# Anthropocene in Friction. Dis-Encounters Between Geology and History

Germán Palacio Castañeda [1]
Alberto Vargas [2]
Elizabeth Hennessy [3]

**ABSTRACT**

This article brings attention to the need to introduce social sciences to the Global Environmental Change conversation in order to discuss the notion of the "Anthropocene" postulated by prominent natural scientists (Crutzen & Stoermer 2000; Crutzen 2002). The focus of analysis concentrates on and the way the local and the global are put into friction (Tsing 2005). If natural scientists have achieved to show the dangers Earth currently confronts, what is not yet clear is if they understand how human **societies, the main driver of this geological era**, work. They tend to consider humans as a specie, so they make a reductionist idea of humans as a compact unity, taking away our knowledge that teaches that they are "social" (Moore 2015). This article starts with a discussion about the apparent common understanding on the "global," by natural and social sciences. This article poses important challenges to social scientists, is critical toward the Anthropocene concept, and aspires to suggest critical thinking contributions on the global and its friction with the local. This article illustrates how, through the idea of the Anthropocene, Geology meets History in ways that are not easy to accept for social scientists because, they are right when they argue that the "anthropos" of the Anthropocene cannot be reduced to a "specie" because he/she is a socio-ecological entity.

**Keywords:** Anthropocene; Globalization; Global Environmental Change; World; Earth; Environmental History.

[1] Ph.D. in History at Florida International University, FIU, Flórida. Professor at Universidad Nacional de Colombia, UNAL, Colombia. Fulbright Visiting Researcher at University of Wisconsin-Madison, WISC, Madison. germanpalacio@hotmail.com
[2] Ph.D. in Forestry and Land Resources at University of Wisconsin-Madison, WISC, Madison. Associate Director Latin American, Caribbean and Iberian Studies Program at University of Wisconsin-Madison, WISC, Madison. avargasp@wisc.edu
[3] Ph.D. at University of North Carolina, UNC, Chapel Hill. Professor of History and Environmental Studies at University of Wisconsin-Madison, WISC, Madison. elizabeth.hennessy@wisc.edu

This article brings attention to the need to introduce social sciences to the Global Environmental Change conversation in order to discuss the notion of the "Anthropocene" postulated by prominent natural scientists (Crutzen & Stoermer 2000; Crutzen 2002). The focus of analysis concentrates on the "global," and the way the local and the global are put into friction (Tsing 2005). The reader should be prepared to understand that climate problems are not just a matter of objective scientists, but also a source of environmental prejudices and perceptions in friction where specific actors see or experience problems related to climate in very different ways.

As forecasted by natural scientists, contemporary human societies are becoming aware of severe dangers as consequences of a lack of care and abuse of the planet in which they live (Fagan 2010; IPCC 2014; McKibben 2011; Palacio Castañeda 2013). Social sciences should contribute to understand this situation and help re-address the way societies live in the new geological and climatic period. If natural scientists have achieved to show the dangers Earth currently confronts, what is not yet clear is if they understand how human **societies, the main driver of this geological era,** work. There are two reasons, one of which is self-evident: the study of human societies is not their area of expertise. There is another reason that follows as a corollary: they tend to consider humans as a specie, so they make a reductionist idea of humans as a compact unity, taking away our knowledge that teaches that they are "social (Moore 2015). Social sciences should be addessing the challenge already posed by climate change scientists, but they should also revise its premises, so the idea of the Anthropocene is also seen as, a defiance to social sciences, and knowledge regarding the humanities (Hackmann & St. Clair 2012).[4]

Many scholars and institutional scientific organizations of global scope are addressing this challenge. For example, The International Council for Science launched in 2010 "Earth System Science for Global Sustainability: The Grand Challenges" (ICSU 2010), inviting the International Social Science Council (ISSC) to participate in this initiative, acknowledging the important role of the social sciences within these challenges.[5] Our main contention is that under a similar enterprise, and common concern shared by natural and social scientists, there is still a long way to go in order to build common ground.[6]

[4] For the sake of economy, this article sometimes uses the expression "social sciences," but it includes humanities (Rose & Robin 2004; Sörlin 2012). One of the topics humanities should help to understand is narratives. Some of the dominant narratives related to climate change are, Declension, Civilization and Philanthropy. We will attempt to follow up this in another article.

[5] This list includes Future Earth, the Science and Technology Alliance for Global Sustainability, the International Council for Science (ICSU), the International Social Science Council (ISSC), the Belmont Forum, the Sustainable Development Solutions Network (SDSN), STS forum, UNESCO, UNEP, UNU, and the World Meteorological Organization.

[6] One of the difficulties is that natural scientists have construed an edifice of knowledge that usually oppose knowledge elaborated by the social sciences, and social sciences have a long tradition of constructing knowledge regardless of the

This article starts with a discussion about the apparent common understanding on the "global," by natural and social sciences. For example, those natural scientists, that postulate the idea of the Anthropocene, have been working about Global (Climate) Change, referring to the global as referring to the Earth. This article is part of the effort to understand the awkward encounter between the "Earth" and the "World," a more common expression in social sciences. This article poses important challenges to social scientists, is critical toward the Anthropocene concept, and aspires to suggest critical thinking contributions on the global and its friction with the local. Let us start by showing specifics of the irruption and popularization of the "global," contrasting different understandings coming from the social and natural sciences. In the last section, this article illustrates how, through the idea of the Anthropocene, Geology meets History in ways that are not easy to accept for social scientists because, they are right when they argue that the "anthropos" of the Anthropocene cannot be reduced to a "specie" because he/she is a socio-ecological entity.

## TALE OF TWO "GLOBALS": DIFFERENT STORIES FROM THE NATURAL AND THE SOCIAL SCIENCES

### GLOBALIZATION IS NOT EXACTLY GLOBAL (ENVIRONMENTAL) CHANGE

The social and natural sciences conflated with distinct discourses on the "Global" at the beginning of the 1990s: Globalization, on the one hand, and Global (Environmental) Change on the other.[7] However, the "global," as understood in each area, diverges in important aspects. This dual understanding of these processes has been acknowledged and studied by O'Brien and Leichenko (2000) trying to find connections between the two real processes currently happening, and what are the type of exposures people experience in real life as a result of both factors – framed as climate change and the global market. Rather than double exposures (Leichenko & O'Brien 2008), we contend that Globalization and Climate Change are not two different global processes occurring at the same time, rather that they are different types of concepts trying to understand the complexity of global change.[8]

implications of the presence of ecosystems, biodiversity, climates, tectonic plaques, micro-organisms, and so on, that are constitutive parts of the societies in which they live.

[7] Most likely, the split between these two great areas of knowledge was diminishing because developments of environmental thinking attempted to build inter-disciplines, such as environmental history, environmental economics, ecological economics, cultural ecology, political ecology, sociobiology, and environmental humanities, among other areas of knowledge.

[8] Recently, Nigel Clark (2010) has argued that the global goes to the Earth (a long view on agency), as has been proposed by climate change natural scientists, and shows the way social scientists and Western philosophers have recently postulated that the "social" is composed not just of human beings but of an array of other-than-human things, as Bruno Latour (2004), for example, has contended.

## GLOBAL (ENVIRONMENTAL) CHANGE: THE EARTH, THE ANTHROPOS, SCALES, AND TIMING

The development of a supranational environmental concern during the 1960s, institutionally expressed under the umbrella of the United Nations in 1972 in Stockholm, opened the door to the entrance of "global environmental change" discourse consolidated by the **Earth** Summit in Rio de Janeiro 20 years later. Natural scientists synchronized with the "globalization" discourse during the beginning of the 1990s. Since then, these scientists received institutional anchors reinforced by the popularization of "Globalization."

However, the meaning of the global was not exactly the same in each area of knowledge. The "global" as an object of study refers to the Earth (Clark 2010). In contrast to the economic, technologic, cultural, legal, or political areas of globalization, the global environmental frame relates to the topics familiar to natural sciences: knowledge of the planet Earth, such as the coupling of biosphere-geosphere, biogeography, evolution of species, environmental degradation and the limits of the Earth; climate change; biodiversity lost, and so on.

These two components could be unfolded from the biosphere aspect in several big ecosystems or biomes; seen by the geosphere aspect it could be unfolded as lithosphere, hydrosphere, atmosphere, or cryosphere. The recent proposal derived from climate change science is that there in fact exists a new geological component, the Anthroposphere, and that the Earth has entered into a new epoch, called the "Anthropocene" (Crutzen & Stoermer 2000).

The Earth sciences worked with technological apparatuses, ready to impress nonprofessionals, and people of the social sciences. Gregg Mitman (2018) argues that these sophisticated devises were developed in times of confronting nuclear threats during the Cold War, and to win the race to the moon. They also used models to check the global, and to express or represent complex forces such as winds, waves of heat and cold air, oceanic currents, or Earth oscillations. They developed a "*globological*" point of view in which the local and the territorial nation-state is relegated to a secondary status. The local is a derivative or secondary expression, non-constitutive of the global.

Under this framework, environmental activists made famous the idea of "think globally, act locally." Convinced, with good reason, that neither global environmental change can be managed or understood properly from the point of view of territorial states, nor from a local perspective, the local action is though as derived from the global thinking, and NGO's of global scope become key actors for environmental action (Macekura 2015).

Moving to humans, natural scientists talk about a powerful species that has astronomically enlarged its population to seven billion and is projected to increase. Social scientists consider this a

reductionist vision that forgets the complexity of human societies. The demographic argument has been dominant in the environmentalist movement led by natural scientists that have captured the public imagination since the Ehrlich (1970), *Population Bomb*, which goes back to Thomas Malthus (2007).

Because humans are socially, economically, politically and culturally organized, social scientists ask questions to which, apparently, natural scientists are not very invested: How do they live? What do they produce? How are land and water appropriated? How and when do social conflicts arise? When do these conflicts become violent? Who are the winners and losers in such social organizations? Who commands and who obeys? What are the power relations in which they live in order to know who benefits and who is to be blamed? How are they distributed over the world? How does the legal system appropriate nature or aspects of it? Are all humans at the same time in the same way, in the same quantities, producing all the chemical transformations that have led the Earth into a new geological epoch? Are they not unevenly producing gases, and how are they localized in different places? All of these questions would be relevant in order to know, when, who, where, and how these human societies got to the point of producing a geological transformation. If the Anthropocene presents all humans as a unified geological force, a species, are they not missing a key part of the problem? Globalization seems to interrogate the global in a very different way. Let us turn the gaze toward the "global" in social sciences that match better with the "world" than with the **Earth**.

## GLOBALIZATION AND SOCIAL SCIENCES: CONJUNCTURE, EXPANSION AND FATIGUE.

Social science disciplines were very aware of the importance of the "world" since long time ago, but nation states during the nineteenth century organized world space as the sum of nation-states. In turn, imperialism and capitalism as an international system provided some sense or antecedent of the "global." Only at the end of the twentieth century was this feature framed as globalization or "*mondialisation*". With the fall of the Berlin Wall, the Soviet Union dismantled and the fall of existent socialism, the international mood set a new agenda guided by the implications of the end of the Cold War. The Washington consensus, neoliberal policies, an apparent de-ideologization of the political discourse based on the belief of the triumph of Western democracy over one party systems, celebrated by some as the "end of history" (Fukuyama 2006), were part of these implications.

A spatial metaphor (Lefebvre 1991; Massey 2005) translated to markets and capitalism, technology, culture, Law, governance and so on (Sousa Santos 2002; Dauvergne 2005; Jones 2010). The expansion of the Globalization rhetoric was not that smooth. Many wondered about the benefits of globalization, and its possible downside effects and unintended consequences. Some started to worry

because globalization could lead toward a cultural homogenization and a loss of diversity, although multiculturalism and inter-culturalism substituted former discussions on class contradictions, and economic disparities. Other social topics lost part of its appeal, such as poverty, in part, because with the defeat of socialism and the beginning of the end of the welfare state by neoliberal policies vacuumed the air necessary to breathe the air of social aspirations.

Historians looked at this process and proposed that globalizations had a *longue durée* history: the beginnings are dated in different points of time and some build periodizations with different departing and rupture points starting with the European expansion during the fifteenth century. Globalization process underlines new aspects of the spatial/temporal world - compression not based on nation-states and, in fact, tended to undermine them. "Globalization" as metaphor, implied a de-ideologization of capitalist-socialist contentions that substituted a political "temperature" metaphor, the Cold War, by a spatial one: economic superiority of the market, and a weakening of the political critique of the summation of nation-states to frame the world. The words that expressed the unity of the world from a political language could be framed as "from Imperialism to Globalization," with the interlude of international organizations of the Cold War. Actually, this is not a smooth succession from one to the other. Rather, it expresses the attempt to suppress ugly political hierarchies labeled as imperialism for a more neutral, aseptic word, and the attempt to outdate an international organization, an organization that may be ineffective but is still alive.

At the end of the twentieth century, critics of globalization found some momentum. They started to consider globalization as the new face of the capitalist domination in a more intense way in a post-Fordist era and decided to criticize or oppose globalization. Some of them proposed that globalization was more an ideology than a reality. At the end of the twentieth century, a strong anti-globalization movement confronted the ministerial conference of the WTO organized to launch an epochal new round of trade negotiations in Seattle. However, September 11$^{th}$, 2001 changed the whole conversation centered between pro-cons globalization, paralleling it with a new discourse on terrorism that does not fit well with globalization, and in some sense builds a formidable obstacle to a fluid model of globalization (Palacio Castañeda & Wakild 2016). When anti-globalization protests became widespread, globalization defenders had to deal with another interpretation of the heating times of the new century: **terrorism**.

The fatigue of globalization, seen from disciplines within the social sciences, had to deal with a new global reality. The economic strength of China, in transition to a market economy led by a strong centralized state in a one-party system, shook the main players of globalization, and challenged

neoliberal economic policies which, at least in Latin America, gave trouble to the apparent benefits of globalization. Furthermore, the idea of "imperium," has brought back to the debate a new way to see the "global" under the new conditions of the end of the twentieth century (Hardt & Negri 2001). When the World Social Forum reached notoriety at the beginning of the new millennium, and little by little, social topics were back at the debate table through problems of globalization, older topics and problems recovered part of their importance. This is the case of migration from the South to the North, and most importantly, the U.S. financial crisis in 2008 opened up the discussion of the growing inequalities generated in the last three or four decades that cut the gains of the workers and widened inequalities (Piketty 2014). Globalization was losing its luster.

This article will only keep insisting on the global-local aspect and it's in between. It will also present a couple of ramifications of the same problem, particularly when periodization of the Anthropocene intersects periodization of the globalization process as understood by the social sciences. The reader could imagine this simplification of the global-local remembering a "Russian doll," with the local being the smallest, merely a replica of the biggest - the global (Carse 2014). It is also simplistic to consider humans just as a species, without considering social complexities. It tends to sub-represent the importance of humans in smaller scales than the global. This article contends that more refined discussions in social sciences have tried to explore the relationship between the global with the local and it's "in between." To simplify, other have called this "global" to capture the interaction between different scales that descend in successive steps from the global to the local, and back again. This relationship tends to highlight ideas such as this: the local is not simply a derivative expression of the global; or this: the global may be seen, wrongly, as a political imposition over the local. And this: the locals could revolt against the global. The point is that thinking globally and acting locally is not enough; thinking locally and acting globally is also possible, and important. The global point of view tends to reduce or subordinate equally important scales, including the local.

Let us put an example of how we could start from the local to face the global change and some other categories that should be considered when thinking in climates or environmental change. It has to be accomplished through "situated" perspectives in the Loglobal range, and in time.

## FROM THE LOCAL TO THE GLOBAL IN FRICTION: LIVING IN THE NEO-TROPICS

The global exists as an idea in our minds, but it is experienced "in friction" (Tsing 2005). Anna Tsing has argued that the global process cannot be put into action without friction with the local. She says: "A wheel turns because of its encounter with the surface of the road; spinning in the air it goes nowhere. Rubbing two sticks together produces heat and light; one stick alone is just a stick. In both

cases, it is friction that produces movement, action, effect" (p. 1). In some sense, this exercise could also be considered a sort of "situated" learning (Palsson 2016, p. 115–138; Lave & Wenger 1991). Tsing emphasizes that global experiences are tied to local ones. Therefore, instead of moving from the global to the local we should proceed the other way around, from the local to the global. In truth, even if it sounds awkward, we should do **Loglobalization** rather than **Glocalization.**

Let us think of a person born somewhere in the Americas. We should consider if the Equator split his/her country, if it is located in the tropics or in temperate lands. We should consider if he/she lives in the mountains, particularly in tropical countries, because the weather is strikingly different in lowlands and in highlands. The sea is normally warm when living in the tropics, particularly in the Caribbean, or on the coast of Brazil, and someone living there could possibly imagine it normal that the sea is warm all over the world.

It is possible this person has to deal with some people known as "Indians"? A name given to them because a misconception of Christopher Columbus. As a paradoxical contemporary development denomination, he/she could think that they probably are spontaneous ecologists, as some have recently represented, but people interested in climate change would agree that they are "low carbon people." (Salick & Byg 2007). This is, by now, an Anthropocene fact. Probably, this person lives with the scars of the shocking experience between Europeans, Indians, and Africans. Little by little they have learned that all humans, including "terrorists," live on a common planet, and those humans have to transform the way they conceive of rights, and relationships between humans and non-humans.

The previous is an initial example of a particular "*Loglobalization"*. Before moving forward, let us consider that this person lives in the tropics or the equatorial lands of America. Now, let us add a new environmental dimension: contrasting climate findings in the tropics and in temperate regions. Living in the Americas, even in the apparently remote Amazonia, does not impede someone to think that all humans share a common planet, or feel a bit stressed because of what human societies are doing against Mother Nature. We ask the reader to have in mind that the "glocal" is always embodied in particular lived experiences.

Consequently, when people from the neo-tropics go to temperate lands, they have to be extremely concerned with the weather. If you live in a city rather than in the countryside, you do not have to worry as much about the weather as when you live in tropical climates (with the exception of seasonal Caribbean hurricanes). For example, weather in the U.S. and Canada's Midwest have to be extremely prepared to deal with its continental climate, and its scary winters, humid summers, tornados, brutal blizzards, *Katrinas* and "Perfect Storms." They become intrigued by the need to be very vigilant

about weather through T.V., internet or other forms of media. Whether they be rich or poor, they all must brave the weather.

However, everyone, not just scientists, has noticed that every prediction is having a hard time getting it right, and as the fastest human societies change the climate, more closely they become victims of their own inventions. Weather has become a daily narrative. Just check the Weather Channel. Weather is seen as a soap opera. Weather is composed of impressive villains with strong monsters ready to flood streets, tear apart automobiles, strike buildings, eat houses, propagate fires, and devour islands. We even give hurricanes male and female familiar names. Tragedy is one of the preferred ways to see climatic events (Cronon 2002). People from the beautiful Maldives in the Indian Ocean would probably say that this is a naïve vision given that tragedy is upon them thanks to climate change. They would be right given it is their present ominous local existence.

However, to live is also to remember. When people of the tropics read about nineteenth century history, they realize something that they have heard somewhere from physicians, health workers, and older people. Some of our human fellows living in Europe invented a sort of nasty "tropics" (Palacio Castañeda 2002). It is curious that when systematic and formalized social sciences emerged during the nineteenth century, some distinguished thinkers from Europe considered it as unhealthy climates, populated by lazy people, low races, incapable of building true civilizations (Palacio Castañeda 2006). For example, Le Baron de Montesquieu (1867) is one of the great authors that is necessary when studying Law in Latin America. This great intellectual was very influential in the discussion on building political institutions and he was widely read by patriots and lawyers. Latin American Lawyers, politicians and intellectuals learned from him the idea of the tri-division of state power, legislative, executive, and judicial, as a key condition of democracy but, also they learned from him that civilization only could prosper in temperate climates, not in the tropics. For example, Simon Bolívar (1982), the great South American patriot from Venezuela read him and argued against some liberals, compelling their fellow citizens that they should not built "aerial republics," meaning that political institutions for Latin America should be aware of the climate and the populations living in these enormous territories.

In this regard, one of the contributions of the social sciences may be the idea that complex power relations intertwine knowledge (Foucault 2014). Ramifications of this thinking lead to the thesis that Europeans constructed the so-called "modern science" in times where Western Europe became the center of the world in an imperial fashion during several centuries but consolidated it and formalized it during the nineteenth century (Pachón 2008; Escobar 1998; Quijano 1999; Alimonda

2011). During this time, Europeans started to consider their scientific knowledge as universal, denigrating other types of thinking as backward. Only recently has social science coming from other localities tried to liberate such prejudice, where they are producing "de-colonized" knowledge. This de-colonization does not claim that knowledge should be completely independent from knowledge produced in Europe (or that such knowledge is not relevant) and has more recently funneled English as a sort of universal standard, but it is knowledge that is in dialogue between formerly colonized countries and minds with knowledge produced in Western Europe. Universal knowledge should be put in friction with knowledge at the regional and the local scale.

Let us examine another example: Hegel in his *Introduction to the Philosophy of History* in the "Excerpt" section, titled "Geographical bases of history," asserts that the spirit manifests itself within existing people and that this existence fits not just in time but also in space. Therefore, he continues his environmental deterministic perspective saying that natural factors exclude the possibility of the existence of the spirit, both in torrid and in frozen weathers. Consequently, the existence of the spirit is a property of the temperate North regions. World history, he writes, goes from East to West, and as Asia was the beginning of history, Europe is the end. He also mentioned that when the United States finished clearing the western forests, they probably could obtain a place in history. Hegel was implicitly condemning tropical Americans because determinant climatic reasons.

At this point, we have shown that "globalization" and "global" environmental change refers to two different type of global. Yet we are not arguing that we are experiencing the impact of two global. Rather, we are arguing that the global in practice only exists in friction with other scales, starting with the local, and going to the global.

## ANTHROPOCENE: GEOLOGY MEETS HISTORY

If natural and social scientists conflated the ideal of the "global" at the end of the twentieth century, nobody should underestimate differences coming from an apparent coincidence. We were acknowledging that we had to work as in Environmental History, Political Ecology, Ecological Economics, Ethnobotany, Cultural Ecology, and so on. Social scientists were not very happy with Socio-Biology, but it has a place with fans of biodiversity. Therefore, Geo scientists did not bring anything new to the debate, but they raise the issue in a more dramatic way: "humanity is geology." Consequently, we have to conclude: a new epoch where geology meets history. The question then is how much history is in the Anthropocene? Or, what is the climate of history? (Chakrabarty 2009).

There is no complete consensus about the starting point of the Anthropocene. One argument postulates its beginnings with the invention of agriculture, 8,000 years ago. This idea is hard to sustain

because there is neither convincing evidence that the chemical composition of the atmosphere has been substantially changed because of this reason, nor that the scale and the presence of agriculture has generated a global impact. Human discovery of fire produced important environmental transformations, as did agriculture; there must be evidence of global telluric impact. Other arguments seem more convincing in terms of the impact and of the global scale. This meets with the origin of global capitalism.

Therefore, another hypothesis looks more reliable. The second relates to the beginning of capitalism somewhere between 1450 and the industrial revolution (Moore 2015). Therefore, in this case, the history of globalization of human society in nature is key to understanding the Anthropocene as more than a corrosive and damaging expansion of the human species.

Other experts synchronize it one hundred years after the European industrial revolution at the end of nineteenth century with the huge use of fossil fuels. (Lewis & Maslin 2015, p. 171–180). When talking about globalization, from the social science point of view, late nineteenth century is the time when capitalism advanced under a fierce French-British Imperial competition, challenged by newcomers: Germany, Russia, Japan, and the United States. This is a time of industrial mechanization, massive use of carbon and oil, and great urbanization of the United States. This was also the beginning of industrialization of the agricultural production, the age of guano and the opening of the Pacific world (Cushman 2013); U.S. expansion on the West, and the invention of "wilderness." It is the time of expansion of the global market as well, linking Latin America to markets in Europe and the U.S. with raw materials and commodities. This general picture requires detail and precision but it serves as an outline. Such would be the meaning of this "Anthropos," if one dates the Anthropocene to the end of the nineteenth century, this is to say, when specific human beings were living in a certain mode of political economy in a world scale, better expressed as a **capitalist-world ecology** (Moore 2015).

The fourth hypothesis is one aligned with stratigraphers (Autin & Holbrook 2012). Until the end of 2015, the scientific community had not officially accepted the term.[9] Palsson (2016) says that geologists debated if the term "would meet their strict protocols, (and) how to detect the relevant signatures in the geological record." (p. 174). Soon, beginning in 2016, this situation changed. *Future Earth* posted in January 6, 2016 the following news: "Are we in the Anthropocene?" The answer is: "A new analysis from members of the Anthropocene Working Group concludes the Anthropocene exists, it's an 'epoch' and began about 1950." It continues: "A major review of the evidence supporting the proposal that Earth has left the Holocene is published in *Science* today by 24 members of the

[9] Some of them considered that it is, just "pop culture." (Autin & Holbrook 2012).

Anthropocene Working Group. The group was set up by the International Commission on Stratigraphy, which makes decisions on these types of things." They conclude: "The scientists, many from the global environmental change programs, reviewed evidence from sediment and ice cores for biological and climatic signatures of human activity. They concluded that Earth has indeed left the Holocene and entered the Anthropocene, and that this should be designated an 'epoch.'"

To date the Anthropocene around 1950 is exactly a point where the mixture of the industrial-military complex was identified in the United States, also known as the "The Great Acceleration" of the post-World War II. Environmental historian, Gregg Mitman (2018) pointed out that the dropping of the atomic bomb, and the end of the Cold War was key to understand this Great Acceleration. Despite not knowing exactly when the Anthropocene started, Mittman has asserted that it is possible to know when this discourse started and became widespread. This was a time, he says, when Geosciences would competitively displace ecology in the scramble for who claimed "the environment" as its subject.

The Anthropocene is an object constituted through the Cold War nuclear arms race, which yielded unprecedented funding for the Earth sciences, and enabled, as Joseph Masco (2013) argues, "new public fears and visions of planetary threat." Rupture and apocalypse, in addition to the hubris of geoengineering were built into the scientific apparatus of the national security state. He adds, "The drastic increase of Cold War American military funding for the earth sciences greatly benefited fields such as oceanography, atmospheric science, terrestrial magnetism, and ionospheric studies. During the Cold War, the Earth sciences were second only to physics in levels of support." The Cold War, then, produced the scientific infrastructure, data, and research that would ultimately provide, as Paul Edwards (2006) and others have argued, the evidence for climate change. Masco (2013) expresses this history: "the first years of the Cold War were a period in which the global biosphere was quite literally militarized by the U.S. nuclear state, but it was also positioned as an object of scientific research." Following this idea, instead of Capitalocene, maybe the proper name would be *Capitwarcene*, the fusion of expansive capitalism with sophisticated war machines and the Earth/world in flames.

## CONCLUDING NOTES

**Talking of Two Globals**: This article has pointed out the importance of the "global" in the process of confluence between the natural and the social sciences. However, it also has shown how these apparent convergences could cloud important differences that lead to misunderstanding and confusion. In addition, we have explored the connection between the global and the local, because the global is better understood in friction with the local. Visions that are not aware of a wide variety of frictions are very problematic. They are not able to understand how some specific, eco-socially

organized, humans have become main drivers of climate change. Some of them, for example, are victims rather than victimizers. Not all humans play the same role. This is the case, for example, of "low carbon people" and people from non-industrialized countries. This is a call for a research agenda to better understand eco-societies living during an epoch of dramatic environmental change.

**Geoengineering, The United Nations and environmental democracy**: After the Copenhagen meeting in 2009, climate researchers and environmental movements were in despair because before the evidence, powerful institutions composed by nation-states were not able to acknowledge the climate change problem and act accordingly. Lack of consensus about findings, and lack of determination from powerful actors on how to proceed, were driving the mood of important people and scientists toward geo-engineering. Even respected scientists were moving in that direction, including Paul Krutzen (Hamilton 2013). Before this catastrophic situation, the desperation was leading toward the idea that someone should fix it. Ff nation-states are not able to do it, billionaires, such as Bill Gates, Michael Bloomberg, or Richard Branson and others, will try to do it through geo-engineering (Klein 2015). Following a deep trend rooted in modern science and technology, geo-engineering became a possible and sound answer for some people. Engineering the globe, and even, the climate of the Earth. This is exactly the mixing of science and authoritarianism under the philanthropic flag of saving the planet, or humanity (Klein 2012). It is an imperial, global-centric, and scary perspective. The "Earthmasters" (Hamilton 2013; Morton 2015) follow a long modern tradition of controlling the world by technical means.

Globalization discourses have tended to underestimate nation-states. However, they have not died yet, and in the COP 21 in Paris, 2015, some consensus was built to come back again to optimism based precisely in agreements of nation-states. Nobody can be completely sure that this is going to be an easy solution. Just think in one of the decisive actors: The United States. Despite commitment of this current President,[10] nobody would assure that a Republican led majority will approve these agreements. Global environmental justice and democracy is an even longer path to walk. Low carbon people should not pay, or be responsible for cleaning the mess.

**Who is the Anthropos of the Anthropocene?** If natural scientists can claim all the merits for calling our attention to a crucial problem humans are facing, and bringing to the fore the need to change the path to disaster, it is not so sure that they have clear idea of what they are talking about when they discuss human societies. The Anthropos of the Anthropocene cannot be accurately defined as an undifferentiated 7 billion people. (Palson et. al.) At this point, the social sciences and humanities

[10] This article was originally written during the Obama administration. Now, that D. Trump is the President, the U.S. is out of the agreement.

have to take the post to contribute to think about the Anthropos thrown through the academic debate by the natural sciences.

Social science problems are not simply a matter of data and precision but a matter of interpretation. Today, this is also true for science in general. Environmental or climate justice is a very contentious matter if one wants to fix the problem, or if one has to figure out responsibilities (Forero 2010). In addition, climate change is not only a synchronic problem of 2016, but is a historic problem of how the Earth became what it is today. If the Anthropocene concept does capture humans as a global species, it does not capture how humans live, organize, and distribute all over the world in the past and how they changed themselves and the Earth/world, it is shortsighted. This is the reason why it is not enough to know the global number of humans living in the world, but also how they differentially live at different scales and in different time periods. While climate change seems very real, the Anthropocene seems powerfully misleading.

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## Antropoceno em Fricção: Incompatibilidade entre Geologia e História

**RESUMO**

Este artigo chama a atenção para a necessidade de introduzir "ciências sociais" na conversa sobre Mudança Ambiental Global com o propósito de discutir a noção de "Antropoceno", como postulado por notáveis cientistas naturais (Crutzen & Stoermer 2000; Crutzen 2002). O foco dessa análise está no modo como o local e o global são colocados em atrito (Tsing, 2005). Se as ciências naturais conseguiram mostrar os perigos que a Terra está enfrentando atualmente, o que ainda não está claro é se eles entendem como as sociedades humanas (o motor principal desta era geológica) operam. Eles tendem a considerar os humanos como uma espécie, então eles redutivamente concebem o humano e o privam de seu caráter social (Moore 2015). Este artigo começa com uma discussão sobre o aparente entendimento comum em torno do global a partir de ciências naturais e ciências sociais. Propõe desafios importantes para as ciências sociais, critica o conceito de Antropoceno e pretende sugerir contribuições críticas para a forma como o global interage com o local. Através da ideia do Antropoceno, a Geologia encontra a História de maneiras que não são aceitáveis para as ciências sociais

e argumenta que o Antropoceno "anthropos" não pode ser reduzido a uma "espécie" porque é uma entidade socio-ecológica.

**Palavras-Chave:** Antropoceno; Globalização; Mudança Global; Mundo; Terra; História Ambiental.

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